

Handbook of Research on

Accounting and Financial Studies

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**Luís Farinha, Ana Baltazar Cruz,
and João Renato Sebastião**



Handbook of Research on Accounting and Financial Studies

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The literature on accounting, business, and finance, as a sub-area of the sciences of administration and management, has been receiving strong attention from researchers since the 1950s. This study's main goal is to evaluate the nature and course of development of the literature on these research areas. A bibliometric analysis on the top journals published on the Web of Science and on the Scopus databases is conducted. Results synthesize the conceptual framework related to this area of science, identifying the roots of its intellectual structure, which give life to the respective tree of knowledge. New paths for future research are outlined.

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Carlos A. F. Sampaio, Polytechnic Institute of Castelo Branco, Portugal & NECE Research Center in Business Sciences, University of Beira Interior, Portugal

This study aims to analyse the present state of fair value accounting research. A search on the Web of Science database was conducted. Article type documents containing “fair value” and “accounting” in the title were searched, and results returned 34 documents. A systematic literature approach was used to evaluate the articles. Results indicate that the banking sector is the main source of data for fair value accounting research. On the other hand, the adoption of fair value accounting seems to produce different results according to the type of industry sample used, the temporal context of the study, financial turmoil, or the evaluated assets and liabilities.

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Using Strategic Management Accounting Practices to Measure and Manage Intellectual Capital:

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The main purpose of this chapter is to examine the role of management accounting to measure and manage intellectual capital (IC), and more specifically to explore the potential role of strategic management accounting (SMA) in this process. In addition, this chapter is intended to link SMA practices and some IC resources. SMA practices enable the identification, measurement, and management of IC resources such as production processes and innovation capacity (e.g., target costing), quality management (e.g., quality costing), knowledge-based resources related to the organization's external relationships (e.g., attribute costing, value chain costing, and target costing), and brand image (e.g., brand valuation/management). SMA practices, given its external orientation, enable, mainly, the identification and management of resources encompassed in relational capital. Therefore, this chapter contributes to the extant literature regarding the measurement and management of IC, highlighting the role of SMA, and provides some suggestions for further research.

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The Perception of Portuguese Accountants on the Impact of the Implementation of E-Accounting

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The researchers proceed with a quantitative approach resulting from a questionnaire addressed to Portuguese accountants in order to know their perceptions on the impact of adopting e-accounting to understand if they perceive it as a threat or as an opportunity for this profession. The authors found that respondents mostly believe that the level of dependency between accounting and taxation is medium, but that will sharply increase with the introduction of the e-accounting. The researchers found that most accountants perceive the implementation of e-accounting as a mix between problem and opportunity, whose main obstacle to implementation is, from the respondents' perspective, the inability of clients and employers to collaborate with this process. Additionally, data suggest that professional experience of the accountants, the development of the activity in accounting office or by other form, and finally, being certified accountants or accounting technicians are variables with impact on respondents' perceptions in this context.

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This chapter aims to analyze the importance of financial theories for SME capital structure decisions. The financial theories considered for this study were trade-off theory and pecking order theory. From

the various empirical evidences researched in the Web of Science and Scopus database, it was found that most SME capital structure decisions follow the financial theory of hierarchical hierarchy, that is, the SME finance their investment opportunities through retained earnings, debt issuance, and finally stock issuance.

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In finance it is crucial to understand the risk of occurrence of extreme events such as currency crises or stock market crashes. It is important to model the distribution of extreme events. Extreme value theory is known to accurately estimate quantiles and tail probabilities of financial asset returns. These kinds of data are usual related to heavy tailed distributions, where a relevant parameter is the tail index. Fitting data to heavy tail distributions usually assumes independent observations. However, the most usual real market scenario describes clusters of extreme events rather than isolated records over some period of time. In that case, estimating tail probabilities includes estimating the extremal index. This chapter describes the usual extremal index estimators based in different approaches and illustrates their values for a real financial data set. Computations are provided by the use of suitable R packages.

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| <i>Rekha Pillai, Emirates Aviation University, UAE</i> | |
| <i>Mohammad S. AlShiab, Higher Colleges of Technology, UAE</i> | |

The purpose of this chapter is to examine the impact of microeconomic factors and the global financial crisis (GFC) on stock prices in the Middle East and North Africa (MENA) region. The study employs panel data techniques covering a sample of 277 firms listed in seven MENA countries for the period 2000-2015. The empirical model consists of eight microeconomic (firm-specific) variables and a dummy variable to capture the impact of global financial crisis. The results suggest that microeconomic factors play a vital role in determining stock prices in the MENA region. More specifically, factors such as return on equity, book value per share, dividend per share, earnings per share, and price-earnings ratio positively influence stock prices, while dividend yield and gearing have negative impact on stock prices. In addition, firm size posits a positive and statistically significant relationship with stock prices. However, the GFC seems to be insignificant determinant of stock prices in the case of MENA countries in the sample studied. This chapter provides several practical implications.

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Corporate Governance and Business Performance

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Innovation is a key factor for firms' competitive advantage in the long-term and for their financial success. Scholars highlight the underinvestment problem with respect of R&D investment. This chapter focuses on two relevant variables of corporate governance that influence firms' innovation performance: firm ownership and board of directors. In the first section, the effect of ownership structure on R&D investment is analyzed. More specifically, the chapter will illustrate the effects of family ownership and institutional ownership on innovation investments. The second section explores the main theoretical perspectives investigating the functions of board of directors and the main board tasks. Lastly, three attributes of board structure and their effect on R&D investments are explored.

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Chee Yoong Liew, UCSI University, Malaysia

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This chapter analyses the relationship between related party transactions (RPT) and firm value and whether independent directors' tenure (IDT) strengthens or weakens this relationship. Further, it examines ownership concentration's role on this moderating effect of IDT in Malaysian family and non-family corporations. It is found that that IDT weakens the relationship between RPT and firm value. However, ownership concentration strengthens this moderating effect of IDT. Interestingly, family corporations are more likely to show a stronger impact of ownership concentration which we allude to concerns of maintaining reputation. The research results remain after controlling for technology corporations. The findings' have important implications for policy makers, practitioners and regulators, especially in emerging economies globally. Keywords: Agency Conflict, Corporate Financial Valuation, Independent Directors' Term in the Office, Corporate Governance, Family Corporations, Emerging Markets

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This study examines the corporate governance mechanisms and how they affect firm performance in Malaysia. After the financial crisis in 1997/98, the CG issues have been the most debated, discussed, and researched in the attempt to improve the CG structure accommodating every economy regardless of the economic landscapes. Using a rich and huge data on Malaysian firms for 16 observation years, this study found that the MCCG has been of a closely referred blueprint by firms in Malaysia to improve firms' performance. Certain CG mechanisms do have significant impact on firm performance. Firms seem to operate in a large board size indicating a positive relationship with performance and board independence. CEO duality is negatively related, in support of separation of roles, complementing the result of board independence and ownership structure as positively related to performance. Agency theory seems to be the dominant theory influencing the CG structure of firms in Malaysia.

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This study analyzes the zero-leverage phenomenon in a sample of European listed firms for the period 2001-2016, with a focus on the role played by the corporate governance mechanisms on the explanation of the phenomenon. Considering a set of internal and external corporate governance variables, it is rejected that firms with poor internal mechanisms of corporate governance have a greater propensity to adopt zero-leverage policies. Nonetheless, a great ownership concentration—measure for external corporate governance mechanisms—decreases the firm’s propensity to be debt-free, indicating that the presence of large shareholders reduces managers’ opportunistic actions. Results that partially validate that zero-leverage policies are driven by entrenched managers avoiding the disciplinary power of debt, especially in the presence of small shareholders without incentives and power to control managers’ actions. Additionally, zero-leverage firms seem to substitute debt by internal sources of liquidity. Results are robust to different zero-leverage classifications and econometric methods.

Chapter 12

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This chapter analyzes 30 variables of the boards of directors (BDs) and oversight boards (OBs) of 325 Brazilian companies from 2011 to 2015, including examination of 19,487 resúms of their members. With support from factor analysis, the authors performed empirical tests considering the relations between the underlying factors of BDs and the properties of Brazilian accounting numbers, controlling for ownership structure, differences in corporate governance levels, issuance of ADRs, type of auditor, presence of an OB, size, and leverage. Factors like age, board interlocking, and variable compensation arrangements are the main characteristics associated with the variations in the accounting information properties of the firms analyzed. On the other hand, characteristics such as gender diversity, existence of a controlling shareholder chairing the board, board independence, and other characteristics considered relevant in the international literature tended to lose strength when the spectrum of variables analyzed increased.

Chapter 13

Measuring Firms’ Financial Constraints: A Rough Guide to Unlisted SMEs 276

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Measuring firms' financial constraints can prove to be a difficult task for researchers because it is not possible to directly observe whether a firm is financially constrained. This chapter surveys the existing methodologies to measure such constraints at firm level, discussing the advantages and disadvantages of each one. In doing so, firstly, the authors review the direct and indirect measures of firms' financial constraints. Then they test the validity of the most commonly used indices using a large panel of (unlisted) Portuguese firms (2010-2017). The FCP index seems to outperform the other indices in capturing financial constraints of unlisted SMEs. This is not a surprising result, as most of the existing empirical literature on the field deals with listed (US) firms. It is not reasonable to expect that the coefficients of indices remain unchanged across countries and over time. Therefore, the authors propose their (re)estimation to apply them to different economies.

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Creative Accounting, Accrual Manipulation, Fraud, and Social Responsibility

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A Critical Look at Social Reporting Evolution: Social Case in Its Future? 300
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This study analyzes the evolution of social reporting. After reviewing the literature on this topic and the main initiatives, reports, and standards, three stages can be distinguished: early moments, middle course, and current situation. All these stages have a coinciding concern that is accountability, but a very different way of putting it into practice. As the main conclusion, accountability continues to be the main objective of social reporting because companies understand the need to attend to stakeholders' demands in line with the stakeholder theory. However, voluntariness seems to give way to a regulatory horizon that allows the information received by these groups to be more relevant and reliable according to Directive 2014/95/EU for Non-Financial Information as a benchmark example of the social case in an international sphere. This contribution can help accounting regulators to address the immediate future of social reporting because understanding the past is a key to approaching the future.

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Corporate Social Responsibility Reporting in the Gambling Industry: Interaction With Government..... 321

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The social cost of the gambling industry has always been controversial. In 2015, the Macau Special Administrative Region (SAR) government initiated a midterm review to evaluate the overall performance of the gambling industry. The objective of the study was to investigate how does the government influence and guide the operators to control their social cost and create value to society. This study applied content analysis and collected data from annual reports, sustainability/social reports, and corporate websites of all gambling operators in Macau from 2005 to 2016. The results were further analyzed by looking into the critical policy documents released and issues occurred during the period. The result indicated that the gambling operators have used CSR reporting as a communication channel with the government, which is consistent with legitimacy theory and stakeholder theory. In addition, most of the companies

have reinforced their disclosure related to government policies after the midterm review report. This finding also reflects some insights of the political economy theory.

Chapter 16

Earnings Management and Fraud: A Theoretical Background and Discussion 343

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The purpose of the chapter is to provide a rounded discussion of the concept of earnings management and theories underpinning this behavior. The chapter presents an overview of the concept, with a discussion of alternative definitions and the theories related to this behavior, including the commonly discussed agency theory as well as some less-researched theories such as socioemotional wealth theory and upper echelons theory. The chapter also presents incentives that can lead to this behavior and evidence in the academic literature, followed by some examples in developed and developing countries of earnings management that spilled into fraud. The chapter concludes with a summary and some potential extensions to the academic literature.

Chapter 17

Externally Financed Growth and Quality Accounting Information: Evidence From Brazil 365

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Brazil & Federal University of Paraíba, Brazil

This study investigates the association between quality accounting information (QAI) and externally financed growth (EFG), taking a sample of 214 firms in Brazilian stock exchange from 1998 to 2015. EFG is estimated from the sales percentage approach to financial planning. QAI is estimated according to the accruals quality model proposed by Dechow and Dichev and modified by McNichols. The hypothesis that signaling efficient accounting information marginally influences and positively EFG is tested by multiple linear regression with estimation by OLS and could not be rejected. It is inferred that QAI is a significant attribute in contributing to the firm's access to the external financing channel. This study broadens the discussions about the themes in the Brazilian scenario, shedding light on the importance of the practice of the dissemination of quality information for the growth of firms in the Brazilian context.

Chapter 18

Benford Law and Earnings Analysis: International Comparison 381

Radiah Othman, Massey University, New Zealand

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The literature suggests that firms are actively managing the smoothing of their reported positive net incomes. The observed frequency of second digits abnormally exceeds the level predicted by Benford's Law, which results in a higher frequency of the number zero and an abnormally low occurrence of the number nine in the second digit of the reported income numbers. A reversal pattern occurs for reported net losses. This phenomenon is typically peculiar to countries with weak governance and firms under pressure to meet analysts' expectations. This chapter examines 10 years of reported net incomes by 5,040 firms (44,636 firm-years) in 10 countries ranked as having the best corporate governance quality. The analysis reveals that firms in these countries were not spared from opportunistically rounding their earning numbers. In fact, this rounding behavior is more prevalent when net losses were reported and this rounding phenomenon co-varied with some institutional factors; in particular, the rule of law and government effectiveness has significantly influenced the rounding behavior.

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Preface

In the editorial entitled “50 years of Accounting and Business Research” published in the *Journal Accounting and Business Research*, Clatworthy et al. (2020) argues that the last fifty years have been a dynamic and vibrant period for research in the area of accounting and finance, showing strong interaction between the accounting and business areas over that time, across a wide variety of approaches and perspectives of research.

In the study entitled “The Cost of Capital, Corporation Finance and Theory of Investment,” Modigliani and Miller (1958) launch the central question that arises at the time is what is the “cost of capital” for a company in a world where funds are used to acquire assets whose yields are uncertain and in which capital can be obtained by many different means, such as pure debt instruments, or pure equity. According to the authors, this issue afflicted specialists in corporate finance concerned with the techniques of financing firms, in order to guarantee their survival and growth; managerial economists concerned with the capital budget; and economic theorists, concerned with explaining the behavior of investment at the micro and macro levels.

In another perspective, Cornell and Shapiro (1987) argues that transaction costs in negotiating, contracting, coordination, implementation and enforcement of rights and obligations associated with a set of contracts can be reduced by creating a company that operates with an intermediary between the consumer and the input suppliers. Williamson (1988) comes to defend in his study entitled “Corporate Finance and Corporate Governance,” that debt and equity are treated not mainly as alternative financial instruments, but as alternative governance structures. The author also explores a project financing approach, arguing that whether a project should be financed by debt or equity depends mainly on the characteristics of the assets under analysis. Transaction cost reasoning supports the use of debt to finance redistributable assets, while non-redistributable assets are financed by equity.

Based on Schumpeter’s view, King and Levine (1993) argue in their study entitled “Finance and Growth: Schumpeter Might Be Right” that the financial system can promote economic growth, claiming that several measures of the level of financial development are strongly associated with real GDP growth per capita, the rate of accumulation of physical capital and improvements in the efficiency with which economies employ physical capital.

Graham and Harvey (2001) argue in the study entitled “The Theory and Practice of Corporate Finance: Evidence From the Field” that large companies rely heavily on present value techniques and the capital asset pricing model, while small companies are relatively likely to use the return criterion. In general companies are concerned about the financial flexibility and credit ratings to issue debt and dilution of earnings per share and recent appreciation of the price of the shares to issue shares. However, there is

little evidence that executives are concerned with asset replacement, asymmetric information, transaction costs, free cash flows or personal taxes.

Another perspective of linking accounting and finance to the performance of the entrepreneurial initiative is brought to us by Mueller and Thomas (2001). On the one hand, potential entrepreneurs must be psychologically equipped to face the challenges of a global competitive market, on the other hand, business education can play an important role for success, providing not only the technical tools (i.e. accounting, marketing, finance, etc.), but also helping to reorient individuals towards self-confidence, independent action, creativity and flexible thinking.

Carpenter and Petersen (2002) argues that the growth of small businesses is usually limited by the amount of internal finance. They add that when funding constraints are binding, an additional domestic finance currency unit should generate slightly more than an additional asset growth monetary unit. Thus, the availability of domestic financing can be important for innovation runs and the technological alliance. In this assumption, the weight of internal finances can be seen as a restriction on the company's activity, which is why it is important to support the development of models of the company's strategic behavior.

Orlitzky et al. (2003) advocates a new theoretical current that studies the relationship between corporate social and environmental performance, with corporate financial performance, bringing social and financial perspectives closer to reaching new levels of efficiency and effectiveness. Allen et al. (2005) defend the importance of a strong link between the legal, institutional, financial and growth areas. On the other hand, the imbalance between these three sectors suggests that alternative financing channels and governance mechanisms can be severely affected, including the institutional reputation itself.

According to Wackernagel et al. (2008), another more recent trend is that there is a growing consensus among natural and social scientists that sustainability depends on the maintenance of natural capital, making it essential to develop an accounting structure that tracks the production of energy and resources in national economies and translate them into biologically productive areas.

According to Brown et al. (2009), R&D financing provides a potentially important channel to link finance and economic growth. However, companies sometimes finance R&D from volatile sources: cash flow and equity issues. In the case of young high-tech companies, there is a great impact in terms of the effects of cash flow and external equity, with a strong connection between finance, innovation and growth.

Another trend that quickly became widespread is crowdfunding. Crowdfunding allows founders of for-profit, artistic and cultural start-ups to finance their projects, using relatively small contributions from a relatively large number of people using the Internet, without standard financial intermediaries (Mollick, 2014).

The *Handbook of Research on Accounting and Financial Studies* contains 18 chapters, organized into three sections. The first section, called "New Trends in Business Accounting and Finance," comprises seven chapters.

Chapter 1, entitled "Flipping the Best Journals in Accounting, Business, and Finance: What Fruits Do We Collect?" assumes itself as a hat article in this collection of chapters, analyzing the conceptual and intellectual structure of the higher quality articles published in Accounting, business and Finance areas in the WoS and Scopus databases, through a bibliometric review. The conclusions point to the highlight of a cluster (Finance), which proves the interconnectivity between the intellectual dimensions "Industry productivity", "Sustained competitive advantage", "Business models and innovation", "Learning and innovation", "Statistical analysis" and "Social practices", instead of a reducing view of itself, extended to the areas of accounting and finance.

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Chapter 2, entitled “Fair Value Accounting: A Systematic Literature Review,” aims to analyze the current state of accounting research at fair value, based on a survey in the Web of Science database. The results indicate that the banking sector is the main source of data for fair value accounting research.

Chapter 3, entitled “Using Strategic Management Accounting Practices to Measure and Manage Intellectual Capital: A Proposal,” aims to examine the role of management accounting to measure and manage intellectual capital (IC) and, more specifically, to explore the potential role of strategic management accounting (SMA) in this process. It also aims to link SMA practices and some IC resources. SMA practices allow the identification, measurement and management of IC resources, such as production processes and innovation capacity, quality management, knowledge-based resources related to the organization’s external relations and brand image. On the other hand, SMA practices allow the identification and management of resources covered by relational capital.

Through a quantitative approach, Chapter 4, entitled “The Perception of Portuguese Accountants on the Impacts of the Implementation of E-Accounting With SAFT-PT,” through the application of a survey addressed to Portuguese accountants, aims to know their perceptions about the impact of the adoption of electronic accounting in the accountant profession. The study revealed that respondents believe that the level of dependence between accounting and taxation is medium, but that it will increase markedly with the introduction of electronic accounting. In addition, they highlight some inability of customers and employers to collaborate with this process.

Chapter 5, entitled “The Importance of Financial Theories for SME Capital Structure Decisions,” aims to analyze the importance of financial theories for capital structure decisions for SMEs. The authors found that most capital structure decisions for SMEs follow the financial theory of hierarchical hierarchy, that is, SMEs finance their investment opportunities through retained earnings, debt issuance and, finally, share issuance.

Chapter 6, entitled “Extremal Index Estimation: Application to Financial Data,” describes the most common extreme index estimators, based on different approaches and illustrates their values for a set of real financial data. The calculations were obtained from a suitable R package.

Chapter 7, entitled “Evaluating Microeconomic Factors, Financial Crisis, and Stock Price Dynamics: Evidence From MENA Region,” intends to examine the impact of microeconomic factors and the global financial crisis (GFC) on share prices in the Middle East and North Africa (MENA) region. The study carried out panel data techniques covering a sample of 277 companies listed in seven MENA countries for the period 2000-2015. The results suggest that microeconomic factors play a vital role in determining stock prices in the MENA region.

The second section, entitled “Corporate Governance and Business Performance,” comprises six chapters. Chapter 8, entitled “Corporate Governance and Firm’s Innovation: The Effect of Ownership and Board of Directors on R&D Investments,” focuses on two relevant corporate governance variables that influence companies’ innovation performance: company ownership and board of directors. In the first section, the effect of the shareholding structure on investment in R&D is analyzed. In addition, the chapter analyzes the effects of family and institutional ownership on investments in innovation, as well as the main theoretical perspectives that investigate the functions of the board of directors and their main tasks.

Chapter 9, entitled “Independent Directors’ Tenure, Expropriation, Related Party Transactions, and Firm Value: The Role of Ownership Concentration in Malaysian Publicly Listed Corporations,” analyzes the relationship between related party transactions (RPT) and firm value and whether independent directors’ tenure (IDT) strengthens or weakens this relationship. Further, it examines ownership

concentration's role on this moderating effect of IDT in Malaysian family and non-family corporations. The findings show that IDT weakens the relationship between RPT and firm value. They also show that family corporations are more likely to possess a stronger impact of ownership concentration which allude to concerns of maintaining reputation

Chapter 10, entitled "Corporate Governance and Firm Performance in an Emerging Market: The Case of Malaysian Firms," examines Corporate Governance mechanisms and how they affect the company's performance in Malaysia. Using rich and huge data on Malaysian companies for 16 years of observation, this study found that the Cooperative Governance model has been a model very well referred by companies in the country to improve the performance of companies.

Chapter 11, entitled "Zero-Leverage in European Firms: The Role of Corporate Governance Mechanisms on the Phenomenon," analyzes the phenomenon of zero leverage in a sample of companies listed in Europe for the period 2001-2016. Focused on the role played by corporate governance mechanisms in explaining the phenomenon, the results of the study partially validate that zero leverage policies are directed by entrenched managers, avoiding the disciplinary power of debt, especially in the presence of small shareholders without incentives and power to control managers' actions. In addition, companies with zero leverage appear to replace debt with internal sources of liquidity.

Chapter 12, entitled "Corporate Governance and Properties of Accounting Numbers in Brazil," analyzes 30 variables of the boards of directors (BDs) and oversight boards (OBs) of 325 Brazilian companies from 2011 to 2015. Through factor analysis, the authors carried out empirical tests relating the underlying factors of BDs and the properties of Brazilian accounting numbers, controlling the shareholding structure, differences in levels of corporate governance, type of auditor, presence of OB, size and leverage.

According to the authors of Chapter 13, entitled "Measuring Firms' Financial Constraints: A Rough Guide to Unlisted SMEs," measuring companies' financial constraints can be a difficult task for researchers, because it is not possible to directly observe whether a company is financially limited. This study examines the existing methodologies for measuring these restrictions at the company level, discussing the advantages and disadvantages of each.

The third section, entitled "Creative Accounting, Accrual Manipulation, Fraud, and Social Responsibility," contains five chapters. Chapter 14, entitled "A Critical Look at Social Reporting Evolution: Social Case in Its Future? Social Reporting Evolution," analyzes the evolution of social reports, concluding that accountability remains the main objective of the social report, because companies understand the need to meet the demands of interested parties, according to the Theory of Stakeholders. However, voluntariness seems to give rise to a regulatory horizon that allows the information received by these groups to be more relevant and reliable.

Chapter 15 is entitled "Corporate Social Responsibility Reporting in the Gambling Industry: Interaction With Government" The aim of the study is to investigate how the Macau government influences and guides operators of the gambling industry to control their social costs and create value for society. The result of the study indicated that gambling operators used CSR reports as a channel of communication with the government, which is consistent with the theory of legitimacy and the theory of stakeholders. Most companies also reinforced their disclosure related to government policies after the mid-term review report.

Chapter 16, entitled "Earnings Management and Fraud: A Theoretical Background and Discussion," aims to provide a rounded discussion of the concept of earnings management and theories underlying this behavior. The chapter addresses a general perspective of the concept, with a discussion of alternative definitions and theories related to this behavior, including the commonly discussed agency theory,

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as well as some less researched theories, such as the theory of socioemotional wealth and the theory of upper echelons.

Chapter 17, entitled “Externally Financed Growth and Quality Accounting Information: Evidence From Brazil,” investigates the association between quality accounting information (QAI) and externally financed growth (EFG), from a sample of 214 companies on the Brazilian stock exchange from 1998 to 2015. The study concludes that the hypothesis that the signaling of efficient accounting information influences marginally and EFG is positively tested by multiple linear regression with OLS estimation and could not be rejected.

Chapter 18 is entitled “Benford’s Law and Earnings Analysis: International Comparison.” According to its authors, the literature suggests that companies are actively managing the smoothing of their reported positive net incomes. They also report that the observed frequency of second digits abnormally exceeds the level provided by Benford’s Law, which results in a higher frequency of the number zero and an abnormally low occurrence of the number nine in the second digit of the reported income numbers. A reversal pattern occurs for reported net losses. This phenomenon is typically peculiar to countries with weak governance and companies under pressure to meet analysts’ expectations. The study reveals that companies in these countries have not been spared from rounding up their earnings figures in a timely manner, noting a greater prevalence when net losses were reported and this rounding phenomenon co-varied with some institutional factors; in particular, the rule of law and government effectiveness significantly influenced rounding behaviour.

While editing the handbook, it is exciting to see how the chapters are interconnected in the volume and how the issues raised in one chapter are discussed and often answered in subsequent chapters. We sincerely hope that readers will be delighted to read the *Handbook of Accounting and Financial Studies*. Working on this compilation was an enriching and rewarding experience. We hope that readers will have an enriching experience as well.

The editors,
February 2020

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Section 1

New Trends in Business Accounting and Finance

Chapter 1

Flipping the Best Journals in Accounting, Business, and Finance: What Fruits Do We Collect?

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ABSTRACT

The literature on accounting, business, and finance, as a sub-area of the sciences of administration and management, has been receiving strong attention from researchers since the 1950s. This study's main goal is to evaluate the nature and course of development of the literature on these research areas. A bibliometric analysis on the top journals published on the Web of Science and on the Scopus databases is conducted. Results synthesize the conceptual framework related to this area of science, identifying the roots of its intellectual structure, which give life to the respective tree of knowledge. New paths for future research are outlined.

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INTRODUCTION

According to the Encyclopædia Britannica (2010), management science is defined as any application of science to the study of management, that applies, from the older scientific areas like economics, business administration, sociology, psychology and mathematics, analytical data, statistics, and methods to increase the efficiency.

Furthermore, management science is a broader concept that involves several research streams as marketing, strategy, innovation and knowledge transfer, accounting and finance, among others.

Moreover, the landscape of management science research field presents an intense and continuous producing of research as well as many scientific journals focused in this topic, mostly on miscellaneous management research, however, many are focused on narrow research fields.

Business, finance and accounting literature, as a subset of the management science discipline has been source of great attention by researchers, that produced a substantial amount of research on these topics. One of the main reasons for the researchers attention on these topics is due to the characteristics of the accounting and finance information and its usefulness to companies, namely in providing critical information to managers as well as for shareholders, once the primary objective of the financial reporting is to provide information to financial statement users (Beaver & Demski, 1974).

Bibliometrics refers to a research stream related to the study of the dynamics of subjects as portrayed in the production of its literature (Hood & Wilson, 2001) to shed light over written communications and to evaluate the nature and course of development of a discipline by using quantitative methods through the assembling and interpretation of statistics (Pritchard, 1969). Applied to a research field, the main goal of a bibliometric study is to provide an insight in that specific stream over a period of time (Leung, Sun, & Bai, 2017) that, despite being broadly used across scientific disciplines, its origins can be traced as far as the 18th century (Shapiro, 1992).

Bibliometric studies, by means of citations, co-citations or co-word analysis have been applied in a broad range of research fields in recent years (e.g. Chunjia, 2019; Farinha, Sebastião, Sampaio, & Lopes, 2020; Khasseh, Soheili, Moghaddam, & Chelak, 2017; Leung et al., 2017; Shiau, Dwivedi, & Yang, 2017). Nevertheless, despite the relevance of business, accounting and finance on the management science literature, to the best of the authors knowledge, no article has focused on the bibliometric analysis, by means of citation, co-citation, and co-word analysis on the aggregate literature on business, finance, and accounting.

Therefore, this study's main goal is to evaluate the nature and course of development of business, financial and accounting literature, conducting a bibliometric analysis on the top journals published on the Web of Science and on the Scopus databases. To accomplish this objective, a set of procedures using a citation, co-citation and a co-word analysis on the articles' keywords are conducted, fulfilling the identified gap on literature and portraying the present state-of-the-art on the business, accounting and finance literature.

This study is organized into five sections: (i) Introduction; (ii) Literature review; (iii) Methodology; (iv) Results and discussion; and (v) Final remarks.

Literature Review

Finance, as well as accounting, receive considerable scholarly attention on scientific literature. Furthermore, research on these topics is well grounded and has been fruitful during the years, focusing on almost every aspect of human activities, from for-profit to not-for-profit enterprises, as well as on public companies, among others. Despite the transversal dimensions of the finance and accounting research streams, topics like corporate governance, including the theory of agency and the ownership structure, technology transfer, the organizational learning (e.g. Cohen & Levinthal, 1990; March, 1991) and innovation and its relationship with business performance, as well as the business models (e.g., Foss & Saebi, 2016; Magretta, 2002; Zott, Amit, & Massa, 2011) and international trade (e.g., Amiti & Konings, 2007; Melitz, 2003; Rauch, 1999) are particularly relevant in the accounting and finance literature.

The corporate governance deals with the ways in which suppliers of funding to companies assure that their investment will get a return (Shleifer & Vishby, 1992). Therefore, the theory of agency and the ownership structure emerge as a fundamental for corporate governance, and for the accounting and finance research (e.g. Demski & Feltham, 1978; Fama, 1980; Jensen & Meckling, 1976; La Porta, Lopez-De-Silanes, & Shleifer, 1999; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998; Shleifer & Vishny, 1997; Young, Peng, Ahlstrom, Bruton, & Jiang, 2008).

The agency costs act as real as any other costs that depend on statutory and common law and on human ingenuity in devising contracts (Jensen & Meckling, 1976). The agency relationship happens between several parties when one, designated as the agent, acts for, on behalf of, or as representative for the other, usually in the domain of decision problems (Ross, 1973), making the agency issue highly significant in the corporate governance. Managers, have plenty opportunities to abscond with financiers' funds, or to squander them on bad projects (Shleifer & Vishby, 1992). This implies that the survival of organizations relies in important decision agents whose wealth is not affected, at least in a substantial way, by their decisions (Fama, 1980) putting therefore the central question of corporate governance on how to assure to the financiers that their financial investment will get a return (Shleifer & Vishny, 1997). This aspect is particularly relevant because the concentration of ownership of shares in the largest companies is negatively related to investor protections, and small, diversified shareholders are unlikely to be important in countries that fail in protecting their rights (La Porta et al., 1999, 1998), which added to the separation of the control and ownership, can damage the corporate governance. Nevertheless, the separation of the control and the security ownership in large corporations can be an efficient way of economic organization (Fama, 1980).

Moreover, accounting and the financial reporting is critical to managers as well as for shareholders, once the primary objective of the financial reporting is to provide information to financial statement users (Beaver & Demski, 1974), enabling informed decisions for managers and providing critical information for investors, putting therefore, the accounting and finance research heavily related to the corporate governance.

Furthermore, international trade as well as the innovation and the technology transfer have also been an important source of research on business, accounting and finance related issues, namely by evaluating the intra-industry effects of international trade and the effects of the innovation and the knowledge transfer on the product development. The research in this field found that when exposed to international trade, the more productive companies tend to export whereas, simultaneously, the least productive firms are forced to exit, reallocating the market share and increasing the overall aggregate productivity (Melitz, 2003). On the other hand, relations, proximity, common language or colonial ties were found to be more

important to international trade growth for differentiated products than for products traded on organized exchanges. Furthermore, search barriers to trade are higher for differentiated than for homogeneous products (Rauch, 1999) and, despite the substantial impact on firms exit, export, and product innovation decisions of a change in trade costs, the impact of the later on the firms decisions on welfare is essentially compensated by the response of product innovation (Atkeson & Burstein, 2010). Moreover, the firm's decision in allocating resources for innovation depends on its absorptive capacity (Cohen & Levinthal, 1990). Yet, public research is critical to industrial research and development (R&D) and importantly affects industrial R&D across the manufacturing sector, contributing roughly in equal measure as universities for the completion of new ideas for industrial R&D (Cohen, Nelson, & Walsh, 2002).

Universities play a critical role in the knowledge capacity of a region, positively influencing the number of firms located in that region and contributing therefore to the absorptive capacity of companies (Zahra & George, 2002). However, the effect of public and universities' research on the knowledge capacity of regions and companies and on the R&D knowledge transfer is mainly due to published papers and reports, public conferences and meetings. Nevertheless, informal information exchange and consulting play also a substantial role in this process (Cohen et al., 2002), similarly to the relations, proximity, common language or colonial ties role on enhancing international trade growth (Rauch, 1999). Furthermore, in this process, the cooperation with universities and with competitors are key aspects in creating innovations, generating sales of products new to the market, and on improving the performance growth of firms, (Belderbos, Carree, & Lokshin, 2004).

Despite the amount of research on management science research field, the relevance of the business, finance, and accounting research stream has been focused in several topics, many times hardly related, like corporate governance, innovation, international trade, sustainability or competition as well as in contextual factors affecting business performance, implying a need to map and evaluate the nature and course of development of the discipline.

Methodology

These study's objectives will be achieved by employing a combination of several bibliographic techniques that allow the characterization of the current conceptual structure of the research field in the areas of business, accounting and finance.

In general, bibliographic methods can be used from the point of view of performance analysis, which is related to the study of the individual production of authors and institutions, and from the point of view of science mapping, which aims to identify the structure and the dynamics of a research field (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011; Zupic & Čater, 2015).

A methodology based on science mapping presents several advantages over the more traditional methods of structured literature review and meta-analysis. On one hand, according to Zupic & Čater (2015), when "... compared with structured literature review, science mapping has more macro focus and aims to find patterns in the literature as body of work" (p.436), on the other hand, according to (Aguinis, Pierce, Bosco, Dalton, & Dalton, 2011) the meta-analysis, despite being a powerful methodology, is "*inherently limited in the type and breadth of studies it can analyse*" (p. 436).

Small (1999) defines science mapping as a spatial representation of how keywords, articles, authors, institutions, journals and other actors relate to each other. Spatial representation is done through complex networks where large groups called "thematic clusters" (Kovács, Van Looy, & Cassiman, 2015) are

interconnected by nodes, thus allowing to identify the conceptual, intellectual and social structure of a research field (Cobo et al., 2011; Mora, Deakin, & Reid, 2019).

This work uses a hybrid methodology that, in the first stage, identifies the current conceptual structure of the research field and then, for each resulting “thematic cluster”, characterizes the roots of knowledge using its intellectual structure. Zupic & Čater (2015) suggest the use of co-word analysis (Callon, Courtial, & Laville, 1991) for the study of conceptual field and co-citation analysis (Small, 1973) to identify the intellectual structure.

Regarding co-word analysis, Zupic & Čater (2015) refers that “*the idea underlying the method is that when words frequently co-occur in documents, it means that the concepts behind those words are closely related. It is the only method that uses the actual content of the documents to construct a similarity measure, while the others connect documents indirectly through citations or co-authorships. The output of co-word analysis is a network of themes and their relations that represent the conceptual space of a field.*” (p. 435). On the other hand, Cobo et al. (2011) proposes several clustering methods that can be used to identify thematic clusters. However, the authors suggest the use of the simple centers algorithm (Coulter, Monarch, & Konda, 1998) because this method allows to use the knowledge of the researchers in the configuration of essential parameters for the determination of the clusters (Cobo et al., 2011).

After building the conceptual network, the analysis of the results can be performed using two concepts defined in Callon et al. (1991) called Callon’s Centrality and Callon’s Density. The Callon’s Centrality can be understand as a value that “*measure the importance of a theme in the development of the entire research field*” (Cobo et al., 2011: p. 150) and the Callon’s Density “*measure the strength of internal ties among all keywords describing the research theme. This value can be understood as a measure of the theme’s development.*” (Cobo et al., 2011: p. 150). In this way, we can represent these two numerical concepts in a two-dimensional graph (Centrality in the x-axis and Density in the y-axis) obtaining the Stategic Diagram (Callon et al., 1991) that classifies thematic clusters into 4 groups: Transversal and well developed themes (high density and centrality); Transversal and undeveloped themes (high centrality and low density); Developed but weakly related externally (low centrality and high density); Undeveloped and poorly externally related (low centrality and low density) (Cobo et al., 2011).

The next step in the methodology will now consist of identifying the intellectual structure of each thematic cluster in the conceptual framework, through co-citations analysis of documents. Co-citations of two documents occur when they are simultaneously cited in a third document. “*A fundamental assumption of co-citation analysis is that the more two items are cited together, the more likely it is that their content is related*” (Zupic & Čater, 2015: p.431). Co-citation analysis also makes it possible to find clusters that represent the roots that scientifically support the research sub-domains identified by co-word analysis.

Data Collection

The data were obtained in two phases: first, the journals classified in the first quartile (Q1) of the Scimago Journal & Country Rank in the areas of “Accounting” and “Finance” and of the Journal Citation Reports in the area of “Business, Finance” were gathered. Next, the overall publications on these journals over the last three years (2017-2019), which are included in the Web of Science (WoS) and Scopus databases, were retrieved. The main reason to focus on the last three years is linked to the study’s main goal of understanding the current state-of-the-art and the research trends in these research fields. A longer timeframe presents several risks, namely not reflecting the current trend.

The two databases were consolidated and the duplicate articles were removed. The final set of 12575 obtained articles, 77 journals with Q1 impact factor and other statistics is shown in Table 1. The R (R Core Team, 2019) with package Bibliometrix (Aria & Cuccurullo, 2017) was used to perform the analysis.

Table 1 - Statistical Descriptives

| Description | Results |
|--------------------------------------|-------------|
| Documents | 12575 |
| Sources (Journals, Books, etc.) | 77 |
| Keywords Plus (ID) | 3282 |
| Author's Keywords (DE) | 23799 |
| Period | 2017 – 2019 |
| Average citations per documents | 3.821 |
| Authors | 18183 |
| Author Appearances | 31726 |
| Authors of single-authored documents | 1796 |
| Authors of multi-authored documents | 16387 |
| Single-authored documents | 2160 |
| Documents per Author | 0.692 |
| Authors per Document | 1.45 |
| Co-Authors per Documents | 2.52 |
| Collaboration Index | 1.57 |
| | |
| Document types | |
| ARTICLE | 12567 |
| ARTICLE, EARLY ACCESS | 4 |
| ARTICLE, PROCEEDINGS PAPER | 4 |

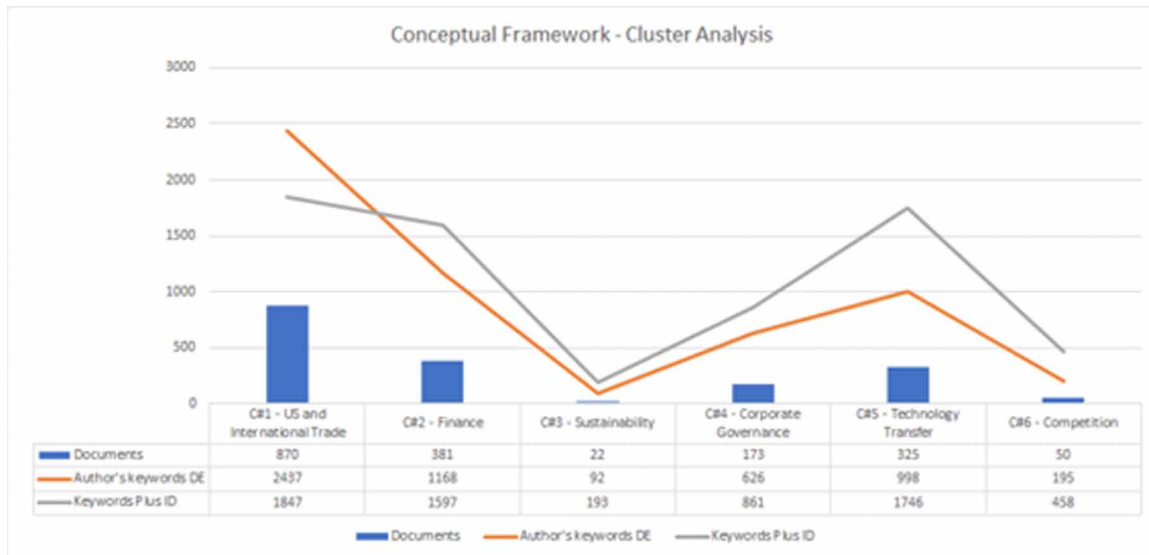
The conceptual structure through co-word analysis was obtained using the keywords Plus (ID) that represents the consolidated keywords defined by WoS and Scopus. The keywords Plus (ID) were used because they broadly cover the articles topics. Furthermore, the 23799 Author's Keywords (DE) in Table 1, compared to the 3282 of the keywords Plus, show a highly specification of the former, no relevant in identifying the conceptual structure.

The results that define the conceptual structure of the top research field in accounting, business and finance, as well as its intellectual roots, are found in the following section.

Results and Discussion

Based on a perspective of conceptual analysis (conceptual structure), results returned six clusters on the scientific articles researched on the last three years (2017-2019): (i) US and International Trade; (ii) Finance; (iii) Sustainability; (iv) Corporate Governance; (v) Technology Transfer; and (vi) Competition (Figure 1).

Figure 1. Conceptual Framework



According to the number of identified documents, the most representative clusters in the last three years (2017-2019) are: US and International Trade (870 documents); Finance (381 documents); Technology Transfer (325 documents); Corporate Governance (173 documents); Competition (50 documents); and Sustainability (22 documents).

The most cited papers on the period 2017-2019 by cluster, are listed in Table 2.

Table 3 reveals the conceptual framework inherent to all articles published until 2019 (870 articles found), framed in cluster 1 - US and International Trade. The number of occurrences by keyword (Top 10), the most cited articles (Top 10) and the most productive authors are revealed.

Similar reasoning is followed in Tables 4, 5, 6, 7 and 8 for the “Finance”, “Sustainability”, “Corporate Governance”, “Technology Transfer” and “Competition” clusters respectively.

Following Cobo et al. (2011) four quadrants were identified: first quadrant (low centrality and high density); second quadrant (high centrality and density); third quadrant (high centrality and low density); and a fourth quadrant (low centrality and density) (Figure 2).

Figure 2 shows that quadrant 1 (low centrality and high density) houses two clusters (cluster # 3 and cluster # 6), which correspond to a state of “developed but weakly related externally”. Quadrant 2 (high centrality and density) comprises a cluster (cluster # 2) in the “Transversal and well-developed” state. Quadrant 3 (high centrality and low density) houses two clusters (cluster # 1 and cluster # 5), corresponding to the status of “Transversal but undeveloped”. Finally, quadrant 4 (low centrality and density) brings together a cluster (cluster # 4) in the “undeveloped and poorly externally related” state. In this last quadrant the “emerging areas” or “fading areas” are represented, thus justifying the low consistency in terms of development and external relations.

Furthermore, according the Cobo et al. (2011) guidelines, the best positioned clusters are essentially cluster # 2 - Finance, aided by clusters # 5 and # 6 (Technology Transfer and Competition, respectively).

Figure 3 shows the knowledge tree in which, through an integrated analysis (conceptual framework and intellectual structure), it becomes possible to focus on analysis not only the “tree canopy”, but also

Table 2. Most Cited Papers on the period 2017-2019

| C#1 - US and Internacional Trade | TC | TCperYear | C#2 - Finance | TC | TCperYear |
|---|-----------|------------------|---|-----------|------------------|
| AUDRETSCH DB, 2017, J TECHNOL TRANSF-a | 91 | 22.75 | TEECE DJ, 2018, LONG RANGE PLANN | 98 | 32.67 |
| SAEBI T, 2017, LONG RANGE PLANN | 53 | 13.25 | SAEBI T, 2017, LONG RANGE PLANN | 53 | 13.25 |
| LU Y, 2017, J INT ECON | 33 | 8.25 | SOTO-ACOSTA P, 2017, J TECHNOL TRANSF | 48 | 12.00 |
| DEL GIUDICE M, 2017, J TECHNOL TRANSF-a | 31 | 7.75 | FOSS NJ, 2018, LONG RANGE PLANN | 43 | 14.33 |
| CHERNIWCHAN J, 2017, J INT ECON | 26 | 6.50 | HAUTZ J, 2017, LONG RANGE PLANN | 34 | 8.50 |
| HACKLIN F, 2018, LONG RANGE PLANN | 26 | 8.67 | APPLEYARD MM, 2017, LONG RANGE PLANN | 29 | 7.25 |
| GRIMM M, 2017, WORLD BANK ECON REV | 26 | 6.50 | HACKLIN F, 2018, LONG RANGE PLANN | 26 | 8.67 |
| BAPTISTA J, 2017, LONG RANGE PLANN | 26 | 6.50 | RITTER T, 2018, LONG RANGE PLANN | 26 | 8.67 |
| HAYTER CS, 2017, J TECHNOL TRANSF | 26 | 6.50 | BAPTISTA J, 2017, LONG RANGE PLANN | 26 | 6.50 |
| VAN DOORN S, 2017, LONG RANGE PLANN | 25 | 6.25 | VAN DOORN S, 2017, LONG RANGE PLANN | 25 | 6.25 |
| C#3 – Sustainability | TC | TCperYear | C#4 - Corporate Governance | TC | TCperYear |
| LAASCH O, 2018, LONG RANGE PLANN | 24 | 8.000 | VRONTIS D, 2017, J TECHNOL TRANSF | 61 | 15.25 |
| COSENZ F, 2018, LONG RANGE PLANN | 24 | 8.000 | EVELEENS CP, 2017, J TECHNOL TRANSF | 23 | 5.75 |
| KENNEDY S, 2017, LONG RANGE PLANN | 17 | 4.250 | GEGENHUBER T, 2017, LONG RANGE PLANN | 16 | 4.00 |
| LIAO SH, 2017, J TECHNOL TRANSF | 10 | 2.500 | SNIHUR Y, 2018, LONG RANGE PLANN | 14 | 4.67 |
| GREWATSCH S, 2018, LONG RANGE PLANN | 7 | 2.333 | RINGOV D, 2017, LONG RANGE PLANN | 14 | 3.50 |
| RAMN-LLORENS MC, 2019, LONG RANGE PLANN | 4 | 2.000 | SUN J, 2017, CORP GOV | 13 | 3.25 |
| MAROUN W, 2018, ACCOUNT FORUM | 3 | 1.000 | BURKE R, 2017, ACCOUNT FORUM | 13 | 3.25 |
| LEHMAN G, 2017, ACCOUNT FORUM-a | 3 | 0.750 | BOATENG A, 2017, CORP GOV | 13 | 3.25 |
| ASHRAF N, 2019, LONG RANGE PLANN | 2 | 1.000 | BENDIG D, 2018, LONG RANGE PLANN | 10 | 3.33 |
| BLUHM R, 2018, EUR ECON REV | 2 | 0.667 | YANG JY, 2017, LONG RANGE PLANN | 10 | 2.50 |
| C#5 - Technology Transfer | TC | TCperYear | C#6 - Competition | TC | TCperYear |
| TEECE DJ, 2018, LONG RANGE PLANN | 98 | 32.67 | VAN DOORN S, 2017, LONG RANGE PLANN | 25 | 6.25 |
| AUDRETSCH DB, 2017, J TECHNOL TRANSF-a | 91 | 22.75 | COSENZ F, 2018, LONG RANGE PLANN | 24 | 8.00 |
| VRONTIS D, 2017, J TECHNOL TRANSF | 61 | 15.25 | FAINSHMIDT S, 2017, LONG RANGE PLANN | 22 | 5.50 |
| SAEBI T, 2017, LONG RANGE PLANN | 53 | 13.25 | KENNEDY S, 2017, LONG RANGE PLANN | 17 | 4.25 |
| SCUOTTO V, 2017, J TECHNOL TRANSF | 51 | 12.75 | GALN-MUROS V, 2017, J TECHNOL TRANSF | 14 | 3.50 |
| SOTO-ACOSTA P, 2017, J TECHNOL TRANSF | 48 | 12.00 | LIAO SH, 2017, J TECHNOL TRANSF | 10 | 2.50 |
| WRIGHT M, 2017, J TECHNOL TRANSF | 46 | 11.50 | HARRIGAN KR, 2017, J TECHNOL TRANSF | 10 | 2.50 |
| FOSS NJ, 2018, LONG RANGE PLANN | 43 | 14.33 | GARCA-GRANERO A, 2018, LONG RANGE PLANN | 9 | 3.00 |
| ACS ZJ, 2017, J TECHNOL TRANSF | 34 | 8.50 | TUNCDOGAN A, 2017, LONG RANGE PLANN | 9 | 2.25 |
| DEL GIUDICE M, 2017, J TECHNOL TRANSF-a | 31 | 7.75 | SKUTE I, 2019, J TECHNOL TRANSF | 9 | 4.50 |

the “tree root”, which supports the entire intellectual structure by behind the conceptual framework of this study (Cobo et al., 2011; Mora et al., 2019).

If, on the one hand, the conceptual framework gives us an image of the articles grouped in clusters and based on the respective themes (key words of research), the intellectual structure allows to know in detail the multiplication of roots of knowledge that support that same conceptual framework, through which the various mineral nutrients and other hydrating solutions flow in perfect interconnectivity, which feed the leaves and fruits (conceptual framework) (Figure 3 and Figure 4). In figure 4 we can see the knowledge tree.

Table 3. United States and International Trade

| Cluster #1: United States and International Trade (ARTICLES #870) | | | | | | | |
|---|-------------------------|--|------|-------------|----------|------------------|-------------------------|
| Occurrences | Words (Top 10) | MostCitedPapers: | Freq | Authors | Articles | Authors | Articles Fractionalized |
| 101 | united states | MELITZ, M.J., THE IMPACT OF TRADE ON INTRA-INDUSTRY REALLOCATIONS AND AGGREGATE INDUSTRY PRODUCTIVITY (2003) ECONOMETRICA, 71 (6), PP. 1695-1725 | 52 | AURAY S | 4 | BEN Z N | 2.33 |
| 69 | international trade | FISCHBACHER, U., Z-TREE: ZURICH TOOLBOX FOR READY-MADE ECONOMIC EXPERIMENTS (2007) EXP. ECON., 10 (2), PP. 171-178 | 23 | FAFCHAMPS M | 4 | LAASCH O | 2.00 |
| 62 | export | EATON, J., KORTUM, S., KRAMARZ, F., AN ANATOMY OF INTERNATIONAL TRADE: EVIDENCE FROM FRENCH FIRMS (2011) ECONOMETRICA, 79 (5), PP. 1453-1498 | 19 | IACOVONE L | 4 | FAFCHAMPS M | 1.83 |
| 57 | china | EATON, J., KORTUM, S., TECHNOLOGY, GEOGRAPHY, AND TRADE (2002) ECONOMETRICA, 70 (5), PP. 1741-1779 | 17 | OREFICE G | 4 | MARDAN M | 1.83 |
| 54 | experimental study | SMETS, F., WOUTERS, R., SHOCKS AND FRICTIONS IN US BUSINESS CYCLES: A BAYESIAN DSGE APPROACH (2007) AM. ECON. REV., 97 (3), PP. 586-606 | 16 | OTTAVIANO G | 4 | PARK J | 1.67 |
| 51 | labor market | ANDERSON, J.E., VAN WINCOOP, E., GRAVITY WITH GRAVITAS: A SOLUTION TO THE BORDER PUZZLE (2003) AM. ECON. REV., 93 (1), PP. 170-192 | 15 | PERI G | 4 | ALFARO L | 1.58 |
| 48 | competition (economics) | LEVINSOHN, J., PETRIN, A., ESTIMATING PRODUCTION FUNCTIONS USING INPUTS TO CONTROL FOR UNOBSERVABLES (2003) REV. ECON. STUD., 70 (2), PP. 317-341 | 15 | YOTOV Y | 4 | CHATTERJEE A | 1.50 |
| 48 | europa | AMITI, M., KONINGS, J., TRADE LIBERALIZATION, INTERMEDIATE INPUTS, AND PRODUCTIVITY: EVIDENCE FROM INDONESIA (2007) AM. ECON. REV., 97 (5), PP. 1611-1638 | 14 | ALFARO L | 3 | GERVAIS A | 1.50 |
| 47 | monetary policy | AUTOR, D.H., DORN, D., HANSON, G.H., THE CHINA SYNDROME: LOCAL LABOR MARKET EFFECTS OF IMPORT COMPETITION IN THE UNITED STATES (2013) AM. ECON. REV., 103 (6), PP. 2121-2168 | 14 | ANDERSON J | 3 | GOMEZ-GONZALEZ P | 1.50 |
| 45 | modeling | GREINER, B., SUBJECT POOL RECRUITMENT PROCEDURES: ORGANIZING EXPERIMENTS WITH ORSEE (2015) J. ECON. SCI. ASSOC., 1 (1), PP. 114-125 | 14 | BEN Z N | 3 | HUANG Y | 1.50 |
| 45 | import | | | | | | |

Each fruit of the conceptual framework corresponds to a set of intellectual clusters (intellectual structure), which aim is to help us better understand its essence. Exemplifying, the conceptual cluster # 2 - Finance, is formed from six intellectual clusters: I # 1 - Aggregate industry productivity; I # 2 - Sustained competitive advantage; I # 3 - Business models and innovation; I # 4 - Learning and innovation; I # 5 - Statistical analysis; and I # 6 - Social practices. The set of these intellectual clusters, formed from a set of scientific articles grouped by thematics, helps to better understand the composition of that conceptual cluster under analysis, which in turn is integrated in a particular quadrant of the conceptual framework. In this case the conceptual cluster # 2, located in the upper right quadrant (high centrality and density), is formed from the above-mentioned six intellectual clusters that through interconnectivity with other roots of knowledge, helps to better understand its scientific significance (Figure 4).

Once the fruit corresponding to conceptual cluster # 2 has been selected and its roots (intellectual structure) identified, it is now possible to deepen its analysis through the exhaustive analysis of the content of its related articles.

Studying in depth cluster 2 - “Finance”, associated with the conceptual framework of this study, the interconnectivity between the intellectual dimensions “Industry productivity”, “Sustained competitive

Table 4. Finance

| Cluster #2: Finance (ARTICLES #381) | | | | | | | |
|-------------------------------------|------------------------------|--|------|--------------|----------|--------------|-------------------------|
| Occurrences | Words (Top 10) | MostCitedPapers: | Freq | Authors | Articles | Authors | Articles Fractionalized |
| 89 | finance | MELITZ, M.J., THE IMPACT OF TRADE ON INTRA-INDUSTRY REALLOCATIONS AND AGGREGATE INDUSTRY PRODUCTIVITY (2003) ECONOMETRICA, 71 (6), PP. 1695-1725 | 19 | VOLBERDA H | 4 | LAASCH O | 2.00 |
| 57 | enterprise resource planning | ZOTT, C., AMIT, R., MASSA, L., THE BUSINESS MODEL: RECENT DEVELOPMENTS AND FUTURE RESEARCH (2011) J. MANAG., 37 (4), PP. 1019-1042 | 16 | COZZI G | 3 | HUANG Y | 1.50 |
| 56 | theoretical study | COHEN, W.M., LEVINTHAL, D.A., ABSORPTIVE CAPACITY: A NEW PERSPECTIVE ON LEARNING AND INNOVATION (1990) ADMINISTRATIVE SCIENCE QUARTERLY, 35 (1), PP. 128-152 | 12 | IACOVONE L | 3 | AUDRETSCH D | 1.33 |
| 51 | empirical analysis | AMITI, M., KONINGS, J., TRADE LIBERALIZATION, INTERMEDIATE INPUTS, AND PRODUCTIVITY: EVIDENCE FROM INDONESIA (2007) AM. ECON. REV., 97 (5), PP. 1611-1638 | 9 | PATEL P | 3 | BIRKINSHAW J | 1.33 |
| 47 | decision making | FISCHBACHER, U., Z-TREE: ZURICH TOOLBOX FOR READY-MADE ECONOMIC EXPERIMENTS (2007) EXP. ECON., 10 (2), PP. 171-178 | 9 | AHN K | 2 | CHEN C | 1.33 |
| 39 | strategic approach | GREINER, B., SUBJECT POOL RECRUITMENT PROCEDURES: ORGANIZING EXPERIMENTS WITH ORSEE (2015) J. ECON. SCI. ASSOC., 1 (1), PP. 114-125 | 9 | ANGWIN D | 2 | PARK J | 1.33 |
| 34 | industrial performance | FOSS, N.J., SAEBI, T., FIFTEEN YEARS OF RESEARCH ON BUSINESS MODEL INNOVATION: HOW FAR HAVE WE COME, AND WHERE SHOULD WE GO? (2017) J. MANAG., 43 (1), PP. 200-227 | 8 | AUDRETSCH D | 2 | SCHYMIK J | 1.33 |
| 31 | organizational framework | MAGRETTA, J., WHY BUSINESS MODELS MATTER (2002) HARV. BUS. REV., 80 (5), PP. 86-92 | 8 | BIRKINSHAW J | 2 | VOLBERDA H | 1.12 |
| 30 | business | MARCH, J.G., EXPLORATION AND EXPLOITATION IN ORGANIZATIONAL LEARNING (1991) ORGAN. SCI., 2 (1), PP. 71-87 | 8 | BRETSCHGER L | 2 | COZZI G | 1.08 |
| 26 | learning | RAUCH, J.E., NETWORKS VERSUS MARKETS IN INTERNATIONAL TRADE (1999) J. INT. ECON., 48 (1), PP. 7-35 | 8 | BROWN A | 2 | ABREHA K | 1.00 |

advantage”, “Business models and innovation”, “Learning and innovation”, “Statistical analysis” and “Social practices” were explored.

In a first approach to productivity, firms with different productivity levels coexist in an industry because each firm faces initial uncertainty concerning its productivity before making an irreversible investment to enter the industry. Entry into the export market is also expensive, but the company’s decision to export comes after it has been able to optimize the own productivity (Melitz, 2003). In addition, as with investment, the analysis of intermediate inputs (those that are normally subtracted from a value-added production function) can also contribute to increase industrial efficiency and effectiveness (Levinsohn & Petrin, 2003).

From a Sustained competitive advantage perspective, Teece, Pisano, & Shuen (1997) argues that a company’s competitive advantage depends on the stability of market demand and the ease of replicability (internal expansion) and imitability (replication by competitors). These authors add that the creation of private wealth in regimes of rapid technological change depends on the ability to improve the company’s internal technological, organizational and managerial processes. Finally, it is essential to be able to identify new opportunities and effectively and efficiently organize, focusing on commercial conduct that keeps competitors out of balance, increases competitors’ costs and includes new barriers to the entry of

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Table 5. Sustainability

| Cluster #3: Sustainability (ARTICLES #22) | | | | | | | |
|---|-------------------------|---|------|--------------|----------|-------------|-------------------------|
| Occurrences | Words (Top 10) | MostCitedPapers: | Freq | Authors | Articles | Authors | Articles Fractionalized |
| 17 | sustainability | HAHN, T., PREUSS, L., PINKSE, J., FIGGE, F., COGNITIVE FRAMES IN CORPORATE SUSTAINABILITY: MANAGERIAL SENSEMAKING WITH PARADOXICAL AND BUSINESS CASE FRAMES (2014) ACAD. MANAG. REV., 39 (4), PP. 463-487 | 4 | AHMADSIMAB A | 1 | BONFATTI R | 1.0 |
| 10 | sustainable development | MILNE MJ, 2013, J BUS ETHICS, V118, P13, DOI 10.1007/S10551-012-1543-8. | 4 | ASHRAF N | 1 | CUCKSTON T | 1.0 |
| | | GAO, J., BANSAL, P., INSTRUMENTAL AND INTEGRATIVE LOGICS IN BUSINESS SUSTAINABILITY (2013) J. BUS. ETHICS, 112 (2), PP. 241-255 | 3 | ATKINS J | 1 | GOODSPEED T | 1.0 |
| | | GRAY R, 2010, ACCOUNT ORG SOC, V35, P47, DOI 10.1016/J.AOS.2009.04.006. | 3 | BADAR K | 1 | LAASCH O | 1.0 |
| | | ORLITZKY, M., SCHMIDT, F.L., RYNES, S.L., CORPORATE SOCIAL AND FINANCIAL PERFORMANCE: A META-ANALYSIS (2003) ORGAN. STUD., 24 (3), PP. 403-441 | 3 | BERG A | 1 | MOGGI S | 1.0 |
| | | TREGIDGA H, 2013, ACCOUNT AUDIT ACCOUN, V26, P806, DOI 10.1108/AAAJ-02-2013-1234. | 3 | BIRKIN F | 1 | VAN D B I | 1.0 |
| | | ABDELKAFI, N., TUSCHER, K., BUSINESS MODELS FOR SUSTAINABILITY FROM A SYSTEM DYNAMICS PERSPECTIVE (2016) ORGAN. ENVIRON., 29 (1), PP. 74-96 | 2 | BLUHM R | 1 | WEIR K | 1.0 |
| | | ATKINS J, 2015, ACCOUNT AUDIT ACCOUN, V28, P651, DOI 10.1108/AAAJ-09-2013-1485. | 2 | BONFATTI R | 1 | ATKINS J | 0.5 |
| | | BALL A., 2005, ACCOUNT AUDIT ACCOUN, V18, P346, DOI DOI 10.1108/09513570510600738. | 2 | BUFFIE E | 1 | COSENZ F | 0.5 |
| | | BATTILANA, J., DORADO, S., BUILDING SUSTAINABLE HYBRID ORGANIZATIONS: THE CASE OF COMMERCIAL MICROFINANCE ORGANIZATIONS (2010) ACAD. MANAG. J., 53 (6), PP. 1419-1440 | 2 | CHEN C | 1 | GREWATSCH S | 0.5 |

Table 6. Corporate Governance

| Cluster #4: Corporate governance (ARTICLES #173) | | | | | | | |
|--|----------------------|---|------|--------------|----------|---------------|-------------------------|
| Occurrences | Words (Top 10) | MostCitedPapers: | Freq | Authors | Articles | Authors | Articles Fractionalized |
| 54 | corporate governance | JENSEN MC, 1976, J FINANC ECON, V3, P305, DOI 10.1016/0304-405X(76)90026-X. | 31 | ZAKARIA Z | 4 | HUANG Y | 1.50 |
| 35 | management | FAMA EF, 1983, J LAW ECON, V26, P301, DOI 10.1086/467037. | 19 | SLACK R | 3 | WANG Z | 1.33 |
| 35 | performance | SHLEIFER A. 1997, J FINANC, V52, P737, DOI 10.1111/J.1540-6261.1997.TB04820.X. | 18 | ADEGBITE E | 2 | BABOUKARDOS D | 1.00 |
| 29 | firm performance | LA PORTA R, 1998, J POLIT ECON, V106, P1113, DOI 10.1086/250042. | 14 | BELAL A | 2 | BELAL A | 1.00 |
| 22 | ownership | LA PORTA R, 1999, J FINANC, V54, P471, DOI 10.1111/0022-1082.00115. | 14 | CHEN L | 2 | BROWN A | 1.00 |
| 19 | governance | FAMA EF, 1980, J POLIT ECON, V88, P288, DOI 10.1086/260866. | 11 | FERRY L | 2 | CHEN V | 1.00 |
| 14 | ownership structure | YOUNG MN, 2008, J MANAGE STUD, V45, P196, DOI 10.1111/J.1467-6486.2007.00752.X. | 11 | GUDERGAN S | 2 | COL B | 1.00 |
| 13 | information | EISENHARDT KM, 1989, ACAD MANAGE REV, V14, P57, DOI 10.2307/258191. | 10 | HUANG Y | 2 | COMYNS B | 1.00 |
| 12 | disclosure | HILLMAN AJ, 2003, ACAD MANAGE REV, V28, P383. | 10 | LEHMAN G | 2 | FEHR D | 1.00 |
| 12 | accountability | PFEFFER J, 1978, EXTERNAL CONTROL ORG. | 10 | MINICHILLI A | 2 | GONCHARENKO G | 1.00 |
| 12 | earnings management | | | | | | |

Table 7. Technology Transfer

| Cluster #5: Technology transfer (ARTICLES #325) | | | | | | | |
|---|----------------------------|--|------|--------------|----------|--------------|-------------------------|
| Occurrences | Words (Top 10) | MostCitedPapers: | Freq | Authors | Articles | Authors | Articles Fractionalized |
| 113 | technology transfer | COHEN, W.M., LEVINTHAL, D.A., ABSORPTIVE CAPACITY: A NEW PERSPECTIVE ON LEARNING AND INNOVATION (1990) ADMINISTRATIVE SCIENCE QUARTERLY, 35 (1), PP. 128-152 | 24 | AUDRETSCH D | 9 | AUDRETSCH D | 3.95 |
| 90 | innovation | COHEN, W.M., NELSON, R.R., WALSH, J.P., LINKS AND IMPACTS: THE INFLUENCE OF PUBLIC RESEARCH ON INDUSTRIAL R&D (2002) MANAGEMENT SCIENCE, 48 (1), PP. 1-23 | 18 | CARAYANNIS E | 6 | CARAYANNIS E | 2.08 |
| 37 | knowledge management | MARCH, J.G., EXPLORATION AND EXPLOITATION IN ORGANIZATIONAL LEARNING (1991) ORGANIZATION SCIENCE, 2 (1), PP. 71-87 | 13 | HARRIGAN K | 5 | ANTONELLI C | 2.00 |
| 37 | patents and inventions | LAURSEN, K., SALTER, A., OPEN FOR INNOVATION: THE ROLE OF OPENNESS IN EXPLAINING INNOVATION PERFORMANCE AMONG UK MANUFACTURING FIRMS (2006) STRATEGIC MANAGEMENT JOURNAL, 27 (2), PP. 131-150 | 12 | LEHMANN E | 5 | MEISSNER D | 2.00 |
| 29 | education | ZAHRA, S.A., GEORGE, G., ABSORPTIVE CAPACITY: A REVIEW, RECONCEPTUALIZATION, AND EXTENSION (2002) ACADEMY OF MANAGEMENT REVIEW, 27 (2), PP. 185-203 | 12 | MEISSNER D | 5 | LINK A | 1.83 |
| 27 | research and development | AUDRETSCH, D.B., LEHMANN, E.E., DOES THE KNOWLEDGE SPILLOVER THEORY OF ENTREPRENEURSHIP HOLD FOR REGIONS? (2005) RESEARCH POLICY, 34 (8), PP. 1191-1202 | 11 | CANTNER U | 4 | HARRIGAN K | 1.75 |
| 27 | investments | AUTIO, E., KENNEY, M., MUSTAR, P., SIEGEL, D., WRIGHT, M., ENTREPRENEURIAL INNOVATION: THE IMPORTANCE OF CONTEXT (2014) RESEARCH POLICY, 43 (7), PP. 1097-1108 | 11 | CUNNINGHAM J | 4 | LEE S | 1.75 |
| 27 | societies and institutions | LINK, A.N., SIEGEL, D.S., BOZEMAN, B., AN EMPIRICAL ANALYSIS OF THE PROPENSITY OF ACADEMICS TO ENGAGE IN INFORMAL UNIVERSITY TECHNOLOGY TRANSFER (2007) INDUSTRIAL AND CORPORATE CHANGE, 16 (4), PP. 641-655 | 11 | DEL G M | 4 | LEHMANN E | 1.70 |
| 27 | economics | BELDERBOS, R., CARREE, M., LOKSHIN, B., COOPERATIVE R&D AND FIRM PERFORMANCE (2004) RESEARCH POLICY, 33 (10), PP. 1477-1492 | 10 | GOEL R | 4 | GOEL R | 1.67 |
| 23 | commerce | BOSCHMA, R., PROXIMITY AND INNOVATION: A CRITICAL ASSESSMENT (2005) REGIONAL STUDIES, 39 (1), PP. 61-74 | 10 | GRAF H | 4 | SCHILLO R | 1.50 |
| 23 | ecosystems | | | | | | |
| 23 | academic entrepreneurship | | | | | | |

new players in the market. Eisenhardt & Martin (2000) highlight the importance of the resource-based company vision. Dynamic resources are a set of specific and identifiable processes, such as product development, strategic decision making and alliance. The authors argue that, if in moderately dynamic markets, resources resemble the traditional conception of routines, including detailed, analytical and stable processes, with predictable results; in high-speed markets, dynamic resources result in simple, highly experiential and fragile processes, generating unpredictable results.

Regarding to the relevance of business models and innovation, whenever a company is established, it explicitly or implicitly employs a specific business model that describes the design or architecture of the mechanisms for creating, delivering and capturing value. According to Teece (2010) “The essence of a business model is to define the way in which the company delivers value to customers, encourages customers to pay for value and converts those payments into profit”. The business model choices define

Table 8. Competition

| Cluster #6: Competition (ARTICLES #50) | | | | | | | |
|--|---------------------------|---|------|-------------|----------|----------------|-------------------------|
| Occurrences | Words (Top 10) | MostCitedPapers: | Freq | Authors | Articles | Authors | Articles Fractionalized |
| 23 | competition | BOZEMAN, B., TECHNOLOGY TRANSFER AND PUBLIC POLICY: A REVIEW OF RESEARCH AND THEORY (2000) RESEARCH POLICY, 29 (4-5), PP. 627-655 | 3 | HARRIGAN K | 2 | ANTONELLI C | 1.000 |
| 12 | human resource management | COHEN, W.M., LEVINTHAL, D.A., ABSORPTIVE CAPACITY: A NEW PERSPECTIVE ON LEARNING AND INNOVATION (1990) ADMINISTRATIVE SCIENCE QUARTERLY, 35, PP. 128-152 | 3 | ROTHGANG M | 2 | COCCIA M | 1.000 |
| 10 | costs | COHEN, W.M., NELSON, R.R., WALSH, J.P., LINKS AND IMPACTS: THE INFLUENCE OF PUBLIC RESEARCH ON INDUSTRIAL R&D (2002) MANAGEMENT SCIENCE, 48 (1), PP. 1-23 | 3 | ROZAKIS S | 2 | KALANTARIDIS C | 1.000 |
| 10 | efficiency | DEBACKERE, K., VEUGELERS, R., THE ROLE OF ACADEMIC TECHNOLOGY TRANSFER ORGANIZATIONS IN IMPROVING INDUSTRY SCIENCE LINKS (2005) RESEARCH POLICY, 34 (3), PP. 321-342 | 3 | VOLBERDA H | 2 | KLN U | 1.000 |
| | | EISENHARDT, K.M., BUILDING THEORIES FROM CASE STUDY RESEARCH (1989) ACADEMY OF MANAGEMENT REVIEW, 14 (4), PP. 532-550 | 3 | ABOUD A | 1 | LIU Y | 1.000 |
| | | EISENHARDT, K.M., GRAEBNER, M.E., THEORY BUILDING FROM CASES: OPPORTUNITIES AND CHALLENGES (2007) ACADEMY OF MANAGEMENT JOURNAL, 50 (1), PP. 25-32 | 3 | ANDERSSON U | 1 | STAKE J | 1.000 |
| | | ETZKOWITZ, H., LEYDESDORFF, L., THE DYNAMICS OF INNOVATION: FROM NATIONAL SYSTEMS AND MODE 2 TO A TRIPLE HELIX OF UNIVERSITYINDUSTRYGVERNMENT RELATIONS (2000) RESEARCH POLICY, 29 (2), PP. 109-123 | 3 | ANN P T | 1 | HARRIGAN K | 0.833 |
| | | JENSEN MC, 1976, J FINANC ECON, V3, P305, DOI 10.1016/0304-405X(76)90026-X. | 3 | ANNIQUE U C | 1 | ROZAKIS S | 0.667 |
| | | ZAHRA, S.A., GEORGE, G., ABSORPTIVE CAPACITY: A REVIEW, RECONCEPTUALIZATION, AND EXTENSION (2002) ACADEMY OF MANAGEMENT REVIEW, 27 (2), PP. 185-203 | 3 | ANTONELLI C | 1 | ROTHGANG M | 0.583 |
| | | ALMUS, M., CZARNITZKI, D., THE EFFECTS OF PUBLIC R&D SUBSIDIES ON FIRMS INNOVATION ACTIVITIES: THE CASE OF EASTERN GERMANY (2003) JOURNAL OF BUSINESS AND ECONOMIC STATISTICS, 21 (2), PP. 226-236 | 2 | ASAKAWA K | 1 | VOLBERDA H | 0.533 |

the business architecture and a competitively sustainable business model requires a strategic analyses filter. Following Teece (2010b), technological innovation does not guarantee business success, and it is required that efforts to develop new products must be associated with a business model that defines its ‘going to market’ and ‘capturing value’ strategies. Sometimes great technological achievements fail commercially because little attention has been paid to the design of a business model to get them to market properly. This learning, which does not always appear in the first definition of the business model, will help entrepreneurs and managers to achieve better levels of profitability and business sustainability.

From a learning and innovation perspective, Kogut & Zander (1992) argues that companies exist, not only because they control transaction costs, but because knowledge flows from individuals to groups within an organization (knowledge management), and this knowledge is reinforced through cooperation networks (at the organizational, social, innovation system level). If this knowledge does not evolve from individuals to groups, knowledge management in the organization is not ensured, making the change in the company only happening simply by employee turnover. The author adds that hiring new employees is not equivalent to changing a company’s skills, an analysis of what companies can do must understand the knowledge embedded in the organizational principles by which people cooperate within organiza-

Figure 2. Conceptual Framework

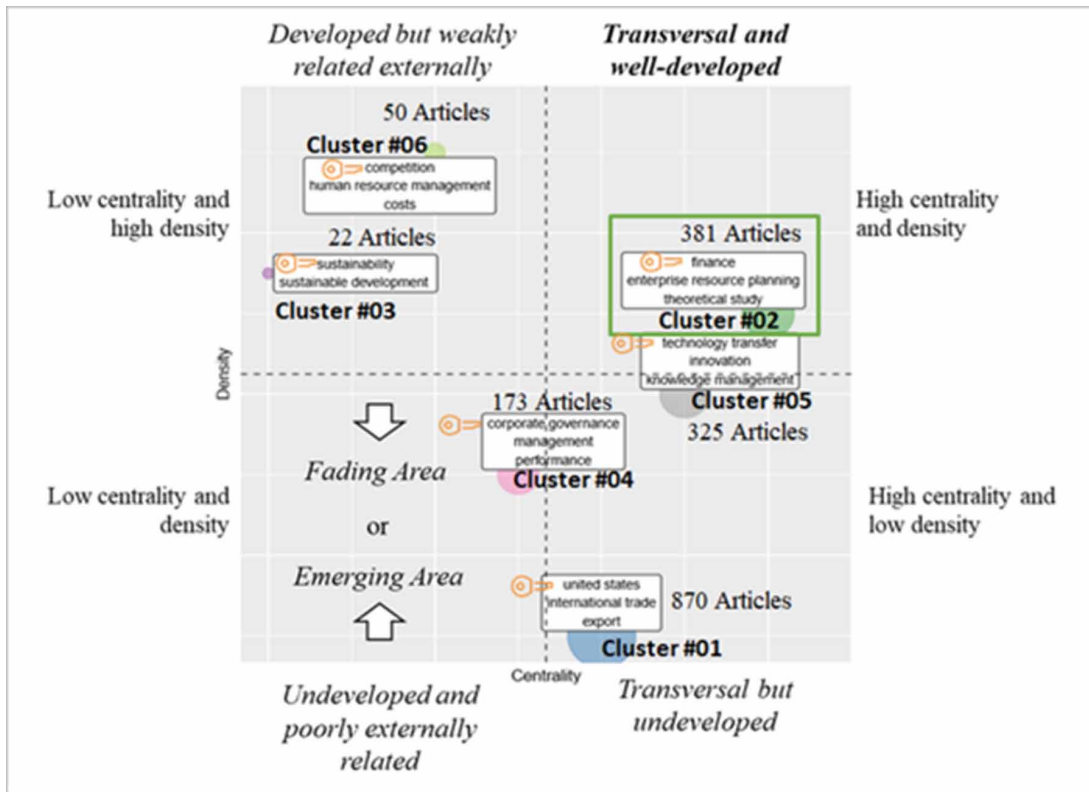


Figure 3. Conceptual framework and intellectual structure

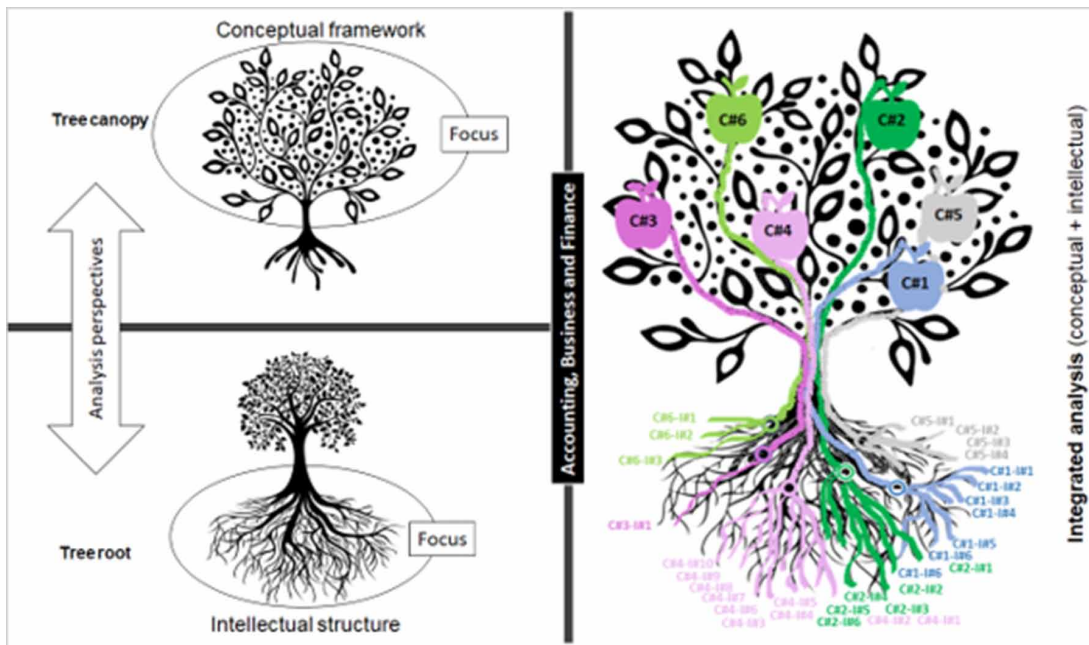
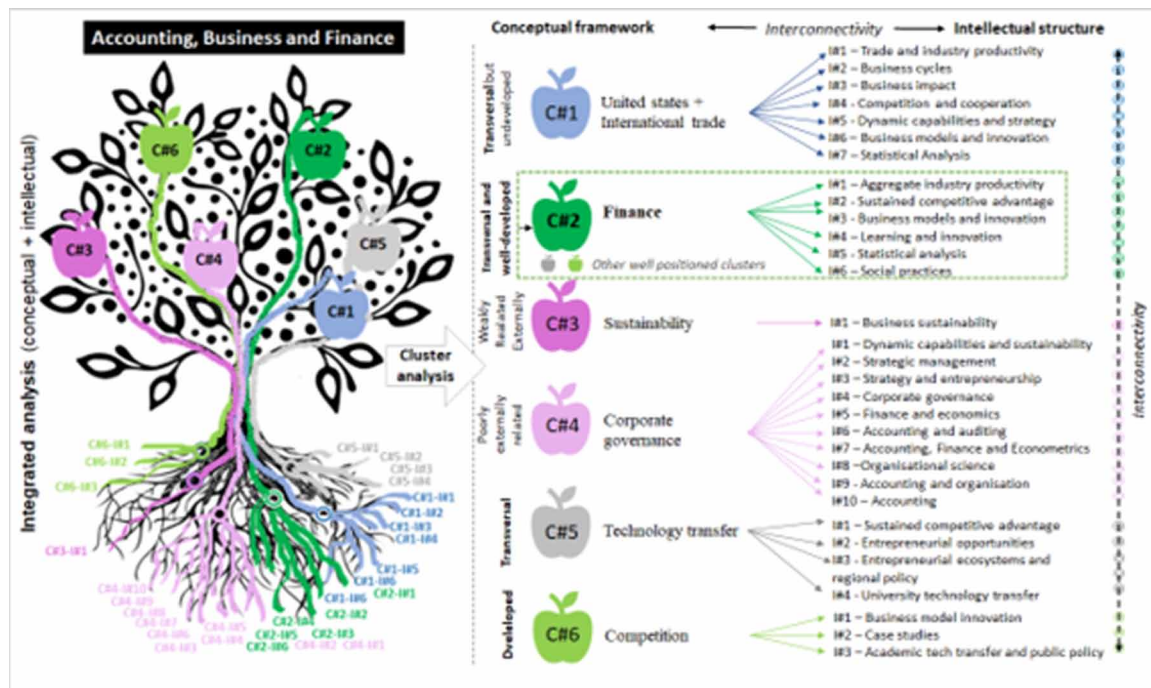


Figure 4. Knowledge Tree



tions. On the opposite side, the company's accumulated knowledge offers new options for expansion. In his book entitled "The Theory of the Growth of the Firm", Penrose (1959) clarified that the bases for Theory of the Growth of the Firm has illuminated and inspired thinking in strategy, entrepreneurship, knowledge creation, and innovation. Furthermore, according Katila & Ahuja (2002) it is important to understand how companies develop research and solve problems to create new products, helping to better understand their competitive position in the market based on the knowledge exploitation. Laursen & Salter (2006) adds that a central part of the innovation process concerns the way companies organize the search for new ideas with commercial potential. New innovation models suggest that many innovative companies have changed the way they search for new ideas, adopting open research strategies that involve using a wide range of actors and external sources to help them achieve and sustain innovation.

The performance implications of innovation in small and medium-sized enterprises (SMEs) have attracted considerable interest among academics and professionals. The use of statistical techniques helps to better understand to what extent the innovation-performance relationship depends on the context (Lindell & Whitney, 2001; Rosenbusch, Brinckmann, & Bausch, 2011). Furthermore, smaller, resource-poor companies benefit from innovation, and factors such as the age of the company, the type of innovation and the cultural context affect the impact of innovation on the company's performance to a large extent (Rosenbusch et al., 2011).

Vaara & Whittington (2012) highlight the importance of research in Strategy-as-Practice (SAP), suggesting new directions for its development. In this alignment, social theories in strategic management represent alternatives to analyzes dominated by performance, based on the prevailing organizational and social practices.

In an extensive approach to social practices Whittington, Cailluet, & Yakis-Douglas (2011) present a long-term view of strategy development as a profession, from the 1950s to today. It shows that strategy as a profession is structurally precarious, subject to cyclical demand and changes in organizational power. He adds that, in recent decades, this direction has taken on more open forms of strategy development, with more transparency inside and outside organizations and more inclusion of different actors, internally and externally. As vertical axes, four levels have been highlighted - organizational, social, cultural and technological - driving the evolution of strategy as a profession, allowing an increase in organizational effectiveness.

In a complementary and transversal way, cluster 5 - "Technology transfer", brings us a new view on "Entrepreneurial ecosystems and regional policy", in the perspective of "University technology transfer" and the "Academia-Industry" interaction, and its contribution to the regional economic development.

Cluster 6 - "Competition", addresses the innovation of the business model and its opportunities, barriers and challenges; particularizes as sources of value creation in low-income markets and academic technology transfer organizations to improve companies' performance.

Final Remarks

This research aimed to study the state of the art of the business, finance and accounting literature and deals with several important issues regarding the management science research field. A bibliometric analysis approach was used to evaluate the nature and course of the development of the business, accounting and finance literature. A search on the Web of Science and on Scopus databases was conducted. The journals classified in the first quartile (Q1) of the Scimago Journal & Country Rank in the areas of "Accounting" and "Finance" and of the Journal Citation Reports in the area of "Business, Finance" were retrieved. In the next stage, 12575 articles published in the last three years were obtained and the R (R Core Team, 2019) with package Bibliometrix (Aria & Cuccurullo, 2017) was used to perform the analysis.

Results show six clusters: (i) US and International Trade; (ii) Finance; (iii) Sustainability; (iv) Corporate Governance; (v) Technology Transfer; and (vi) Competition. Furthermore, it was also found that the highly centered and dense cluster was the Finance cluster, followed by the Technology Transfer and Competition clusters.

The in-depth analysis to the cluster Finance showed that the intellectual dimensions "Industry productivity", "Sustained competitive advantage", "Business models and innovation", "Learning and innovation", "Statistical analysis" and "Social practices" are well interconnected to this cluster.

From a theoretical standpoint this study contributes to the development of the knowledge on the business, finance and accounting research field, by portraying the present state-of-the-art on these issues. On the other hand, the obtained results enlighten academics and researchers about the current and emerging sources of research in these research streams, providing critical information and guidance to the current and potential researchers on these topics.

From a practical and managerial perspective, the obtained results provide further guidelines for managers better understand the short-term strengths and weaknesses and long-term capabilities and strategies of their firms. Companies are social constructions connected with its contextual environment. Furthermore, the world economy is characterized by its interconnectivity, which implies a critical influence of external factors, many times, hardly related to the firms regional or national context, on the managers decisions. Moreover, informed decisions depend on critical information provided by all sources of information and the companies rely heavily on the knowledge flow from published papers and reports, public conferences

and meetings, provided by researchers (Cohen et al., 2002). Consequently, managers should focus their attention, but not limit it, on the industry productivity, in order to obtain sustainable competitive advantages, in which the firms learning and absorptive capacity play a critical role in enhancing innovation (Cohen & Levinthal, 1990) and business models through the use of relevant information provided from all available sources, from the internal information, primarily retrieved from the cost and from financial accounting reporting to the external information, obtained from market.

Despite the enlighten provided, this study faces several limitations that imply further research opportunities. First, this study focuses on top ranked journals classified in the first quartile (Q1) of the Scimago Journal & Country Rank in the areas of “Accounting” and “Finance” and of the Journal Citation Reports in the area of “Business, Finance” which means that a relevant part of knowledge on this topics was not analysed. Furthermore, by narrowing the search to the areas of “Accounting”, “Finance”, and “Business, Finance”, a severe amount of research on the management science was not evaluated, representing an opportunity for further research on these topics. Nevertheless, the decision of narrowing the research scope is perfectly under the study’s objective. Finally, this research, by its nature, represents an analysis to the background literature on business, finance and accounting, meaning therefore that further research should focus, for instance, on an empirical study evaluating the managers point of view about the relevance of the business, finance and accounting topic of their firms strategic decisions.

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Chapter 2

Fair Value Accounting: A Systematic Literature Review

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ABSTRACT

This study aims to analyse the present state of fair value accounting research. A search on the Web of Science database was conducted. Article type documents containing “fair value” and “accounting” in the title were searched, and results returned 34 documents. A systematic literature approach was used to evaluate the articles. Results indicate that the banking sector is the main source of data for fair value accounting research. On the other hand, the adoption of fair value accounting seems to produce different results according to the type of industry sample used, the temporal context of the study, financial turmoil, or the evaluated assets and liabilities.

INTRODUCTION

The Financial Crisis Advisory Group (FCAG) jointly created by the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) sought to improve the decision usefulness of the financial instrument reporting. According to the Financial Crisis Advisory Board (2009), accounting standards and their application face several weaknesses. Among these weaknesses, the FCAB report pointed to the difficulty of applying fair value (“mark-to-market”) accounting in illiquid markets; and complexity of accounting standards for financial instruments, including multiple approaches to recognizing asset impairment. On the other hand, some of these weaknesses also highlighted areas in which International Financial Reporting Standards (“IFRS”) and the United States generally accepted accounting principles (“US GAAP”) diverged. Furthermore, according to the proponents of the fair value, fair value measurements are timelier and more relevant to shareholders, given that fair values directly reflect the current value of assets and liabilities. On the other hand, fair value critics point out that fair value estimates are less reliable than historical costs because there is of significant subjectivity in measuring the fair value of the assets and liabilities (Hairston & Brooks, 2018).

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Fair Value Accounting

Therefore, this work aims to review the fair value accounting literature, providing a synthesis of the existent literature, contributing, therefore, as guidance for standard setters, accounting academics, and practitioners.

Methods

Following Tranfield, Danyer, and Smart (2003), the Centre for Reviews and Dissemination (2009), Harris, Quatman, Manring, Siston, and Flanigan (2013) and Moher, Liberati, Tetzlaff, Altman, and Prisma Group (2009) guidelines, on the procedures in conducting a systematic literature review, this study focuses on the study of the fair-value accounting research, following, therefore, a three-stage process. This section addresses two stages, (1) planning the review, which describes the identification, preparation and the development of the review protocol, (2) conducting the review, where the identification of research, the selection of studies, the quality assessment, data extraction, and monitoring progress and data synthesis are conducted. The third stage is assessed in the next section when, the reporting is described.

Planning the Review

The systematic literature review seeks to answer specific questions and, differing from traditional narrative reviews, is a more specific and transparent process (Petticrew & Roberts, 2008). Furthermore, high-quality systematic reviews can define the boundaries of what is known and what is not known and can help avoiding knowing less than has been proven, helping practitioners to solve specific problems (Cook, Mulrow, & Haynes, 1997). It adopts a methodology in an endeavour to limit bias, with the overall aim of producing a scientific summary of the evidence in any area (Petticrew & Roberts, 2008). Therefore, in seeking to reduce the research bias, the Centre for Reviews and Dissemination (2009), Harris et al. (2013), Moher, Liberati, Tetzlaff, Altman, and Prisma Group (2009) and Tranfield, Danyer, and Smart (2003) guidelines were followed, with adaptations.

Conducting the Review

According to the research objectives, a systematic literature review on fair-value accounting was conducted. Web of Science database was selected to search for research on fair value accounting because of its multidisciplinary and because it is one of the top leading databases, composed of Science Citation Index Expanded and Social Sciences Citation Index. Therefore, a search in the Web of Science database was conducted in August 2019. All the title articles containing the words “fair value” and “accounting”, published between 2013 and 2019, were selected. In this process 103 results were found. Nevertheless, further refinement was conducted. Document that are not “Articles” indexed in the Social Sciences Citation Index, were excluded. This decision was made to focus the analysis on high impact factor articles. Research returned 34 articles. The 2013 to 2019 time frame was selected due to the International Financial Reporting Standards (IFRS) 13, *Fair Value Measurement* (International Accounting Standards Board (IASB), 2012), which has been applicable for annual reporting periods from 1 January 2013. Nevertheless, articles on fair value accounting, reporting other than the IFRS 13, were not excluded from the study. Accounting research usually uses historical data (e.g., Amel-Zadeh, Barth, & Landsman, 2017; Barron, Chung, & Yong, 2016; Blankespoor, Linsmeier, Petroni, & Shakespeare, 2013; Bowen & Khan, 2014; Marabel-Romo, Guiral, Luis Crespo-Espert, Gonzaloc, & Moonb, 2017; McInnis, Yu,

& Yust, 2018; Shalev, Zhang, & Zhang, 2013), among others. Therefore, removing articles focused on older accounting standards could harm this study results.

In the next stage, the remaining full-text articles were assessed for eligibility, none of it were excluded from the analysis. Therefore, a final set of 34 articles were maintained for the systematic literature review.

For the propose of analysis, there are several effective methods of extraction of study data into a coherent group parameter. Data collection forms can be either written paper or electronic spreadsheets (Harris et al., 2013). Therefore, a spreadsheet was constructed with the relevant information, and data were extracted from individual trials, including study details, key study statements, evaluation of study methodological outcome measures, context, sample and study sector, and main outcomes/findings.

Furthermore, a content analysis was conducted using Nvivo (version 12) for data analysis. The remaining 34 articles were computed in the Nvivo software, and an analysis was conducted. Moreover, the extracted information was used to evaluate, synthetize and report the main conclusions about the present state of fair value accounting.

Results

The Concept of Fair Value Accounting

The IFRS 13 (International Accounting Standards Board (IASB), 2012) defines fair value as “as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.”, expanding the definition indicating that, ”a fair value measurement is for a particular asset or liability. Therefore, when measuring fair value, an entity shall take into account the characteristics of the asset or liability if market participants would take those characteristics into account when pricing the asset or liability at the measurement date”.

Descriptive Data Analysis

This systematic literature review seeks to evaluate the fair-value literature published since 2013 due the Standards (IFRS) 13, *Fair Value Measurement* (International Accounting Standards Board (IASB), 2012), which has been applicable for annual reporting periods from 1 January 2013. The retrieved articles were analysed and a descriptive analysis was conducted. Results show that 34 studies have been published focusing on fair value accounting. Furthermore, when grouping the research by Journal (table 1), results show that seven articles were published in the Review of Accounting Studies; four in the Journal of Accounting Research; two articles on the Accounting and Finance, Accounting Auditing & Accountability Journal, Accounting Organizations, and Society, Accounting Review, Australian Account Review and Journal of Accounting and Public Policy; and the remaining articles were published one in each journal (see table 1).

Furthermore, results show that seven studies were published in 2013 and 2014, four in 2015, six in 2016 and 2018, three in 2017, and one in 2019. Nevertheless, data from 2019 represents only the period until August 2019.

Table 1. Number of studies by Journal and authors

| Journal | Number of Studies | Authors |
|--|-------------------|--|
| REVIEW OF ACCOUNTING STUDIES | 7 | (Amel-Zadeh et al., 2017; Blankespoor et al., 2013; Christensen & Nikolaev, 2013; Dong, Ryan, & Zhang, 2014; Easton & Zhang, 2017; Jiang, Wang, & Xie, 2015; Magnan, Menini, & Parbonetti, 2015) |
| JOURNAL OF ACCOUNTING RESEARCH | 4 | (Chen, Tan, & Wang, 2013; Demerjian, Donovan, & Larson, 2016; Shalev et al., 2013; Xie, 2016) |
| ACCOUNTING AND FINANCE | 2 | (Brousseau, Gendron, Belanger, & Coupland, 2014; Chen & Gavius, 2016) |
| ACCOUNTING AUDITING & ACCOUNTABILITY JOURNAL | 2 | (Bewley, Graham, & Peng, 2018; Haswell & Evans, 2018) |
| ACCOUNTING ORGANIZATIONS AND SOCIETY | 2 | (de Jager, 2014a; Lachmann, Stefani, & Woehrmann, 2015) |
| ACCOUNTING REVIEW | 2 | (Blankespoor et al., 2013; McInnis et al., 2018) |
| AUSTRALIAN ACCOUNTING REVIEW | 2 | (Abbott & Tan-Kantor, 2018; de Jager, 2014b) |
| JOURNAL OF ACCOUNTING AND PUBLIC POLICY | 2 | (Barron et al., 2016; Bowen & Khan, 2014) |
| ABACUS - A JOURNAL OF ACCOUNTING FINANCE AND BUSINESS STUDIES | 1 | (Goncharov & van Triest, 2014) |
| ACCOUNTING AND BUSINESS RESEARCH | 1 | (Durocher & Gendron, 2014) |
| BRITISH ACCOUNTING REVIEW | 1 | (Macve, 2015) |
| CONTEMPORARY ACCOUNTING RESEARCH | 1 | (Georgiou, 2018) |
| CRITICAL PERSPECTIVES ON ACCOUNTING | 1 | (Zhang & Andrew, 2016) |
| EUROPEAN ACCOUNTING REVIEW | 1 | (Belze, Larmande, & Schneider, 2019) |
| GENEVA PAPERS ON RISK AND INSURANCE-ISSUES AND PRACTICE | 1 | (Paetzmann & Lippl, 2013) |
| JOURNAL OF ACCOUNTING & ECONOMICS | 1 | (Chircop & Novotny-Farkas, 2016) |
| JOURNAL OF BUSINESS FINANCE & ACCOUNTING | 1 | (Yoo, Choi, & Pae, 2018) |
| REVIEW OF DERIVATIVES RESEARCH | 1 | (Beisland & Frestad, 2013) |
| SPANISH JOURNAL OF FINANCE AND ACCOUNTING-REVISTA ESPANOLA DE FINANCIACION Y CONTABILIDA | 1 | (Marabel-Romo et al., 2017) |

Content Analysis

In the next stage, a content analysis was performed. The Nvivo software (version 12) was used to partially perform the analysis. Figure 1 shows the 100 most frequently mentioned words (with 4 letters or more) in the 34 analysed articles.

Furthermore, to easily evaluate the content of the articles, table 2 shows the top 10 most representative words.

Figure 1. The 100 words most used in the analysed articles



Results (table 2) show the word counting. The top 5 repeated words: *accounting*, *value*, *fair*, *financial*, *bank/banks*, are closely related to the study subject. First, because the main focus of this study is the **fair value accounting**, and second, due the main focus of the analysed articles to be the **bank** sector (table 3), and generally speaking, the **financial** industry, the top 5 words in the word counting were expected. On the other hand, the words *assets*, *market*, *income*, *risk* and *information*, 6th to 10th most relevant words, respectively, are also closely related to fair value accounting and perfectly engaged to the IFRS 13 (International Accounting Standards Board (IASB), 2012) fair value definition: “the price that would be received to sell an **asset** or paid to transfer in an orderly transaction between **market** participants at the measurement date.”.

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Table 2. Top 10 most representative words

| Word | Count |
|-------------|-------|
| accounting | 5574 |
| value | 5480 |
| fair | 4690 |
| financial | 2875 |
| bank/banks | 2801 |
| assets | 1949 |
| market | 1642 |
| income | 1358 |
| risk | 1174 |
| information | 1093 |

Table 3 shows the most relevant sectors, according to the sample/focus of the article, when studying the fair value accounting.

Table 3. Analysed articles by sample/focus type

| Sample/Focus | Count | Authors |
|--|-------|---|
| Banks | 14 | (Amel-Zadeh et al., 2017; Barron et al., 2016*; Blankespoor et al., 2013; Bowen & Khan, 2014; Chircop & Novotny-Farkas, 2016; de Jager, 2014a, 2014b; Dong et al., 2014; Easton & Zhang, 2017; Jiang et al., 2015; Magnan et al., 2015; Marabel-Romo et al., 2017; McInnis et al., 2018; Xie, 2016) |
| Professionals (Accounting, Auditing, Investment) and students | 5 | (Brousseau et al., 2014; Chen et al., 2013; Durocher & Gendron, 2014; Georgiou, 2018; Lachmann et al., 2015) |
| Miscellaneous (not defined, literature review and other) | 9 | (Beisland & Frestad, 2013; Belze et al., 2019; Bewley et al., 2018; Demerjian et al., 2016; Haswell & Evans, 2018; Linsmeier, 2013; Macve, 2015; Shalev et al., 2013; Zhang & Andrew, 2016) |
| Public companies | 2 | (Abbott & Tan-Kantor, 2018; Chen & Gavius, 2016) |
| Insurance companies | 2 | (Barron et al., 2016*; Paetzmann & Lippl, 2013) |
| Industrial firms | 1 | (Yoo et al., 2018) |
| Several sectors | 1 | (Christensen & Nikolaev, 2013) |
| Energy sector companies | 1 | (Goncharov & van Triest, 2014) |
| Financial companies (including banks, insurance companies, and other financial institutions) | 1 | (Barron et al., 2016)* |

* This article focuses on studying financial companies including bank, insurance companies, and other financial institutions, therefore was included several groups.

Figure 2 presents a cluster analysis by word similarity, computed using Nvivo software (version 12). The analysed articles were grouped through the similarity of the words based on the Pearson correlation

coefficient. Furthermore, it allows us to access two main clusters (cluster A and cluster B) grouped by word similarity, divided into several sub-clusters.

Results of the cluster analysis, show a cluster A, grouping ten studies, and cluster B, grouping 24 studies.

Among the articles grouped in cluster A, six are focused on the banking industry (i.e., Amel-Zadeh et al., 2017; Barron et al., 2016; Chircop & Novotny-Farkas, 2016; Dong et al., 2014; Easton & Zhang, 2017; Xie, 2016), one on investigating how managers' compensation incentives affect the allocation of purchase price after acquisitions (i.e., Shalev et al., 2013), one on public companies changes in the dividend policy, following the adoption of fair value accounting rules (i.e., Chen & Gavigous, 2016), one on exploring the option of fair value accounting introduced for property, plant, and equipment by Korean industrial firms (i.e., Yoo et al., 2018), and one on examining the association between fair value accounting for financial assets and market price volatility for nonfinancial firms (i.e., Brousseau et al., 2014).

On the other hand, cluster B includes eight articles analysing fair value accounting on banking industry (i.e., Blankespoor et al., 2013; Bowen & Khan, 2014; de Jager, 2014a, 2014b; Jiang et al., 2015; Magnan et al., 2015; Marabel-Romo et al., 2017; McInnis et al., 2018), nine articles focusing on several issues, mostly related to literature review (i.e., Beisland & Frestad, 2013; Belze et al., 2019; Bewley et al., 2018; Demerjian et al., 2016; Haswell & Evans, 2018; Linsmeier, 2013; Macve, 2015; Shalev et al., 2013; Zhang & Andrew, 2016), five articles focusing on the feedback provided by the accounting, audit and investment professionals, as well as students, about implementing and evaluating fair value accounting (e.i., Brousseau et al., 2014; Chen et al., 2013; Durocher & Gendron, 2014; Georgiou, 2018; Lachmann et al., 2015). Two focusing on public companies' fair value accounting (Abbott & Tan-Kantor, 2018; Chen & Gavigous, 2016), two on insurance companies (Barron et al., 2016; Paetzmann & Lippl, 2013), one on industrial firms (Yoo et al., 2018), one on several sectors (Christensen & Nikolaev, 2013), and one on energy companies (Goncharov & van Triest, 2014). Figure 2 shows two main clusters.

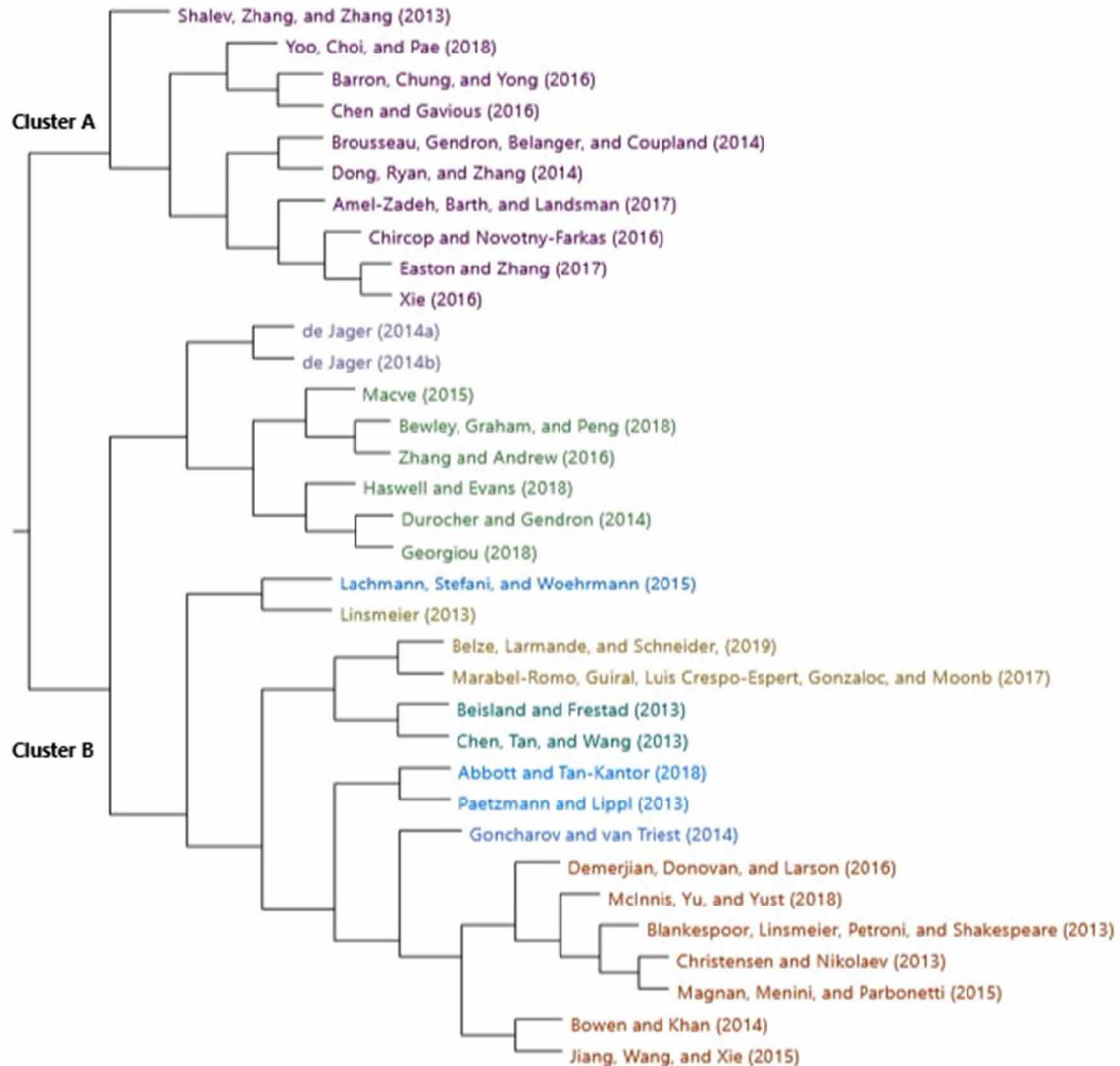
Table 3 shows the most relevant sectors in studying fair value accounting. Furthermore, it was found that the banking sector is the most relevant sector. Nevertheless, the literature review (table 4) found additional relevant information that portrays the present state of the fair value accounting.

Following previous studies about fair value accounting (e.g. Barth & Landsman, 2010; Eboli, 2010; Véron, 2008), pros and cons were also found. Linsmeier (2013) found that reporting unrealized gains/losses on non-financial assets in income, is less likely to provide relevant information. Furthermore, unrealized fair value accounting profit lead to prolonged and excessive boom on bank profits and capital increasement. Nevertheless, during financial crisis, the fair value accounting regulations inherent flexibility enable to postpone the recognition of fair value accounting losses and lending activity stays subdued until all the marked-up items were worked off banks' balance (de Jager, 2014a).

Moreover, fair value accounting application by banks is not neutral, once, during downturns, effort is expended to avoid losses generated by fair value accounting (de Jager, 2014b). Firms paying dividends from unrealized gains are more financially leveraged and less innovative than firms that did not pay dividends from unrealized gains. Furthermore, dividend distributions dilute the firm's real financial resources, thereby increasing the risk for all the firm's stakeholders, particularly debt holders (Chen & Gavigous, 2016). Fair value accounting adjustments in the mid 2000s are linked to the global financial crisis (2008-2009) (Haswell & Evans, 2018). The adoption of fair value measurement, impacts on the reported values of assets, and results in an increase in total assets, total liabilities and total equity. Moreover, fair value leads to a reduction of the rate of profit, and the asset valuation using fair value results in a view that a company performs worse (Abbott & Tan-Kantor, 2018). Additionally, the book

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Figure 2. Cluster analysis by word similarity



of equity under fair value is not more value-relevant than under GAAP and financial statements under fair value accounting provides less relevant information for bank valuation than financial statements under current GAAP (McInnis et al., 2018). Fair value accounting and CEO compensation seems to influence the allocation of price to goodwill after acquisitions (Shalev et al., 2013) and the credit risk and leverage seem to be closely related, as the number of financial instruments measured at fair value increases (Blankespoor et al., 2013). The impact of fair value accounting for derivative on participants' risk hedging decisions is much greater when the price volatility of the hedged asset is higher than when it is lower (Chen et al., 2013). Fair value accounting increasing use on banks' balance sheet is related with more dispersed earnings forecasts (Magnan et al., 2015), and fair value accounting does not seem to contribute to procyclical leverage (Amel-Zadeh et al., 2017).

On the other hand, historical cost accounting (HCA) does not affect participants' risk hedging decisions (Chen et al., 2013). Managers, representing outside stakeholders, usually reveal preferences for HCA (Christensen & Nikolaev, 2013) and fair value adjustments result in higher income, and are exceptional relative to recent performance (Goncharov & van Triest, 2014). Furthermore, there is no systematic difference in price volatility between fair value accounting and HCA and fair value accounting information do not result in systematically higher or lower volatility under fair value accounting (Brousseau et al., 2014). Additionally, fair value disclosures provision is associated with reduced uncertainty regarding future earnings and lower forecast errors, and unrealized gains and losses from fair value changes are positively associated with firms' future performance (Barron et al., 2016).

Moreover, the field of accountancy involves a mixed measurement system increasingly reflective of fair value and the variability in practitioners' epistemic commitment towards fair value accounting highlights the lack of cognitive unity in the field of fair value accounting (Durocher & Gendron, 2014). Furthermore, the credit risks presentation does not affect fair value investors interpretation (Lachmann et al., 2015). However, the focus on accounting discourses, and fair value accounting in particular, demonstrate what appears to be simple claims of technical best practice (Zhang & Andrew, 2016).

Despite the pointed pros and cons of the fair value accounting, the adoption of fair value accounting, especially by banks, still faces several challenges, namely when applying fair value to loans. According to Jiang et al. (2015) the resignation of the former Financial Accounting Standards Board (FASB) chairman, Bob Herz, in 2010, led to a positive response by investors, especially by banks that have been affected by the adoption of fair value requirement for loans.

CONCLUSION, IMPLICATIONS AND FURTHER RESEARCH

This study sought to cover a wide body of literature on fair value accounting, to produce a systematic review of fair value accounting and to provide a synthesis of the existent literature, contributing therefore, as guidance for standard setters, accounting academics and practitioners.

With several adaptations, guidelines for a systematic literature review procedures were followed, namely the Centre for Reviews and Dissemination (2009), Harris et al. (2013), Moher et al. (2009) and Tranfield et al. (2003).

A search on the Web of Science database was conducted to collect the analysed articles. All the document type "Article", indexed in the Social Sciences Citation Index with a title containing the words "fair value" and "accounting" published between 2013 and 2019, were selected. Results returned 34 articles.

The articles were read and a content analysis using Nvivo software (version 12) was done. A "word cloud" with the 100 most relevant words was produced and the ten most relevant words further analysed. Furthermore, a cluster analysis was produced and the articles were grouped according to the used sample/focus. Findings showed that the bank sector is the most relevant sector in fair value accounting research. Moreover, the articles' research question and main findings were grouped by article and a general description was made.

Results indicate that the type of industry sample used, the temporal context of the study, the financial turmoil, or the evaluated assets and liabilities, influence the results of adoption the fair value accounting.

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Table 4. Analysed articles by research question and key findings

| Autor | Research question | Findings |
|--------------------------------|---|--|
| (Shalev et al., 2013) | How managers' compensation, in particular, the relative importance of bonus in CEO pay, affect the allocation of purchase price after acquisitions. | - CEOs whose compensation packages rely more on earnings-based bonuses are more likely to over-allocate the purchase price to goodwill. |
| (Beisland & Frestad, 2013) | Why and how the accounting regulations may affect hedging behaviour. | - The influence of the mark-to-market principle of SFAS 133 and IAS 39 differs across risk-exposure characteristics, but it entails less hedging in future accounting periods. |
| (Blankespoor et al., 2013) | Do financial statements using fair value for financial instruments better describe banks' credit risk than less fair-value-based financial statements? | - The relationship between credit risk and leverage gets stronger as the number of financial instruments measured at fair value increases. - Leverage measured with financial instruments at fair value has a statistically greater ability to explain bond yield spreads relative to the other less fair-value-based leverage measures. |
| (Paetzmann & Lipl, 2013) | Compare fair value as required for purchase accounting within the current IFRS Phase II process, the proposed Solvency II regulations and the practical actuarial concept of Market Consistent Embedded Value (MCEV). | - All relevant parties involved in an insurance Merger and Acquisitions (M&A) transaction need to develop a joint practical approach based on the acquaintance. - The absence of specific guidance on fair value measurement of insurance liabilities introduces a considerable discretionary element into purchase accounting. |
| (Linsmeier, 2013) | Description of an income-statement-focused framework for selecting between the fair value and historical cost measurement attributes. | - Reporting unrealized gains/losses on nonfinancial assets in income is less likely to provide relevant information. |
| (Chen et al., 2013) | How fair value accountin affects managers' real economic decisions. | - The impact of fair value accounting (FVA) for derivatives on participants' risk hedging decisions is much greater when the price volatility of the hedged asset is higher than when it is lower. - The impact of FVA for derivatives on participants' risk hedging decisions only exists when FVA is applied, but not when HCA is used. |
| (Christensen & Nikolaev, 2013) | The choice between fair value and HCA for non-financial assets. | - Managers, representing outside stakeholders, usually reveal preferences for HCA. |
| (Dong et al., 2014) | The explanatory power of realized gains and losses on available-for-sale (AFS) securities on commercial banks' market value of equity and market-adjusted returns. | - Realized gains and losses on available-for-sale (AFS) commercial banks' securities have pricing implications on unrealized gains and losses of book value and comprehensive income. - The pricing implications of realized gains and losses help investors to predict future bank performance. |
| (Goncharov & van Triest, 2014) | The unintended consequences of FVA in determining mandated preferred dividends. | - Larger incomes lead to discontinuing dividends for ordinary and preferred shareholders. - Fair value adjustments result in higher income and are exceptional relative to recent performance. |
| (Bowen & Khan, 2014) | The link between FVA and impairment rules during a period of extreme financial turmoil and the benefits associated with having more timely mark-to-market data for decision-making. | - During the 2008-2009 financial crisis, the FVA and impairment rules were more important to investors than having more timely and transparent mark-to-market data for decision-making. - Stock price reactions to the relaxation of FVA and impairment rules are positively related to the proportion of banks' illiquid assets. |
| (de Jager, 2014a) | The relationship between FVA and the global financial crisis. | - Unrealised FVA profit led to prolonged and excessive boom bank profits and capital increase. - During the financial crisis, FVA regulations inherent flexibility enabled postpone the recognition of FVA losses. - Lending activity stays subdued until all the marked-up items have been worked off banks' balance sheets. |
| (de Jager, 2014b) | How FVA is practically applied by banks in detail. | - FVA in application by banks is not neutral. During downturns, effort is expended to avoid losses generated by FVA. |
| (Brousseau et al., 2014) | The relationship between FVA for financial assets and market price volatility for nonfinancial firms. | - No systematic difference in price volatility between FVA and HCA. - FVA information does not result in systematically higher or lower volatility under FVA. |
| (Durocher & Gendron, 2014) | The practitioners' reactions to the growing compulsory application of fair-value accounting standards. | - The lack of cognitive unity in the field of FVA is highlighted by the level of variability in practitioners' epistemic commitment toward FVA. - The field of accountancy involves a mixed measurement system increasingly reflective of fair value. |
| (Magnan et al., 2015) | Fair value measurement and disclosure by US bank holding companies influence financial analysts' ability to forecast earnings. | - The increasing use of fair value on a bank's balance sheet is related to more dispersed earnings forecasts. - The increasing use of fair value on a Bank's balance sheet is not significantly associated with accuracy. - The Disclosure of measurement basis levels benefits analysts and is associated with more accurate and less dispersed earnings forecasts. |
| (Lachmann et al., 2015) | The presentation of credit risks effects in other comprehensive income (OCI) instead of net income. | - The presentation format does not affect fair value interpretation. - Firm performance evaluation is less biased if credit risk gains are presented in the OCI statement. |
| (Macve, 2015) | The link between the modern financial accounting theory (FAT) and the history of its social, institutional and market contexts. | - Standard setters' and academic doubts about the underlying rationality progress in accounting and auditing, namely the objectivity of HCA and of auditing, despite frequent, are occasionally catastrophic. |
| (Jiang et al., 2015) | How the stock market reacted to former FASB chairman Bob Herz's unexpected resignation in 2010. | - Bank investors found the former FASB chairman Bob Herz's resignation positive, especially banks that would have been affected more by the fair value requirement for loans. |

continued on following page

Table 4. Continued

| Autor | Research question | Findings |
|----------------------------------|--|--|
| (Demerjian et al., 2016) | The relationship between FVA and the design of debt contract covenants written directly on accounting values. | <ul style="list-style-type: none"> - The covenant definition modification is positively affected by problems attributed to FVA and negatively with the benefits attributed to FVA. - FVA is not uniformly detrimental for debt contracting, and fair value adjustments are included when they are most likely to improve performance measurement. - Borrowers with greater opportunities and incentives to manipulate fair value estimates are more likely to have fair value estimates excluded from covenant definitions. |
| (Chircop & Novotny-Farkas, 2016) | The economic consequences of the Basel III requirement to include unrealized fair value gains and losses on available-for-sale (AFS) securities in regulatory capital. | <ul style="list-style-type: none"> - Banks affected by the Basel III regulation reduce their investment in risky AFS securities relative to unaffected banks. - Extending the use of fair value for regulatory purposes reduces ex-ante risk-taking. |
| (Chen & Gavius, 2016) | The changes in the dividend policy of companies following the adoption of FVA rules. | <ul style="list-style-type: none"> - Firms that distribute dividends based on revaluation gains increase dramatically, between in the pre-IFRS period in the post-IFRS period. - Firms paying dividends from unrealized gains are more financially leveraged and less innovative than firms that did not pay dividends from unrealized gains. - Dividend distributions dilute the firm's real financial resources, thereby increasing the risk for all the firm's stakeholders, particularly debt holders. |
| (Xie, 2016) | Does FVA contribute to the pro-cyclicality of bank lending? | <ul style="list-style-type: none"> - FVA has procyclical effects on bank lending. - Lending decisions do not change according FVA vs HCA adoption. - Unrealized gains and losses on AVS are not procyclical. - Greater FVA exposure is not associated with higher denial rates during the 2008–2009 financial crisis. |
| (Barron et al., 2016) | The effect of the adoption of Statement of Financial Accounting Standards No. 157 Fair Value Measurements (FAS 157) on analysts' information environment. | <ul style="list-style-type: none"> - FAS 157 disclosures measurements reduce uncertainty in analysts' information environment. - Fair value disclosures provision is associated with reduced uncertainty regarding future earnings and lower forecast errors. - Unrealized gains and losses from fair value changes are positively associated with firms' future performance. |
| (Zhang & Andrew, 2016) | The role that accounting discourse has played in mediating the relationship between socialism and capitalism. | <ul style="list-style-type: none"> - The adoption of FVA presented technological advantages that enhanced the relevance of the information being produced for decision making. - The focus on accounting discourses, and FVA, in particular, demonstrate what appears to be simple claims to technical 'best practice'. |
| (Amel-Zadeh et al., 2017) | Do commercial banks exhibit procyclical leverage and the extent to which bank regulation and FVA are contributing factors. | <ul style="list-style-type: none"> - Bank regulation contributes to procyclical leverage, but FVA does not. |
| (Easton & Zhang, 2017) | Other comprehensive income (OCI), namely unrealized gains and losses (UGL) from available-for-sale (AFS) debt securities, is non-transitory. | <ul style="list-style-type: none"> - A mix of accounting methods has two side effects: (1) unrealized accounting holding gains and losses (UGL) differ from true economic holding gains and losses, and (2) sizable negative correlation between UGL and accumulated unrealized holding gains and losses (AUGL). - A significant portion of OCI, namely the UGL from AFS, is non-transitory. |
| (Marabel-Romo et al., 2017) | The problem surrounding FVA by relying on the role played by prudence, its meaning, and how the treatment of prudence has changed in the accounting framework of standard setters due to its 'apparent' inconsistency with neutrality. | <ul style="list-style-type: none"> - The argument that neutrality is supported by the exercise of prudence in achieving a faithful representation, since a non-conservative use of FVA, can lead bank managers towards model misspecification error in the valuation of complex financial instruments. - Problems surrounding FVA can be mitigated if prudence is reinstated by standards setters. |
| (Haswell & Evans, 2018) | How well regulators, political actors, and other commentators may have understood the use, misuse, effects, and consequences of FVA at the time of Enron. | <ul style="list-style-type: none"> - The Enron collapse and the adjustment of FVA in the mid-2000s are linked to the global financial crisis. |
| (Bewley et al., 2018) | China's stop-start adoption of FVA into its national accounting standards. | <ul style="list-style-type: none"> - Key actors' extensive efforts to promote FVA in China served as an integrative factor producing the successful outcome in China's second fair value reform. |
| (Abbott & Tan-Kantor, 2018) | The difficulties of determining the fair value of assets that are long-lived and some of the implications of the switch from historical costs to fair value. | <ul style="list-style-type: none"> - The adoption of fair value measurement impacts the reported values of assets results and the increase in total assets, total liabilities and total equity. - Asset revaluation resulted in an upward adjustment of assets. - Fair value results in a reduction of the rate of profit. - Asset valuation using fair value results in a view that the company performed worse than it did in previous years. |
| (Yoo et al., 2018) | The adoption of FVA for property, plant, and equipment (PP&E) during the global financial crisis. | <ul style="list-style-type: none"> - Private firms relying heavily on debt financing are as likely to revalue PP&E as public firms. |
| (McInnis et al., 2018) | The value relevance of banks' financial statements under FVA and under current Generally Accepted Accounting Principles (GAAP). | <ul style="list-style-type: none"> - The combined value relevance of book value of equity and income under fair value is less than that under GAAP. - Financial statements under FVA provide less relevant information for bank valuation than financial statements under current GAAP. |
| (Georgiou, 2018) | How investors and analysts evaluate the usefulness of fair values to their work. | <ul style="list-style-type: none"> - Investors and analysts expect accounting to provide them with insights into the performance of a business and are quite cautious about the limits of using fair values in financial reports. |
| (Belze et al., 2019) | Reliability of option fair value estimates in the presence of transaction costs. | <ul style="list-style-type: none"> - Companies' model adjustments to deal with transaction costs might be a cause for concern, and reliability of their estimates could be questioned. |

Fair Value Accounting

Despite the enlightening it brings, this research suffers from several limitations, namely the covered period. The International Financial Reporting Standards (IFRS) 13, which has been applicable for annual reporting periods from 1 January 2013, was the main cause in delimiting the studied period. Nevertheless, by its intrinsic features, accounting research relies heavily on historical data (e.g., Amel-Zadeh, Barth, & Landsman, 2017; Barron, Chung, & Yong, 2016; Blankespoor, Linsmeier, Petroni, & Shakespeare, 2013; Bowen & Khan, 2014; Marabel-Romo, Guiral, Luis Crespo-Espert, Gonzaloc, & Moonb, 2017; McInnis, Yu, & Yust, 2018; Shalev, Zhang, & Zhang, 2013). This issue prevented the assessment of the adoption of this norm on fair value accounting literature, therefore, was dropped from the analysis.

On the other hand, the article coverage could be higher. In trying to select higher impact articles, several studies published as book chapters and/or in journals not ranked on the Web of Science Social Sciences Citation Index database were not analysed.

These limitations give insights on future research on fair value accounting, namely by expanding the literature coverage or by evaluating the impact of the adoption of the International Financial Reporting Standards (IFRS) 13.

Nevertheless, given the proposed objectives, the author believes that the present research contributes to portray the current state of the fair value accounting research.

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Chapter 3

Using Strategic Management Accounting Practices to Measure and Manage Intellectual Capital: A Proposal


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ABSTRACT

The main purpose of this chapter is to examine the role of management accounting to measure and manage intellectual capital (IC), and more specifically to explore the potential role of strategic management accounting (SMA) in this process. In addition, this chapter is intended to link SMA practices and some IC resources. SMA practices enable the identification, measurement, and management of IC resources such as production processes and innovation capacity (e.g., target costing), quality management (e.g., quality costing), knowledge-based resources related to the organization's external relationships (e.g., attribute costing, value chain costing, and target costing), and brand image (e.g., brand valuation/management). SMA practices, given its external orientation, enable, mainly, the identification and management of resources encompassed in relational capital. Therefore, this chapter contributes to the extant literature regarding the measurement and management of IC, highlighting the role of SMA, and provides some suggestions for further research.

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INTRODUCTION

In the last decades the organizational environment has suffered several changes. Among these are the globalization of business, the increased physical (people and products) and financial (capital) mobility, the continuous innovation and technological sophistication and, in turn, fierce international competitiveness, as well as the increased customer demands (Bukh, Nielsen, Gormsen, & Mouritsen, 2005; Guthrie, 2001; Johanson, Martensson, & Skoog, 2001; Tayles, Pike, & Sofian, 2007). All these changes, among many others, led to a fast transition from an industry-based economy to a knowledge-based economy (Guthrie, Ricceri, & Dumay, 2012).

In this context, the organizations were forced to permanently change and adapt to their surroundings in order to maintain and achieve competitive advantages. To this purpose, they have turned to new sources of value creation, including employees' know-how, capabilities and skills, information and communication systems, development of processes based on knowledge, and the ability to attract and retain business partners (Jordão & Almeida, 2017; Moeller, 2009). So, while traditional competitive advantages result from the collection and use of tangible resources, for instance long-term heavy machinery, such advantages are now associated with others strategic resources as is the case of intangible assets based on knowledge (García-Meca & Martínez, 2007; Guthrie, 2001; Hejazi, Ghanbari, & Alipour, 2016; Tan, Plowman, & Hancock, 2008; Tayles, Bramley, Adshead, & Farr, 2002; Widener, 2006).

In the literature, the knowledge-based resources are recognized as intellectual capital (IC) (Asiaei, Jusoh, & Bontis, 2018; Dumay & Rooney, 2011; Edvinsson & Malone, 1997; Guthrie et al., 2012; Kasztler & Leitner, 2009; Novas, Alves, & Sousa, 2017; Stewart, 1997; Striukova, Unerman, & Guthrie, 2008; Tayles et al., 2002). Thus, the term IC comprises the set of strategic resources such as knowledge, information, know-how, intellectual property, reputation of products and organization, and relations with business partners (Abeysekera, 2006; Guthrie, 2001; Jordão & Almeida, 2017). More simplistically, IC represents the intellectual or knowledge-based resources (Striukova et al., 2008), or all intangible assets, based on knowledge, of an organization (Cleary, 2009). In most studies, these resources are also organized in three main components: human capital (HC), structural capital (SC) (internal, organizational, or process capital), and relational capital (RC) (customer, external, or social capital) (Duff, 2018; Pedro, Leitão, & Alves, 2018; Subramaniam & Youndt, 2005).

Several authors consider that the IC has become increasingly important for organizations since it represents the set of critical resources to achieve strategic and sustainable competitive advantages, determining the value creation and organizations' success (Abeysekera, 2006; Buenechea-Elberdin, Sáenz, & Kianto, 2018; García-Meca & Martínez, 2007; Jordão & Almeida, 2017; Mohamed & Jones, 2014; Roslender & Fincham, 2001). According to Marr (2008, p. 29), "success and value creation of any organization in today's economy is driven by intellectual capital." In fact, some studies show a positive and significant influence of IC on performance (Buenechea-Elberdin et al., 2018; Chowdhury, Rana, Akter, & Hoque, 2018; Hejazi et al., 2016; Jordão & Almeida, 2017; Nadeem, Gan, & Nguyen, 2018; Novas et al., 2017; Tayles et al., 2007).

In this context, it is vital to identify, measure, manage, recognize, and report IC in order to fulfill its maximum potential (Cronje & Moolman, 2013; Hejazi et al., 2016; Roslender & Fincham, 2001). Since traditional accounting systems fail to recognize it (they only recognize some intangibles assets in the balance sheet and, consequently, the book value of an organization tends to be different from its market value) (Abeysekera, 2006; Duff, 2018; Guthrie, 2001), it is goal of the management accounting to contribute to the identification, measurement, management, and reporting of resources that constitute

IC (Tayles et al., 2007). On the one hand, the role of the SMA is to provide information to support strategic decision-making (Arunruangsirilert & Chonglertham, 2017; Ma & Tayles, 2009; Tayles, 2011). On the other hand, IC is a group of strategic resources. Thus, SMA should include the analysis of such resources (Nixon & Burns, 2012; Tayles et al., 2002, 2007).

Although some papers examine the relationship between some features of the management accounting and IC components (i.e., HC, SC, and RC) or only some resources of such components (Asiaei & Jusoh, 2017; Asiaei et al., 2018; Cleary, 2009; Jan Mouritsen & Larsen, 2005; Novas et al., 2017; Tayles et al., 2007; Widener, 2006), the majority of papers analyzes exclusively the IC report or voluntary disclosure (Abeysekera, 2006; Beretta, Demartini, & Trucco, 2019; Chowdhury et al., 2018; Duff, 2018; Pablos, 2003; Striukova et al., 2008; Xia & De Beelde, 2018). On the other hand, scarce literature explores the potential role of SMA practices for measuring and managing IC (Pires & Alves, 2011; Tayles et al., 2002, 2007).

In this sense, the main purpose of this chapter is to examine, theoretically, the role of the management accounting, more precisely the role of the SMA, to measure and manage IC. This chapter has two specific goals. Firstly, it aims to address the definition of IC and identify its components in order to understand what it comprises. Secondly, it intends to discuss, in more detail, the potential role of the SMA in the process of measurement and management of IC. In other words, it aims to establish a link between SMA practices and the resources that constitute IC.

The chapter contributes to the development of IC and SMA literatures in an integrated framework. In fact, SMA literature has largely neglected some strategic organizational resources, as is the case of IC (Nixon & Burns, 2012), and their link, with the exception of Tayles et al. (2002, 2007).

The remainder of this chapter proceeds as follows. The second section provides the definition of IC and its components. The third section presents and characterizes the key practices identified in the literature as being useful for the measurement and management of IC. In addition, this section explores the potential role of the SMA practices to reach the goal previously mentioned. That is, it establishes a link between SMA practices and some IC resources. Finally, the fourth section presents the main conclusions, limitations, and some suggestions for future research.

INTELLECTUAL CAPITAL: DEFINITION AND COMPONENTS

According to Bontis (2001) and Hejazi et al. (2016), the first use of the term IC is attributed to John Kenneth Galbraith, who in a letter to the economist Michael Kalecki in 1969 wrote: "I wonder if you realize how much those of us the world around have owed to the intellectual capital you have provided over these past decades." Later, the term appears again through Peter Drucker in his description of post-capitalist society (Bontis, 2001) and its use was extended since then. However, the first use of the term intangibles, often used as synonym, can be found in 1896 in the work of Lawrence R. Dicksee (Kristandl & Bontis, 2007). Given the importance of the role played by intangible assets and IC to organizations' success, other authors also have highlighted them and the study of such assets has attracted several researchers in the last decades (Albertini, 2016; Asiaei & Jusoh, 2017; Asiaei et al., 2018; Duff, 2018; Dumay & Rooney, 2011; García-Meca & Martínez, 2007; Johanson et al., 2001; Jordão & Almeida, 2017; Kristandl & Bontis, 2007; Nadeem et al., 2018; Novas et al., 2017; Stewart, 1997; Striukova et al., 2008; Sveiby, 1997; Tayles et al., 2007; Xia & De Beelde, 2018).

In general, IC is recognized as a set of critical resources based on knowledge to achieve sustainable competitive advantages and value creation in the era of globalization, continuous innovation and technological sophistication, and processes based on knowledge (García-Meca & Martínez, 2007; Widener, 2006). These resources, with an intangible nature, are related to people (e.g., staff resources or employees, customers, and suppliers) and can be more or less dependent on them (European Commission, 2006). In order to broadly understand what IC is and what it is comprised of, the definition and components of IC are discussed below.

Definition of Intellectual Capital

The term IC is used in the literature to represent a set of strategic and valuable resources, with an intangible nature, based on knowledge (Abeysekera, 2006; Dumay & Rooney, 2011; García-Meca & Martínez, 2007; Guthrie, 2001; Kasztler & Leitner, 2009; Novas et al., 2017; Pedro et al., 2018; Tan et al., 2008). “Together with physical and financial capital, intellectual capital is one of the three vital resources of organizations” (Marr, 2008, p. 5). However, although the literature recognizes the importance of the IC, there is still no consensus on a precise definition of IC (Choong, 2008; Chowdhury et al., 2018; Kristandl & Bontis, 2007; Pedro et al., 2018; Tan et al., 2008; Youndt, Subramaniam, & Snell, 2004). In order to prove it, some definitions of IC identified in the literature are presented, chronologically, in Table 1. The list of definitions is only illustrative and non-exhaustive.

Stewart (1997), for instance, defines IC as intellectual material (knowledge-based resources) that can be used to create wealth (or value). Similarly, Edvinsson and Malone (1997) define IC as the possession of knowledge, and other knowledge-based resources, that can provide competitive advantages. Additionally, other authors define IC as the sum of knowledge (Roos & Roos, 1997; Subramaniam & Youndt, 2005; Youndt et al., 2004) or use examples to illustrate it (Bukh et al., 2005; Choong, 2008; Cuganesan, Boedker, & Guthrie, 2007). However, the definition of IC using illustrative examples has the disadvantage of not covering all resources that can be part of IC.

Particularly, the European Commission (2006) defines IC as the combination of human, organizational, and relational resources, including intangible activities of an organization. IC comprises (i) knowledge, competences, experience and employees’ skills (human resources); (ii) research and development activities, routines, procedures, databases, organization’s systems, and intellectual property rights (activities and organizational resources); and (iii) resources related to external relations with customers, suppliers, and partners in research and development (relational resources). The combination of intangible resources and activities allows an organization to transform a set of material, financial, and human resources into a system capable of creating value for stakeholders (Bontis, 2001; Marr, 2008; Pedro et al., 2018). The European Commission (2006) assumes that to be considered part of the organization, intangible resources have to be internalized in a lasting and efficient way and/or appropriated by the organization. Therefore, this definition, which is more extensive than those presented in other studies, considers that IC encompasses some components (outlined in the next section), and presents a set of illustrative examples of IC. In addition, when analyzing this definition it appears that IC is only one part of the intangibles, as it infers that only intangibles that are internalized and/or appropriated by an organization belong to IC.

Using Strategic Management Accounting Practices to Measure and Manage Intellectual Capital

Table 1. Definitions of intellectual capital

| Source | Definition |
|--------------------------------------|---|
| Edvinsson and Malone (1997, p. 44) | "Intellectual capital is the possession of the knowledge, applied experience, organizational technology, customer relationships and professional skills that provide (a company, edited) with a competitive edge in the market." |
| Roos and Roos (1997, p. 415) | "Intellectual capital is the sum of the 'hidden' assets of the company not fully captured on the balance sheet, and thus includes both what is in the heads of organizational members, and what is left in the company when they leave." |
| Stewart (1997, p. XI) | "Intellectual capital is intellectual material – knowledge, information, intellectual property, experience – that can be put to use to create wealth." |
| Sveiby (1997, p. 11) | IC is "invisible assets that include employee competence, internal structure and external structure." |
| Nahapiet and Ghoshal (1998, p. 245) | IC is "the knowledge and knowing capability of a social collectivity, such as an organization, intellectual community, or professional practice." |
| Pablos (2003, pp. 63–64) | "A broad definition of intellectual capital states it is the difference between the company's market value and its book value. Knowledge-based resources that contribute to the sustained competitive advantage of the firm form intellectual capital." |
| Youndt et al. (2004, p. 337) | IC is "the sum of all knowledge an organization is able to leverage in the process of conducting business to gain competitive advantage." |
| Bukh et al. (2005, p. 715) | IC represents the "knowledge resources, in the form of employees, customers, processes or technology, which the company can mobilize in its value creation processes." |
| European Commission (2006, p. 126) | "Intellectual capital is the combination of the human, organizational and relational resources and activities of an organization. It includes the knowledge, skills, experiences and abilities of the employees; the R&D activities, the organizational routines, procedures, systems, databases and intellectual property rights of the company; and all resources linked to the external relationships of the firm, with customers, suppliers, R&D partners, etc. This combination of intangible resources and activities allows an organisation to transform a bundle of material, financial and human resources in a system capable of creating stakeholder value. Intangibles to become part of the intellectual capital of an organisation have to be durably and effectively internalised and/or appropriated by this organisation." |
| Choong (2008, p. 616) | IC comprises "expenditures on advertising (marketing), training, start-up, research and development activities, human resource expenditures, organizational structure and values that come from brand names, copyrights, covenants not to compete, franchises, future interests, licences, operating rights, patents, record masters, secret processes, trademarks and trade names." |
| Marr (2008, p. 5) | "Intellectual capital includes all non-tangible resources that (a) are attributed to an organization, and (b) contribute to the delivery of the organization's value proposition." |
| Montemari and Nielsen (2013, p. 524) | IC "is considered a phenomenon that allows the "activation" of intangible resources, i.e. the knowledge resources connected to employees, customers, technologies and processes." |
| Krstić and Bonić (2016, p. 724) | "IC is a mechanism that interconnects all visible resources on the balance sheet which contribute to the value creation process, as well as to the improvement of business performance. Also, the IC determines the future potential of a company's growth." |
| Pedro et al. (2018, p. 2521) | IC "is a combination of an organization's intangible resources, represented by all types of knowledge, information, intellectual property, among others, originating in human and technological resources and functioning as potential sources to generate value added for all the stakeholders of that organization, forming a source of sustainable competitive advantage." |

More recently, Montemari and Nielsen (2013) define IC as a phenomenon that enables the "activation" of intangible resources and Krstić and Bonić (2016) define IC as a mechanism that interconnects all the resources captured on the balance sheet (i.e., material and financial resources) that contribute to the value creation process. That is, these authors adopt a more dynamic approach to define IC. More than a set or a sum of knowledge-based resources, Montemari and Nielsen (2013) and Krstić and Bonić

(2016) highlight the interrelationships among the knowledge-based resources and the interrelationships among them and other organizational resources.

Curiously, although there are several definitions of IC, Pedro et al. (2018) show that the majority of the studies on IC adopts similar definitions to the one developed by the most known authors in the field.¹ In this way, the pioneering definitions are still considered the most adequate to define IC (Pedro et al., 2018).

In short, the list of definitions presented in Table 1 and the above analysis show that there is a diversity of IC definitions. However, the analysis also highlights that: (i) explicitly or implicitly the definitions establish that IC resources are intangible or invisible resources (i.e., non-material and non-financial resources); (ii) IC comprises resources and activities based on knowledge; (iii) IC is more than a set or a sum of knowledge-based resources and activities; and (iv) IC resources are critical to achieve sustainable competitive advantages and value creation. In fact, although the relationship between IC (or each of its components) and performance has produced mixed results, several studies highlight the importance of IC in the value creation, showing a positive and significant influence of IC on performance (Buenechea-Elberdin et al., 2018; Chowdhury et al., 2018; Hejazi et al., 2016; Jordão & Almeida, 2017; Nadeem et al., 2018; Novas et al., 2017; Sherif & Elsayed, 2016; Tayles et al., 2007; Zhang, Qi, Wang, Pawar, & Zhao, 2018). For instance, Zhang et al. (2018), based on a sample of 300 Chinese and 200 Indian manufacturers, find that IC enhances product innovation performance (i.e., number, speed, and frequency of new product introduction). Jordão and Almeida (2017), in a sample of Brazilian firms listed on the BM&FBovespa in the period 2005-2014, show that IC positively influences long-term financial performance (i.e., profitability and firm return). Similarly, Nadeem et al. (2018), based on a sample of all publicly listed firms on the Australian stock exchange in the period 2005-2014, also report a significant and positive relationship between IC efficiency and financial performance (i.e., return on assets and return on equity). In turn, Novas et al. (2017), using a sample of 281 Portuguese firms operating in all sectors of economic activity, only find a significant and positive relationship between SC (an IC component described in the next section) and performance (i.e., perceived financial and non-financial performance).²

Additionally, the analysis of the IC definitions also highlights that the terms “IC”, “intangibles”, and “intangibles assets”, among others,³ are still used in the literature, quite often, interchangeably (Choong, 2008; Duff, 2018; Edvinsson & Malone, 1997; Kristandl & Bontis, 2007; Tan et al., 2008). This may occur because IC is studied in several research fields such as accounting, economics, finance, human resources management, and strategic management (Abeysekera, 2006; Choong, 2008). In this sense, a thorough debate is needed in order to standardize the IC definition and to build a more coherent theoretical body (Abeysekera, 2006). Choong (2008), Kristandl and Bontis (2007), and Pedro et al. (2018) have already initiated this debate. Nevertheless, more debate is needed.

Despite the lack of consensus regarding the IC definition, it appears that there is a broad consensus on the existence of at least three main components of IC (Cuganesan et al., 2007; Duff, 2018; Novas et al., 2017; Pedro et al., 2018). Therefore, in the next section these components are analyzed.

Components of Intellectual Capital

Several authors agree that the IC comprises, at least, three main components which are, generally, described as HC, SC, and RC (Albertini, 2016; Beretta et al., 2019; Duff, 2018; Krstić & Bonić, 2016; Marr, 2008; Martínez-Torres, 2006; Novas et al., 2017; Tayles et al., 2007; Toorchi, Asiaei, & Dehghan,

2015). Although not all authors use the designations of HC, SC, and RC, synonym terms are employed in the literature. Thus, instead of HC some authors use the terms “employees” or “employee competencies” (Sveiby, 1997); instead of SC some authors use the terms “internal capital” (Duff, 2018; Sveiby, 1997) or “organizational capital” (Edvinsson & Malone, 1997; European Commission, 2006; Roos & Roos, 1997; Subramaniam & Youndt, 2005; Youndt et al., 2004); and, instead of RC some authors use the terms “customer capital” (Edvinsson & Malone, 1997; Roos & Roos, 1997), “external capital” (Duff, 2018; Sveiby, 1997), or “social capital” (Hejazi et al., 2016; Stewart, 1997; Subramaniam & Youndt, 2005; Youndt et al., 2004). Nevertheless, some authors suggest a new component of IC, designated as renewal capital, which represents the organization’s ability to learn and to permanently renew its knowledge-base (Buenechea-Elberdin et al., 2018; Inkinen, Kianto, Vanhala, & Ritala, 2017; Kianto, Hurmelinna-Laukkanen, & Ritala, 2010). This new component introduces a more dynamic view in the categorization of IC.

In fact, Pedro et al. (2018) find that HC, SC (organizational capital or process capital), and RC (client capital, social capital, cognitive capital, or business capital) are the components most utilized in empirical studies on IC. They also find other IC components such as innovation capital (or renewal capital), image capital (marketing capital or brand capital), and technological capital (or information technology capital). In this context, some definitions of the three main components of IC are presented in Table 2. The definitions are illustrative and presented chronologically.

HC includes the employees’ knowledge, competencies, skills, know-how, and expertise (Duff, 2018; Krstić & Bonić, 2016; Marr, 2008). In this sense, it corresponds to the value that individuals can produce to organizations, given that skills and individual knowledge can be transformed into collective expertise such as SC (European Commission, 2006). Similarly, Marr (2008) considers that HC, as the thinking part of an organization, is the generation basis (starting point) of other IC resources (i.e., SC and RC). According to García-Meca and Martínez (2007), HC resources vary depending on several characteristics of the organizations and are more important for some of them (i.e., knowledge-intensive organizations, such as organizations operating in the information and communication technologies industry or pharmaceutical industry) than for others.

SC corresponds to the institutionalized knowledge and codified experience (Albertini, 2016). It comprises resources such as organizational structure, databases and information systems, organizational culture, organizational learning, routines and procedures, management philosophy, and intellectual property (Duff, 2018; European Commission, 2006; Krstić & Bonić, 2016; Marr, 2008). Unlike HC and RC resources, some SC resources can be legally protected (i.e., intellectual property such as patents and trademarks) and therefore come to be recognized formally as belonging to the organization (Marr, 2008).

Finally, RC represents the value of all knowledge-based resources related to external relationships with customers, suppliers, investors, regulators, pressure groups, and business partners (Duff, 2018; European Commission, 2006; Krstić & Bonić, 2016; Marr, 2008). In this context, in accordance with the European Commission (2006) and García-Meca and Martínez (2007), the relationships with customers are an important contributor to obtain competitive advantages and the most relevant external source of information to promote innovation and development of other IC resources, followed by suppliers, competitors and other business partners. RC encompasses resources such as image and reputation, branding, strategic alliances, and distribution channels (Cuganesan et al., 2007). Consequently, RC is more difficult to manage than HC and SC because it is more externally oriented (Krstić & Bonić, 2016).

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According to some authors IC is more than a sum of the three main components described above (Albertini, 2016; Martínez-Torres, 2006; Montemari & Nielsen, 2013; Novas et al., 2017; Subramaniam & Youndt, 2005). As also recognized in some IC definitions analyzed before (Krstić & Bonić, 2016; Montemari & Nielsen, 2013), IC “reflects the ability of the organization to allocate (static) resources to undertake (dynamic) activities” (Duff, 2018, p. 770). This is, the knowledge-based resources that constitute the three main IC components work together in closer combinations to ensure that all organizational resources, visible and invisible on the balance sheet, contribute to the value creation process (Krstić & Bonić, 2016; Novas et al., 2017; Pedro et al., 2018; Tayles et al., 2007). For instance, Subramaniam and Youndt (2005) show the importance of the interrelationships between IC components to enhance innovative capabilities, which are critical to organizations’ survival and growth (Tece, 2007, 2018).⁴

Table 2. Components of intellectual capital

| Source | Human capital | Structural capital | Relational capital |
|----------------------------|---|---|--|
| European Commission (2006) | HC represents the individual value and includes the knowledge, competences, relationship ability, and values of the employees. | SC corresponds to what is left in the organizations when HC goes home and includes routines and procedures, systems and databases, and intellectual property rights. | RC encompasses all resources related to the organization’s external relationships with customers, suppliers, and partners in research and development activities. |
| Marr (2008) | HC is defined as the alive and thinking part of IC and comprises skills and competencies, know-how, aptitudes, and attitudes of the employees. | SC represents a broad range of vital resources associated with the organizational culture, practices and routines, and intellectual property. | RC represents the value of all relationships with any outside person or organization, such as customers, suppliers, alliance partners, pressure groups, and investors. |
| Krstić and Bonić (2016) | HC contains resources such as competences, expertise, skills, work habits, professional experience, abilities to learn and adapt, and motivation of the managers and other employees. | SC represents a wide set of knowledge-based resources created by employees and includes databases, information systems, control systems, customer lists, innovations, and patents. SC can be grouped into two elements: organizational capital and intellectual property. | RC is created through organization’s external relationships with customers, distribution channels, and suppliers. |
| Duff (2018) | HC comprises all the knowledge that employees take with them when they go home at the end of the working day, such as their knowledge, skills, experiences, and abilities. | SC corresponds to all the knowledge that stays within the organization when employees go home and includes organizational processes, systems, cultures, and management philosophy. | RC contains all resources related to external relationships with clients, suppliers, or regulators. |

In order to highlight the interrelationships (i.e., dynamic relationships) between the three main components of IC, Martínez-Torres (2006) and Novas et al. (2017) develop and empirically test a circular model which considers that HC influences SC, SC influences RC, and RC influences HC. They show

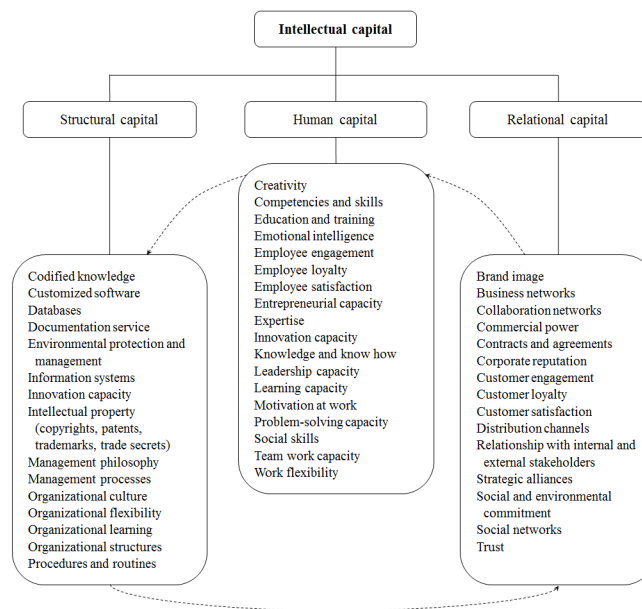
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that HC has a positive effect on SC, SC has a positive effect on RC, and RC has a positive effect on HC. Furthermore, Novas et al. (2017) show that there are indirect relationships between the three components which also contribute to the development of IC. Therefore, HC is a precursor of SC, which can be seen as the consequence of employees' creativity. SC provides the necessary basis to support the relationships between organizations and their stakeholders that allow the development of RC, and these interactions promote the development of HC (Albertini, 2016; Martínez-Torres, 2006; Novas et al., 2017). However, the direction of the interrelationships between the IC components is not consensual (Novas et al., 2017). The interrelationships between the IC components are multiple and complex (Albertini, 2016) and can change direction and/or intensity over time (Montemari & Nielsen, 2013), which complicates their study and deeper understanding.

Figure 1 provides some illustrative examples of each IC component and, also, highlights the relationship among the IC components according to the circular model used by Martínez-Torres (2006) and Novas et al. (2017).

Figure 1. Illustrative examples of intellectual capital components

Source: Adapted from Marr (2008, p. 6) and Pedro et al. (2018, p. 523)



In short, there is a broad consensus in the literature that IC comprises three main components designed as HC, SC, and RC. HC refers to employees' knowledge and competences, SC corresponds to the institutionalized and codified knowledge, and RC represents the knowledge embedded in the organizational relationships with stakeholders. Additionally, the literature, regarding the categorization of IC that adopts a more dynamic approach has highlighted a new component, renewal capital, which represents the ability to permanently renew the knowledge-based resources. Also, the academic literature stresses the interrelationships between the IC components, which allow that the knowledge embedded in one component leverages the value of another component and, together, these maximize the value creation.

(STRATEGIC) MANAGEMENT ACCOUNTING: CONTRIBUTIONS TO MEASUREMENT AND MANAGEMENT OF INTELLECTUAL CAPITAL

The traditional accounting system neither adequately considers information about IC (Abeysekera, 2006; Cronje & Moolman, 2013; Guthrie, 2001; Hejazi et al., 2016; Pablos, 2003; Widener, 2006), nor shows in the balance sheet the value of several intangibles (Choong, 2008; Roos & Roos, 1997; Striukova et al., 2008). This may occur because the identification, measurement, and recognition of IC resources such as employees' knowledge and skills, databases, and knowledge-based resources embedded in the organization's external relationships with stakeholders are complex (Bontis, 2001; Guthrie, 2001; Marr, 2008). Therefore, traditional accounting does not satisfactorily comply with the main goal of showing the true financial position and performance of the organizations, and financial statements lose some usefulness as a tool supporting meaningful decision-making (Guthrie, 2001). The restrictive accounting rules do not allow many of the intangibles to be recognized in the financial statements, especially the internally generated intangibles (Cronje & Moolman, 2013; Duff, 2018; Marr, 2008). Instead many of the costs associated with IC development are directly reflected in the income statement, as is the case of the expenditures on advertising (marketing) and training (Choong, 2008; Marr, 2008).

In this sense, alternative forms and practices are needed for the accounting treatment of IC resources (Cuganesan et al., 2007; Marr, 2008). As a main source of sustainable competitive advantages and value creation, IC resources should be properly identified, measured, and managed (Marr, 2008; Tayles et al., 2007). Several authors consider that for the identification, measurement, and management of IC, management accounting assumes a particular relevance (Asiaei & Jusoh, 2017; Asiaei et al., 2018; Cleary, 2009; Johanson et al., 2001; Marr, 2008; Jan Mouritsen & Larsen, 2005; Novas et al., 2017; Tayles et al., 2002, 2007). In particular, Tayles et al. (2002) consider that SMA practices may have a critical role in providing information on IC, supporting strategic decision-making.⁵ For such decisions managers need information on strategic and critical resources that contribute to achieve long-term competitive advantages and to create value for all stakeholders. On the one hand, Asiaei and Jusoh (2017), based on a sample of 128 Iranian public listed companies, find that companies with higher levels of IC (i.e., HC, SC, RC, and social capital) use a greater diversity of performance measures (i.e., measures related with five perspectives: financial, customer, internal business process, innovation and learning, and social and environmental). On the other hand, Novas et al. (2017) show a positive and significant effect of management accounting (i.e., style of use, type of information provided, and type of decision supported) on HC and SC. In this way, IC affects the development of management accounting but also management accounting contributes to the development of IC (bi-directional relationship).

Measurement of Intellectual Capital

Organizations try to create and recreate models to measure IC, which are reported and analyzed in the literature (Bontis, 2001; Krstić & Bonić, 2016; Pablos, 2003; Tan et al., 2008). Some are more generic, since they can be adapted and used by different organizations (e.g., Balanced Scorecard), and others are

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Table 3. Measurement models of intellectual capital

| Model | Definition and main characteristics | Sources |
|---|--|---|
| Balanced scorecard (BSC) | This model includes financial and non-financial elements, which influence performance, in four perspectives: financial, customer, internal processes, and learning and growth. BSC through the different perspectives reflects the different IC components (i.e., RC through customer perspective, SC and HC through internal processes and learning and growth perspectives, and the influence of IC on value created to shareholders through financial perspective). | Kaplan and Norton (1992), Pablos (2003), Tayles et al. (2007), and Toorchi et al. (2015). |
| Economic Value Added (EVA) | EVA allows the measurement of the potential of strategic options to create value and to assess the performance of business units and managers. Therefore, organizations that have a higher and growing EVA have better use of their IC. However, it does not allow to determine the contribution of each IC resource to the value created. | Bontis (2001) and Tan et al. (2008). |
| IC-Index | This model consolidates the information of several individual measures into a single index and relates changes in IC with changes in the market. Therefore, it allows better visualization of the value creation process. | Bontis (2001) |
| Intangible Asset Monitor | This model divides IC into three components (i.e., individual competence, internal structure, and external structure) that are analyzed from three perspectives: growth/renewal, efficiency, and stability). For each perspective and for each component one or two measures, mainly non-financial, should be selected. Thus, it can be used to measure but also to monitor organizations' intangibles. | Bontis (2001), Sveiby (1997), and Tan et al. (2008) |
| Skandia Navigator | This model considers five areas of focus (i.e., financial, customer, human, process, and renewal and development), and their interaction with time (i.e., past, present, and future), to measure IC. Financial focus represents the past of the organization; customer, human, and process focus represent the present and constitute the IC of an organization; and renewal and development focus is the platform that underpins the organizations' future. The Skandia Navigator includes, mainly, non-financial measures. | Bontis (2001), Edvinsson and Malone (1997), Pablos (2003), Roslender and Fincham (2001), and Tan et al. (2008). |
| Technology Broker | This model uses qualitative measures to analyze IC, which considers the combination of four components: market assets, human assets, intellectual property assets, and infrastructure assets. After a process of diagnosis and examination of each component, the monetary value of IC can be determined by one of the three methods: the cost, the market, and the income approaches. | Bontis (2001), Choong (2008), Pablos (2003), and Tan et al. (2008). |
| Tobin's Q | Tobin's Q is the ratio between the market value of an asset and its replacement cost. When it is greater than 1 and greater than competitors' Tobin's Q, then the organization attaches value to their assets and has the ability to produce higher profits. Then, the higher the value of Tobin's Q the higher the value of IC. | Hejazi et al. (2016), Pablos (2003), and Tan et al. (2008). |
| Value Added Intellectual Coefficient (VAIC) | This model measures the IC based on four main concepts: value added, physical capital, intellectual potential, and intellectual capital. VAIC corresponds to the sum of three coefficients: value added capital coefficient, which represents the value added by one unit of physical capital; human capital coefficient, which indicates the ability of HC to create value; and structural capital coefficient, which measure the share of SC in the creation of value added. | Chowdhury et al. (2018), Hejazi et al. (2016), Pulic (2000), and Tan et al. (2008). |
| Value Chain Scoreboard (VCS) | This model aims to report the influence of intangibles on organizational performance. For this purpose it uses a matrix of non-financial measures organized into three perspectives according to the cycle of innovation (i.e., discovery and learning, implementation, and commercialization). | Choong (2008) and Lev (2001). |

more specific, as they are designed for a particular industry or organization (e.g., Skandia Navigator) (Roslender & Fincham, 2001). Among these measurement models the balanced scorecard (BSC), the economic value added (EVA), the IC-index, the intangible asset monitor, the Skandia navigator, the technology broker, the Tobin's Q, the valued added intellectual coefficient (VAIC), and the value chain

scoreboard (VCS) stand out (Bontis, 2001; Choong, 2008; Tan et al., 2008). In this sense, the definition and main characteristics of each of these measurement models are presented in Table 3.⁶

In addition, the literature provides several others measurement and management models of IC (Guthrie et al., 2012; Krstić & Bonić, 2016; Loyarte et al., 2018; Montemari & Nielsen, 2013; Ramírez, Manzanque, & Priego, 2017). For instance, Montemari and Nielsen (2013) explore the dynamic measurement and management of IC for a network composed by four Danish companies, using causal maps, in order to understand how IC really works, the critical value drivers, and the relationships between them. In turn, Krstić and Bonić (2016) develop a tool for IC performance measurement in knowledge organizations, described as the efficiency of intellectual capital (EIC). This model connects financial accounting valuation and market valuation for measuring the efficiency of total organizations' IC: visible IC on the balance sheet, which comprises intangible assets and goodwill; and invisible IC on the balance sheet, which encompasses HC, SC, and RC.

The adoption and use of these models by the organizations, among others, to measure and manage their IC resources have been examined by several authors (Chiucchi, 2013a, 2013b; Dumay & Rooney, 2011; Giuliani, 2016; Giuliani, Chiucchi, & Marasca, 2016; Tayles et al., 2007). Curiously, they conclude that the models developed, specifically, for IC measurement are not always used by organizations with IC intensive because they do not adequately respond to the information needs (Tayles et al., 2007), and sometimes it is possible to implement IC practices without concrete IC measures (Dumay & Rooney, 2011). For instance, Tayles et al. (2007) find that measures based on value added, as is the case of EVA, are strongly associated with higher levels of IC, while models such as the intangible asset monitor and Skandia navigator (i.e., specific measurement model of IC) are not associated with the IC level of the organizations analyzed. Nevertheless, the authors agree that it is important to use financial and non-financial measures, mainly non-financial measures, to manage IC resources and capture its influence on organizational performance (Asiaei et al., 2018; Montemari & Nielsen, 2013; Tayles et al., 2007).

In this context, recently some authors argue that the more important point is to adapt the measurement models to the organizations' needs, rather than to adopt them in an integral way (Dumay & Rooney, 2011). Also, the measurement model adapted should make sense to the organization and should be aligned with its strategic goals (Giuliani, 2016). However, beyond the IC measurement it is critical to assure its management. The identification and measurement of IC without their proper management makes no sense. In fact, according to Dumay and Garanina (2013, p. 13), the measurement models of IC are only "tools for managers of companies who are more concerned with real implications of IC management for value creation than just pure IC measurement." Thus, possible contributions of (other) SMA practices⁷ for the identification and management of IC resources are examined below.

Linking Strategic Management Accounting Practices and Intellectual Capital

In performing their activities the organizations use knowledge-based resources, which are critical to achieve strategic goals and create value to all stakeholders (Widener, 2006). Therefore, firstly, it is essential to define the strategic goals of an organization and then identify IC resources that influence them, in order to develop a set of management activities that allow the mobilization of such resources to achieve the desired goals (Chiucchi, 2013b; Giuliani, 2016; Ramírez et al., 2017). According to Marr (2008, p. 4), "identifying and managing the right intellectual capital is and will increasingly be the key differentiator between successful, mediocre, and failing enterprises." Given that to monitor these activities and strategic management of knowledge-based resources included in IC, it is needed to provide and

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use financial and non-financial measures (Asiaei & Jusoh, 2017; Giuliani, 2016; Montemari & Nielsen, 2013; Pablos, 2003; Ramírez et al., 2017; Tayles et al., 2002).

The main role of the SMA practices is to provide information to support strategic decision-making (Arunruangsirilert & Chonglertham, 2017; Lachmann, Knauer, & Trapp, 2013; Ma & Tayles, 2009; Tayles, 2011). Thus, they can and should give information on IC resources that allow to manage and mobilize them properly (Nixon & Burns, 2012; Tayles et al., 2002). SMA practices provide strategic information, both internal and external, with environmental and marketing orientation, focused on the future, including financial and non-financial information on multiple dimensions (e.g., competitors, customers, production) (Cadez & Guilding, 2008; Guilding, Cravens, & Tayles, 2000; Tayles, 2011). Taking into account these features Cadez and Guilding (2008) identify 16 SMA practices which they classify into five categories: (i) costing, which includes five practices; (ii) planning, control, and performance measurement, which encompasses two practices; (iii) strategic decision-making, which contains three practices; (iv) competitor accounting, which comprises three practices; and (v) customer accounting, which comprehends three practices.⁸ In this context, the link between some SMA practices (i.e., life cycle costing, quality costing, target costing, value chain costing, benchmarking, competitor cost assessment and competitive position monitoring, customer profitability analysis, and lifetime customer profitability analysis) and IC resources are analyzed more deeply below.

The analysis starts with the life cycle costing that provides a cost analysis, taking into account the product's life cycle instead of an annual or shorter period (Guilding et al., 2000; Tayles, 2011). In this sense, the adoption and use of this practice has strategic implications. If an organization uses this practice it is expected that it thoroughly executes the research and design phase to meet the customer needs and ensure the product's lifetime profitability (Dunk, 2004; Tayles, 2011). Also, innovative products with an expected shorter life cycle can favor flexible resources that give to the organization cost agility (Anderson, Asdemir, & Tripathy, 2013) and promote the rapid development of new products (Ellram & Stanley, 2008). Thus, life cycle costing contributes to the management and development of IC resources related to innovation, research and development, flexibility, and relationship with customers.

Quality costing identifies the costs associated with the prevention, creation, identification, and repair of defects, which represent prevention costs (compliance costs) and assessment and failure costs (non-compliance costs) (Abdelsalam & Gad, 2009; Guilding et al., 2000; Kazaz, Birgonul, & Ulubeyli, 2005; Tayles, 2011). Generally, when prevention costs increase the failure costs decrease and product quality increases, which allow the organization to meet customer requirements and achieve competitive advantages (Abdelsalam & Gad, 2009; Guilding et al., 2000; Tayles, 2011). Therefore, information on quality costs is necessary to detect deficiencies in the quality management systems, identify and eliminate activities that compromise quality, and justify future initiatives related to quality management (Abdelsalam & Gad, 2009; Kazaz et al., 2005). This is, quality costing enables management to focus on the product quality. In this context, this SMA practice supports the management and development of IC resources such as product quality, quality management systems, and, in turn, customer satisfaction.

Target costing corresponds to the method in which a product is designed to meet the customer needs and requirements, and the target cost is determined based on a market price and a desired profit margin (Guilding et al., 2000; Tani, 1995; Tayles, 2011). So, in order to achieve the target cost the organizations use "value engineering" for the planning of activities and technologies to be used in the production process (Tani, 1995). Also, target costing involves techniques of product development and design and needs cooperation of many departments for its execution (Tani, 1995; Woods, Taylor, & Fang, 2012). In this sense, this practice helps to reduce costs and increase profits. In addition, some authors stress

the usefulness of the target costing to generate unique ideas for product development (Tani, 1995), align both perspectives of customers and shareholders (Woods et al., 2012), and establish inter-organizational supply chains (J. Mouritsen, Hansen, & Hansen, 2001). Thus, this practice contributes to the management and mobilization of IC resources such as creativity, innovation capacity, organizational learning and flexibility, business and collaboration networks, and team work capacity.

Value chain costing enables organizations to analyze, coordinate, and optimize the relationships between the value chain activities, which are separated by strategically relevant segments to understand the behavior of costs and the sources of differentiation (Dekker, 2003; Guilding et al., 2000; Tayles, 2011). So, this SMA practice allows to allocate costs across value chain, from the product development and design through to the delivery to customers, and know the activities that contribute to the differentiation. According to Dekker (2003) and Guilding et al. (2000), the value chain costing refers to a structured method of analysis that allows to achieve competitive advantages through an enhancement in customer value or a decrease in costs in a relevant segment of the value chain. In addition, Dekker (2003) shows that the cost information provided by the value chain costing enables joint communication, coordination, and negotiation between partners in a supply chain. Therefore, value chain costing helps to identify and manage IC resources embedded in organizations' relationships with suppliers and customers.

Benchmarking corresponds to the continuous and systematic process used by organizations to identify the best practices in the industry that enable to improve their productivity, competitiveness, and quality (Elnathan, Lin, & Young, 1996; Tayles, 2011). Thus, benchmarking involves comparing the organization with competitors regarding the cost structure, processes, technologies, prices, after-sales services, and profitability, and is undertaken when an organization believes that competitors have increased knowledge on processes, technology, and quality (Elnathan et al., 1996; Tayles, 2011). For instance, Rahman, Azhar, Rahman, and Daud (2012), based on the study of three Malaysian private hospitals, show that benchmarking is used for improving managerial practices and service performance. So, this SMA practice supports the management and development of IC resources such as management processes, organizational learning, processes and procedures, and customer satisfaction.

Competitor cost assessment provides regular estimates of the competitors' costs based on the appraisal of manufacturing facilities, technology, governmental relationships, and economies of scale, using as main source of information the facilities observation, mutual suppliers and customers, and employees (i.e., ex-employees of competitors) (Guilding, 1999; Guilding et al., 2000; Tayles, 2011). Thus, assessing the competitors' costs allows to know the competitors' investments and their cost structure, and compete more efficiently (Guilding, 1999; Guilding et al., 2000). Therefore, competitor cost assessment enables the management and mobilization of IC resources such as competitiveness, management capacity, organizational learning, and other resources embedded in organizations' relationships with competitors.

Competitive position monitoring analyzes the sales, market share, unit costs, and return on sales of the major competitors, in order to know the competitive position in the industry (Guilding, 1999; Tayles, 2011). In addition, competitive position analysis also considers intangible factors related to technological competence, corporate image, sales force effectiveness, and others factors that contribute to achieve competitive advantages and enhance competitive position (Rangone, 1997). In this sense, the information provided by this SMA practice allows a broader analysis than competitors cost assessment, and contributes to the appraisal of competitors' strategies (Guilding, 1999). Thus, competitive position monitoring enables the management and mobilization of IC resources such as corporate reputation, management capacity, and organizational learning.

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Customer profitability analysis determines the sales, costs, and profits of a specific customer or customer segment, allowing an organization to direct marketing efforts or adapt its product or customer portfolio (Tayles, 2011). Also, this analysis allows organizations to manage the relationships with customers, in order to examine mutual benefits, and develop strategies that increase long-term outcomes (Tayles, 2011). In turn, lifetime customer profitability analysis extends the time horizon for the customer profitability analysis to include future years (Cadez & Guilding, 2008; Tayles, 2011). According to Al-Mawali, Zainuddin, and Ali (2012, p. 220) customer information enables organizations “to turn unprofitable customers into profitable ones by improving processes to lower service costs, or customising pricing policies.” Therefore, these SMA practices are useful to manage and develop IC resources embedded in organizations’ relationships with customers.

Finally, some research suggests that SMA practices have the potential to manage and mobilize IC resources such as quality management (Sedevich-Fons, 2018), environmental protection and management (Asiaei & Jusoh, 2017; Henri, Boiral, & Roy, 2016), customer satisfaction (Cugini, Carù, & Zerbini, 2007; Dubois, 2003), and inter-organizational relationships (Carlsson-Wall, Kraus, & Lind, 2015; Fayard, Lee, Leitch, & Kettinger, 2012).

In this context, it appears that the SMA practices analyzed above contribute in identifying, managing, and developing IC resources. The same is seen in Table 4, which establishes the link between the SMA practices identified and defined by Cadez and Guilding (2008) and some IC resources.

However, there is some constraints to the use of the SMA practices to identify, measure, and manage IC. According to some studies the SMA practices are not in widespread use (Lachmann et al., 2013), given that their adoption and use depends on the contextual factors such as: intensity of competition, past performance, business strategy, organizational size, organizational structure, and corporate governance characteristics (Arunruangsirilert & Chonglertham, 2017; Cadez & Guilding, 2008; Pavlatos & Kostakis, 2018; Turner, Way, Hodari, & Witteman, 2017). Therefore, the use of SMA practices and IC in organizations has some difficulties related to their specific features (internal factors) and environment (external factors). For instance, lower size organizations typically have less resources (e.g., financial and human resources) to adopt such practices.

CONCLUSION

The knowledge-based resources that constitute the IC of an organization represent the main source of sustainable competitive advantages and value creation in today’s knowledge-based economy. Given that these resources are strategic and critical to achieve the goals of an organization, it is vital to identify, measure, and manage them. In other words, it is crucial to identify the IC resources and understand how IC works in order to fulfill its maximum benefits. In this context, this chapter examines, theoretically, the role of management accounting to measure and manage IC, and more specifically explores the potential role of SMA in this process.

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Table 4. Strategic management accounting practices and intellectual capital resources

| SMA practice | Definition | IC resources |
|--|--|--|
| Attribute costing | Determines the costs of product attributes that are appealing to customers, such as performance, reliability, warranty arrangements, reliability of supply, and after sales service. | Customer knowledge Customer satisfaction Customer loyalty Trust |
| Life cycle costing | Assesses the costs based on the length of stages of a product's life, which may include design, introduction, growth, maturity, decline, and eventual abandonment. | Innovation capacity Relationship with customer Research and development |
| Quality costing | Determines and reports costs associated with the creation, identification, repair, and prevention of defects, which can be classified into three categories: prevention, appraisal, and internal and external failures. | Customer satisfaction Quality management Management systems |
| Target costing | Is used during the product and process design and involves estimating a cost calculated by subtracting a desired profit margin from a market-based price. Then the product is designed to meet that cost, taking also into account the costs of engineering and marketing. | Customer satisfaction Innovation capacity Production processes Relationship with partners Organizational flexibility |
| Value chain costing | Allocates costs to the activities required to design, acquire, produce, sell, distribute, and service a product or service. | Distribution channels Relationship with suppliers Relationship with customers |
| Benchmarking | Is a continuous and systematic process of comparing products, services, and processes in order to identify the best practices that lead to superior performance. | Customer satisfaction Organizational learning Processes and procedures |
| Integrated performance measurement (e.g., BSC) | Is a measurement system which usually focuses on acquiring performance knowledge based on customers' requirements, encompassing non-financial measures. This system involves monitoring those factors which are critical to ensure customer satisfaction. | Customer knowledge Customer satisfaction Innovation capacity Organizational learning |
| Strategic costing | Uses cost data based on strategic and marketing information to identify and develop strategies that enhance the achievement of competitive advantages. | Management capacity Management processes Organizational learning |
| Strategic pricing | Analyses strategic factors in the pricing process, such as competitor price reaction, elasticity, market growth, economies of scale, and experience. | Competitiveness Organization learning Organization flexibility |
| Brand valuation | Corresponds to the financial valuation of the brand through the assessment of its strength factors such as leadership, stability, market, internationality, trend and support combined with historical brand profits. | Brand image Trademarks Trust |
| Competitor cost assessment | Provides regular estimates of the competitors' costs in order to know their cost structure and enhance competitiveness. | Competitiveness Competitor knowledge Management capacity |
| Competitor performance appraisal | Analyses the competitors' published statements as part of the assessment of competitors' key sources of competitive advantages. | Competitiveness Competitor knowledge |
| Competitive position monitoring | Analyses the competitive position within the industry by assessing and monitoring competitors' sales trends, market share, volume, unit costs, and return on sales. This information provides a basis for the assessment of the competitors' market strategy. | Corporate reputation Management capacity Organizational learning Relationship with competitors |
| Customer profitability analysis | Determines the profit earned from a specific customer or customer segment based on sales and costs that can be traced to a particular customer or customer segment. | Customer's knowledge Marketing activities Relationship with customers |
| Lifetime customer profitability analysis | Considers the extension of the time horizon for customer profitability analysis to include future years. Thus, the practice focuses on all anticipated future revenue flows and costs involved in maintaining a particular customer. | Customer's knowledge Customer loyalty Marketing activities Relationship with customers Trust |
| Valuation of customer as assets | Determines the value of the customers to the organization, computing, for instance, the present value of future profit flows attributable to a particular customer. | Customer knowledge Market knowledge Relationship with customers |

The discussion in the sections above enables some conclusions. First, as already highlighted by some authors (Duff, 2018; Johanson et al., 2001; Pedro et al., 2018) there is no consensus about the IC definition. However, the IC definitions analyzed stress that IC encompasses intangible resources, based on knowledge, which are critical to the organizations' success as a main source of sustainable competitive advantages and value creation. In addition, some of these definitions also emphasize that IC is more than a sum of resources and activities based on knowledge. The combination of IC resources and the interrelationships among IC resources and among IC resources and other organizational resources are critical for the process of value creation.

Second, contrary to the lack of consensus regarding the IC definition, the literature reveals a broad consensus about the three main components included in IC: HC, which represents the employees' knowledge and competences; SC, which represents the institutionalized and codified knowledge; and RC, which contains all the knowledge embedded in the organizational relationships with stakeholders. Further, the literature that adopts a dynamic approach adds a new component, renewal capital, which corresponds to the ability to renew the knowledge-based resources (Buenechea-Elberdin et al., 2018; Inkinen et al., 2017; Kianto et al., 2010), in order to renew the competitive advantages and create value for all the stakeholders.

Third, regarding the relationships between management accounting and IC, the literature stresses that, on the one hand, IC influences the development of management accounting and, on the other hand, management accounting has a critical role in the measurement and management of IC (bi-directional relationship). To the measurement and management of IC it is fundamental to use financial and non-financial measures, mainly non-financial measures given that they are leading measures that drive the performance of financial measures and have the potential to monitor and manage the causes that influence the value creation (Montemari & Nielsen, 2013). Some of this information is provided by the measurement models such as BSC and intangible asset monitor, which are, also, within the scope of SMA. Additionally, (other) SMA practices contribute to the identification, management, and mobilization of several IC resources such as customer satisfaction and loyalty (e.g., attribute costing, benchmarking, BSC, quality costing, target costing, and lifetime customer profitability analysis), innovation capacity (e.g., BSC, life cycle costing, and target costing), organizational learning and flexibility (e.g., BSC, target costing, strategic costing, and strategic pricing), and business and collaboration networks (e.g., target costing and value chain costing). In this sense, the majority of the SMA practices has the potential to identify, manage, and develop IC resources related to the organizations' external relationships with stakeholders, mainly customers and business partners, which are contained in RC. This occurs because both RC and SMA are externally oriented.

In closing, it is important to acknowledge some limitations of this study that should be taken into consideration. First, although the chapter highlights, in general terms, the role of SMA to measure and manage IC, it only explores in more detail how some SMA practices can support this process. However, as referred above, there are other SMA practices. Thus, the analysis of how all these practices can support the measurement and management of IC resources requires the development of additional research. Second, the chapter only establishes, theoretically, the link between SMA practices and some IC resources without examine empirically how SMA practices contribute to the management and consequent development of IC, which also represents an opportunity for further research.

In this sense, this chapter results in some clues for future developments. First, the development of a bibliometric analysis will allow researchers to understand how the research that explores the relationship between management accounting and IC has evolved. This approach has been used by scholars in the

fields of accounting and management (Castillo-Vergara, Alvarez-Marin, & Placencio-Hidalgo, 2018; Sardo & Alves, 2018) and provides to the researchers a basis for positioning current contributions and detecting new lines for future research. In fact, bibliometric analysis enables researchers to identify the main scientific actors, the most reliable sources of publication, and the main research streams in a research field (Gutiérrez-Salcedo, Martínez, Moral-Munoz, Herrera-Viedma, & Cobo, 2018; Zupic & Čater, 2015).

Second, the development of multiple case studies could be appropriate in order to empirically examine how SMA practices contribute to the identification, management, and development of IC. As pointed out above in this chapter there are several SMA practices that can be used to manage different IC resources encompassed in the IC components. Therefore, it is needed to understand how each SMA practice is used in the organizations to manage and develop these strategic resources. To perform this analysis, the approach strategy-as-practice or accounting-as-practice recently used by some authors can be appropriate (Cuganesan, Dunford, & Palmer, 2012; Hutaibat, von Alberti-Alhtaybat, & Al-Htaybat, 2011). This approach allows researchers to examine how SMA is mobilized in the management and development of IC resources and who the major actors involved in this process are (Cuganesan et al., 2012; Nixon & Burns, 2012). The role of the actors (e.g., “sponsor”, “project leader”, and other managers) involved in the project of measurement and management of IC is critical (Chicucci, 2013a; Giuliani, 2016), namely in the “sensemaking” (i.e., assigning a meaning to the events in the environment, which serves to explain decision-making and action) and “sensegiving” (i.e., diffusing the sense of them within organizations) activity of this new project and IC measures (Giuliani, 2016).

Finally, in order to study the relationships between SMA practices and IC resources, and specify the direction of these relationships, a quantitative study, using a survey, could also be performed. Although cross-sectional studies do not capture how the relationship is established and are incapable of producing conclusive evidence of causality (Asiaei & Jusoh, 2017), they enable the generalization of the results for an industry or country. In addition, cross-country studies will allow the findings to be more generalizable.

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ENDNOTES

- ¹ IC definitions adopted by Edvinsson and Malone (1997), European Commission (2006), Nahapiet and Ghoshal (1998), and Stewart (1997) are some of the most commonly used in the literature (Pedro et al., 2018).
- ² Contrary to the results reported by Novas et al. (2017), Hejazi et al. (2016) find a positive and significant relationship between IC, HC (when IC components are analyzed separately), and firm performance (measured through Tobin's Q), but not a significant relationship between SC and performance. In turn, Chowdhury et al. (2018) show that SC influences financial performance (i.e., asset turnover and return on assets) unlike HC.
- ³ See Choong (2008) for additional information and a discussion about different terms used in the literature relating to intellectual capital and intangibles assets.
- ⁴ According to Teece (2018, pp. 43–44) “strong dynamic capabilities can serve as a firm foundation for sustainable competitive advantage.”
- ⁵ In fact, some authors show that there is a relationship between management accounting and IC (Asiaei & Jusoh, 2017; Asiaei et al., 2018; Cleary, 2009; Novas et al., 2017; Tayles et al., 2007).
- ⁶ See Bontis (2001) and Tan et al. (2008) for a revision and discussion of some measurement models of IC.
- ⁷ It should be noted that, according to some authors, some of measurement models described are also considered SMA practices (Lachmann et al., 2013; Tayles, 2011).
- ⁸ Other authors provide and use similar lists of SMA practices and provide additional information about them (Arunruangsirilert & Chonglertham, 2017; Kalkhouran, Nedaei, & Rasid, 2017; Pavlatos, 2015; Tayles, 2011).


Chapter 4

The Perception of Portuguese Accountants on the Impact of the Implementation of E-Accounting With SAFT-PT

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ABSTRACT

The researchers proceed with a quantitative approach resulting from a questionnaire addressed to Portuguese accountants in order to know their perceptions on the impact of adopting e-accounting to understand if they perceive it as a threat or as an opportunity for this profession. The authors found that respondents mostly believe that the level of dependency between accounting and taxation is medium, but that will sharply increase with the introduction of the e-accounting. The researchers found that most accountants perceive the implementation of e-accounting as a mix between problem and opportunity, whose main obstacle to implementation is, from the respondents' perspective, the inability of clients and employers to collaborate with this process. Additionally, data suggest that professional experience of the accountants, the development of the activity in accounting office or by other form, and finally, being certified accountants or accounting technicians are variables with impact on respondents' perceptions in this context.

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INTRODUCTION AND BACKGROUND

There is, clearly, a strong relationship between taxation and accounting, which dates back to the origin of the first one, and remains to present days. In this regard, many authors argue that the beginning of the most rudimentary forms of accounting are related to the control of taxes' collection, as stated by Ezzamel (2002) and Carmona and Ezzamel (2009).

The common basis of accounting and taxation, as well as their joint expansion, produced a mutual development of the normalization which governs these two areas (Alley & Simon, 2006; Lamb, 2009; Jones, 2018). In this scope, Lamb (2009: 579) states that "The histories of taxation and accounting are intertwined." and Alley and Simon (2006: 34) argue that "[...] both accounting and taxation are in a continual process of development [...]".

In the previous literature, many academic studies have been conducted about the issues analyzed. Thus, in the literature, it is possible to identify, in present days, three distinct models of relationship between tax and accounting: high level of dependence¹, partial dependence² and low dependence³.

This subject, although is not recent, never lost the interest of academia, especially because the globalization of markets implies the need to harmonize accounting, so that becomes a universal language. In this context, in last years some studies have arisen that question the maintenance of the proximity between accounting and taxation (Pereira, 2013; Sikka, 2017; Martinez, 2019).

Moreover, in the Portuguese case, this theme recaptures a new interest and timeliness, due to the need to comply with the e-Accounting with SAFT-PT (Standard Audit File for Tax Purposes – Portuguese Version), that is, to give compliance with a new tax obligation. This new obligation is the practical application, in the Portuguese context, of OECD (Organization for Economic Co-operation and Development) recommendations⁴.

That new tax obligation implies the strictness of companies and their accountants, especially in the timely organization of accounting documents, because tax authority will be able to control whether the accounting documentation is registered within the deadline and can punish non-compliance. In addition, the e-Accounting implementation imposes certain rules on the movement of accounts, which, also, implies special care in opening of accounts and in the introduction of taxonomies. This context implies, from the perspective of accountants, profound alterations in their paradigms of action and changes in some procedures and habits instituted among accountants.

Considering this recent challenge facing by Portuguese accountants, with this chapter the authors intend to understand whether Portuguese accountants consider adapting accounting procedures to respond to the e-Accounting with SAFT-PT obligation as a problem or threat, or rather the opposite, as an opportunity or challenge to the development of the profession, as well as to know the Portuguese accountants' perception on the impact of these changes on the level of dependency between accounting and taxation.

This study, also, aims to understand if the Portuguese accountants professional characterization variables, namely, the way they perform the activity, their years of experience and the fact that they are certified accountants or accounting technicians influence their perceptions about this theme.

The results of this chapter contribute to the knowledge in this area, allowing the authors to know the accountants' perception on the impact of the changes inherent to the fulfillment of e-Accounting with SAFT-PT at the level of independency of accounting in relation to tax obligations and tax rules.

The contributions of this article are relevant to the profession. On the one hand, because a new proximity between accounting and taxation rules may mean a setback in the process of accounting harmonization in Portugal, which consequences should deserve the consideration of all actors. On the

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Table 1. Models of relationship between accounting and taxation – examples of countries classification

| Studies / Reports / year | Models of relationship | | |
|---------------------------------|---|--|--|
| | High level of dependency | Partial dependency | Low level of dependency |
| OECD (1987) ⁵ | Norway ⁶ | France, Germany and Italy | US [United States], UK [United Kingdom] and Netherlands |
| EC (1992) ⁷ | Belgium, France, Germany, Greece and Luxembourg | | UK and some Nordic countries |
| Hoogendoorn (1996) ⁸ | France, Germany, Belgium, Finland, Sweden and Italy | | UK, Ireland, Denmark, Czech Republic, Norway, Poland and Netherlands |
| Blake <i>et al.</i> (1997) | Continental European countries | | Anglo-Saxon countries |
| Lamb <i>et al.</i> (1998) | France and Germany | | US and UK |
| Sampaio (2000) | Germany, Japan, Norway, Sweden, Greece, Finland, Switzerland, Italy and Belgium | France, Spain and Portugal | Netherlands, Canada, US, UK and Ireland |
| Aisbitt (2002) | Continental European countries | | Anglo-Saxon countries |
| Francis <i>et al.</i> (2002) | Germany and Japan | Nordic countries and the developing systems, both Latinos and Asians | North America and other Anglo-Saxon countries |
| Freedman (2008) | Germany and Sweden | | US and UK |

other hand, the process of implementing of e-Accounting with SAPT-PT obligation is still an ongoing process, so understanding the position of accountants can allow, in particular, the creation of training or clarification sessions directed to target audiences.

This chapter is structured in five parts: introduction, literature review, research methodology, results as well as their discussion and conclusions.

LITERATURE REVIEW RELEVANT TO THE TOPIC

Concerning the relation of interdependence between accounting and taxation, Table 1 summarizes the analysis to the existing work on this issue, by sorting a comparative study on some countries' classification.

As you can see, from the analysis of data presented in Table 1, there is a set of studies that identify two models of dependency; however, there are other studies that point to a third model of dependence between accounting and taxation, in use in some countries, such as Portugal. This third model is applicable in cases where there is a moderate dependence between accounting and taxation, and income tax is levied on accounting results adjusted outside the accounting in accordance with tax rules (Sampaio, 2000).

In addition, the information in Table 1 suggests that there are two large blocks identified, on the one hand, the Anglo-Saxon countries, identified as having a little level or no level of dependency between accounting and taxation, and countries of Continental Europe, in the opposite situation, with a greater or lesser level of dependency.

In the Portuguese case, the model in use, as already mentioned, is the partial dependency, however, in some areas, namely in the depreciation of assets, the relationship between accounting and taxation is so intense that occasionally occurs a phenomenon known as «tax accounting»⁹.

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As states Sampaio (2000), in the Portuguese case, the relation of partial dependency between accounting and taxation is not new, it dates back from the tax reform of the early twentieth century, in the field of the corporate tax income, which imposed the calculation of tax profits based on accounting profits, with some extra-accounting corrections. In this perspective, can be mentioned a few landmarks of the recent history of Portuguese taxation to justify the relationship with accounting rules:

The tax Reform from 1922¹⁰ brought as novelty, at the companies' scope, the taxation of real income, which implied the existence of an accounting system capable of calculating, with a high degree of accuracy and objectivity, that profit.

In addition, the tax Reform of the 1960s years, with the approval, in 1963, of the *Código da Contribuição Industrial* (the Industrial Tax Code), brought as a novelty the following recommendation, in the article 22nd: the "taxable income will be reported to the account of profits or gains and losses established in obedience to good accounting principles."¹¹ It should be noted that this recommendation which would only be put into practice with the publication of the first *POC - Plano Oficial de Contabilidade*¹², approved by the Decree - Law n.º. 47/77 of June 7th.

This means that Portugal only really began to use the model of partial dependency after the adoption of generally accepted accounting standards, which only occurred at the final of 1970s years.

Furthermore, the authors found that there is no widely accepted model of relationship between accounting and taxation, because there are advantages and disadvantages mentioned in each one. Thus, on the one hand, some authors advise a greater harmonization and dependence of these two regulations, in order to simplify tax obligations and to minimize tax and accounting compliance costs of companies, highlighting substantial gains in the area of tax compliance. On the other hand, others arguments pointed to greater separation and autonomy of tax and accounting regulations, due to their different objectives, pointing to the alignment of the two normative as an obstacle to accounting standards harmonization, which is necessary to the globalization of markets. However, some authors recognized the increasing of tax compliance's problems, resulting from the smaller coordination involving these two regulations. In this scope, Table 2 summarizes both lines of arguments presents in the literature review.

As can be seen by the analysis of Table 2 content, the dependence between accounting and taxation has not been a consensual matter in academia, so there are arguments for and against the proximity (harmonization) between accounting and tax rules. Some authors, as Blake *et al.* (1997) and Freedman (2008), performed works which confront the arguments for and against harmonization of these normalizations.

However, it should be noted that the globalization of the economies, namely the internationalization and global development of many business groups, requires a larger harmonization of accounting standards all over the world, to meet the need of global information; these facts may enhance the growing misalignment of the regulations in analyzing. As states Freedman (2008, p.1) "[...]recent developments in accounting may be increasing divergence rather than reducing it." Position also advocated by Porcano and Tran (1998: 89) when they claim that "Compliance with IASs [International Accounting Standard] is difficult when the tax system, designed at the national level, dominates accounting practice."

This may occur because accounting aims tend to be a universal language, which produces information understandable by all potential stakeholders, while taxation does not follow this globalization and intend to respond to the needs for revenue collection of each State.

Thus, despite the strong arguments presented in favour of a bigger harmonization of these two regulations, some authors consider the current economic circumstance more conducive to scenarios against the coordination of them and a little chance of convergence of these two regulations, however, in the

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Portuguese case, the obligation of e-Accounting with SAFT-PT may presents as a potential alteration in this trend.

Table 2. Summary of arguments against and in favor of harmonization of regulations between accounting and taxation

| Authors / Countries¹³ | Arguments against harmonization | Arguments in favor of harmonization |
|---|---|--|
| Green (1995)/UK | - Different objectives require unequal rules | |
| Blake <i>et al.</i> (1997)/ Sweden | - It is a barrier to the international harmonization of accounting normalization - It is an obstacle to implementing good accounting practice - Some tax rules have a distortive effect on the financial reports | - Simplification of procedures and the consequence reduction of compliance costs - In the perspective of tax authorities, it simplifies the process of tax auditing |
| Sampaio (2000)/Portugal | - Different objectives in determining the company's results require unequal rules - Some tax legislation objectives ¹⁴ are not compatible with the objectivity of accounting standards - It ties the financial reports to the tax rules, as though the State were a stakeholder more important than all the others | |
| Aisbitt (2002)/UK | - It complicates the interpretation of financial statements and undertakes its aim to support decision making by the stakeholders | |
| Freedman (2004)/UK | - Different objectives require unequal rules | |
| Freedman (2008)/UK | - Different objectives require unequal rules - The model of partial dependence, that means regulation with exceptions, can make the system more confusing - The interrelationship between the two regulations, in the partial dependence model, can create gray areas conducive to tax evasion - Harmonization may distort the tax base, causing, namely, problems of tax equity | - The harmonization allows the simplification of accounting and tax compliance which provides a lower cost of compliance and the increasing of transparency - It facilitates the monitoring of tax noncompliance - Two separate regulations can cause confusion in the concepts and difficulties in the managing of the relationship between two systems with completely different rules about the same issues - It can reduce the possibility of data manipulation |
| Hanlon and Heitzman (2010)/US | | - Reducing compliance costs - The increase of the tax base and the cutting in the rates - Decrease of earnings management (with tax saving purpose). |
| Addeh (2016)/U | - Potentiates the manipulation of earnings management in order to reduce taxation | |
| Dridi & Boubaker (2015)/Tunisia | - Potentiates the manipulation of earnings management in order to reduce taxation | |
| Sikka (2017) | - "financial reporting is focused on the assumed interests of investors whereas taxation is concerned about levying taxes on realized corporate profits in accordance with the law" (p. 400) | |

In this context, as already mentioned, this chapter aims to understand what is the perception of certified accountants about the impact of e-Accounting on accounting and taxation rules harmonization, as well as on the work of those professionals.

RESEARCH METHOD

In order to meet the stated objectives, the researchers propose to carry out a quantitative work, which is based on the collection of the Portuguese accountants' perceptions on the theme under study.

Aiming to collect the data, following the suggestion of Raupp and Beuren (2006), a survey was addressed to Portuguese certified accountant and accounting technicians, then they are our target population.

The authors opted for the application of an electronic questionnaire, by launching the questionnaire in the community "Members of the Group Accountants" on the internet, which includes 13,853 members, on the official forum of the Portuguese Organization of Certified Accountants (OCC¹⁵) and in other small blogs/forum/websites frequented by Portuguese professionals.

It is important to emphasize that in this questionnaire, certified accountants and the accounting technicians were invited to undertake a self-evaluation of their perceptions about these issues.

The questionnaire aims to fulfil the following specific objectives:

- To construct a socio-demographic, professional and technical characterization of the respondents;
- To assess their perception regarding the application of the e-Accounting with SAFT-PT;
- To assess their perception concerning the impact of e-Accounting with SAFT-PT on the level of dependency between accounting and taxation;
- To assess their self-evaluation regarding the costs of implementing e-Accounting with SAFT-PT.

In order to achieve all the objectives previously outlined, the following research hypotheses were formulated to be tested:

H1: There is a relation between the professionals' category¹⁶ and their perceptions about the implementation of e-Accounting.

H2: There is a relation between the professionals' way of develop the activity¹⁷ and their perceptions about the implementation of e-Accounting.

H3: There is a relation between the professionals' years of experience and their perceptions about the implementation of e-Accounting.

To achieve the stated objectives, the authors performed statistical analyzes of the collected data, using SPSS version 21.

Thus, apart from the statistical frequency analysis a bivariate analysis were performed to verify if may be accept or decline the research hypotheses formulated. The statistical bivariate analysis performed aims to determine whether differences between the professional characteristics of the target population, can influence the professionals' perceptions on this theme.

In the bivariate analysis, due to the characteristics of our data the authors use nonparametric tests: the Mann-Whitney test and the Kruskal Wallis Test. To measure the strength and direction of the relation between variables the researchers use the Spearman Correlation (Pestana & Gageiro, 2000). The

adoption of nonparametric tests, rather than parametric tests, is justified by the lack of data normality, as well as by the using of nominal and ordinal variables frequently based on five point Likert scales.

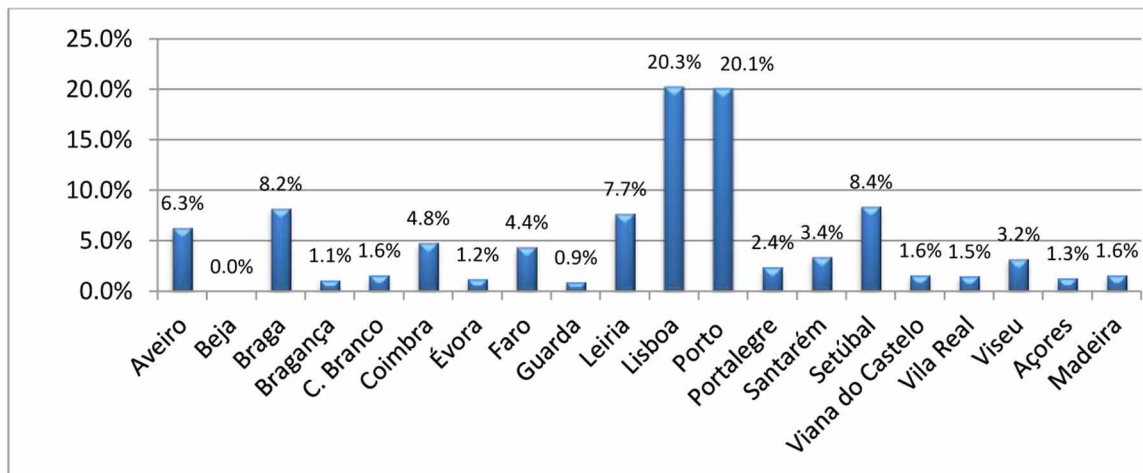
RESULTS AND RESULTS DISCUSSION

In this section the authors will present the results of the statistical analysis performed, both the results of the descriptive statistics and the results of the hypothesis tests (bivariate analysis).

Figures 1 and Table 3 present the socio-demographic and professional technical characteristics of our respondents.

The data presented in Figure 1 are relevant to this study because they allow the researchers to verify that the geographic distribution of our respondents is representative of the entire national territory, with greater emphasis on regions with greater population density.

Figure 1. Geographical origin of respondents in Portugal



Regarding the data in Table 3, the researchers verify that most of respondents are certified accountants (84.6%) and they are predominantly female (71%).

With regard to the age of respondents, the most significant data is that about 63% of professionals are between 35 years old and 49 years old. The researchers, also, verify that, despite the complexity involved and the demands of study and updates, there are quite a number of professionals in activity (about 2,7%) whose ages are considerably above the statutory retirement age (65 years old).

As regards professional experience, 81.4% of respondents have more than 10 years of tax experience, so the authors can consider that the respondents are a professionally experienced group. In addition, most respondents work in accounting offices and have, in terms of number of clients, a medium-sized client portfolio ($>50 \leq 100$).

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Table 3. Summary of respondents' socio-demographic and professional technical variables

| Socio-demographic and professional technical variables | Categories | % |
|--|-----------------------------|-------|
| Age | Up to 25 years old | 1.6% |
| | > 25 to 35 years old | 12.5% |
| | > 35 to 50 years old | 62.6% |
| | > 50 to 65 years old | 20.6% |
| | > 65 years old | 2.7% |
| Gender | Male | 29.0% |
| | Female | 71.0% |
| Professional category | Certified accountants | 84.6% |
| | Accounting technicians | 15.4% |
| Professional experience | Up to 1 year | 0.9% |
| | > 1 to 5 years | 6.5% |
| | > 5 to 10 years | 11.2% |
| | > 10 to 25 years | 56.4% |
| | > 25 years | 25.0% |
| Ways of activity development | In an accounting office | 60.6% |
| | In an accounting department | 16.1% |
| | As a self employed | 22.2% |
| | Other situations | 1.1% |
| Number of clients/employers | Up to 20 | 1.6% |
| | > 20 to 50 | 12.5% |
| | > 50 to 100 | 62.6% |
| | > 100 to 200 | 20.6% |
| | > 200 to 300 | 20.6% |
| | > 300 | 2.7% |

Regarding the data presented in Table 3, the authors highlight the respondents' gender data, because the latest known data on certified accountants point to an equitable distribution between men and women, which is very different from the data presented by our respondents. At the beginning, these data were the subject of our concern, due to the possibility of sample bias, however, the researchers verified, through cross tables and Pearson Chi-Square test (χ^2), that there was no statistically significant relationship between the gender of respondents and their perceptions about this theme. In addition, the sample is also composed by accounting technicians, who represent 15% of respondents, most of whom are women (84%)¹⁸.

Figures 2 and 3 show the respondents' perception about the level of dependency between accounting and taxation in Portugal, as well as the increase in that level of dependency caused by the implementation of e-Accounting.

The Perception of Portuguese Accountants on the Impact of the Implementation of E-Accounting

Figure 2. Respondents' perception on the level of dependence of accounting and taxation in Portugal (before the implementation of e-Accounting)

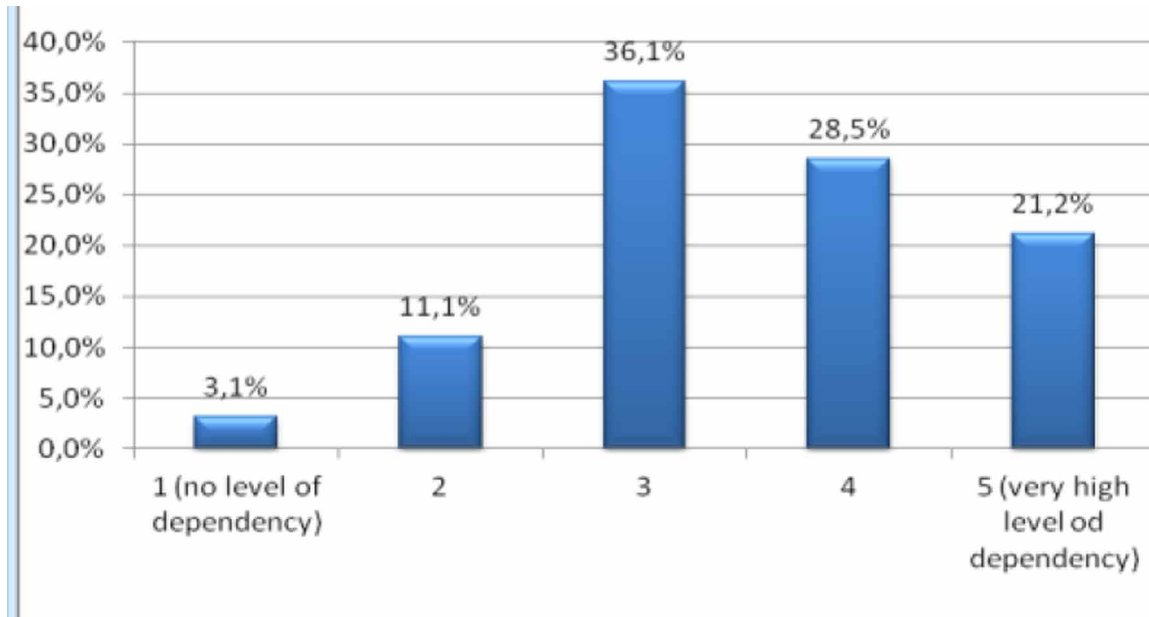
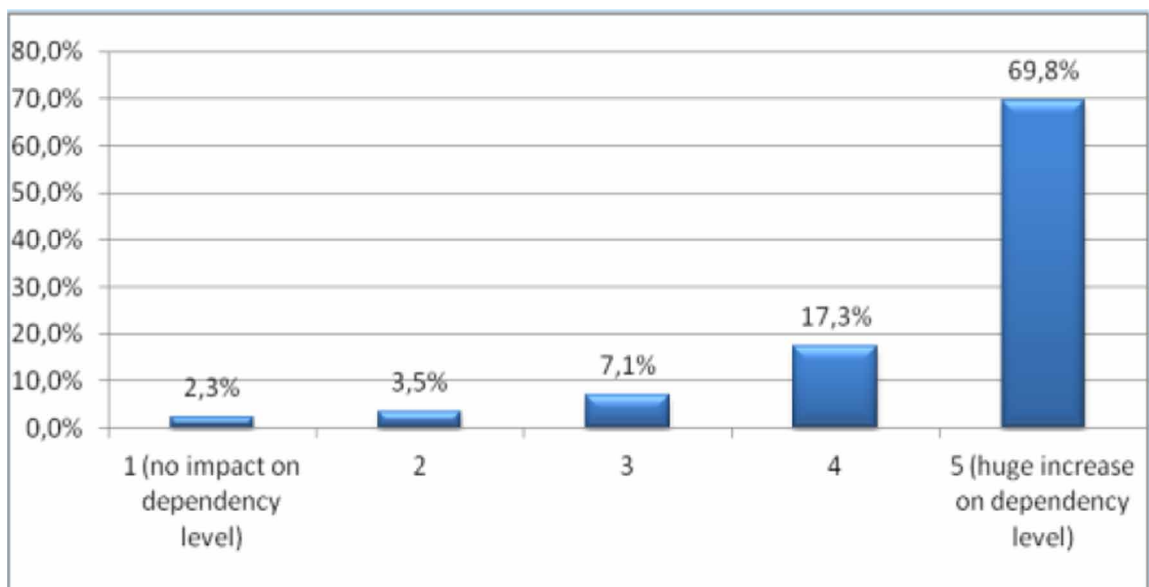


Figure 3. Respondents' perception of the impact of e-Accounting implementation on the increasing of the level of dependence of accounting and taxation in Portugal



The Perception of Portuguese Accountants on the Impact of the Implementation of E-Accounting

Table 4. Summary of respondents' perception about e-Accounting implementation

| | Categories | Number | % |
|--|--|--------|-------|
| Problem vs. opportunity | 1 (Unsurpassed problem) | | 13.4% |
| | 2 | | 28.0% |
| | 3 | | 35.8% |
| | 4 | | 15.9% |
| | 5 (Opportunity) | | 6.9% |
| Identification of the 3 main obstacles to the implementation of e-accounting | Failure of customers / employer to meet the deadlines for delivery of accounting documents | 1 228 | |
| | Insufficiency of human resources to comply with all requirements | 891 | |
| | The clients portfolio / company size does not justify the necessary monetary investment | 537 | |

The analysis of the data presented in Figures 2 and 3 shows that the current level of dependence between accounting and taxation is classified, by the respondents, mostly as medium (level 3 – 36,1%), however, most of them perceive that the implementation of e-Accounting will increase significantly the level of dependency (level 5 - 69.8%).

It should be noted that the level of dependency between accounting and taxation perceived by Portuguese accountants is in line with data from previous studies that point to a partial dependence model in the Portuguese case.

In this point, it is important to highlight that, contrary to the international trend of the last years of greater distance between accounting and taxation, in order to allow a greater harmonization of accounting at international level, in the Portuguese case, the implementation of e-Accounting promises to bring closer again these two strands of the business context.

Table 4 presents the perception of Portuguese accountant respondents on the impact of e-Accounting implementation, that is, they see it as an unsolved problem or as an opportunity for professional growth, due to the change it provides. Table 4, also, presents the three biggest barriers to e-Accounting implementation identified by the respondents.

From the data in Table 4 the authors highlight the following aspects: (i) There are more accounting professionals who classify the implementation of e-Accounting as an unsolved problem than those who have the capacity to understand it as an opportunity. (ii) The biggest obstacle to e-Accounting implementation, from the respondents' point of view, is the "Failure of customers / employers to meet deadlines for delivery of accounting documents".

The results suggest that most respondents are very apprehensive about the e-Accounting implementation process, some accountants fear not being able to implement this. It should be noted, however, that the greatest fear of the responding accountants lies in the inability of their clients and employers to meet the new requirements.

Figures 4 and 5 show the respondents' perception on the e-Accounting impacts in training needs and internal working hours investments, as well as in value of the implementing costs.

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Figure 4. Respondents' perception of the cost of e-accounting implementation (value)

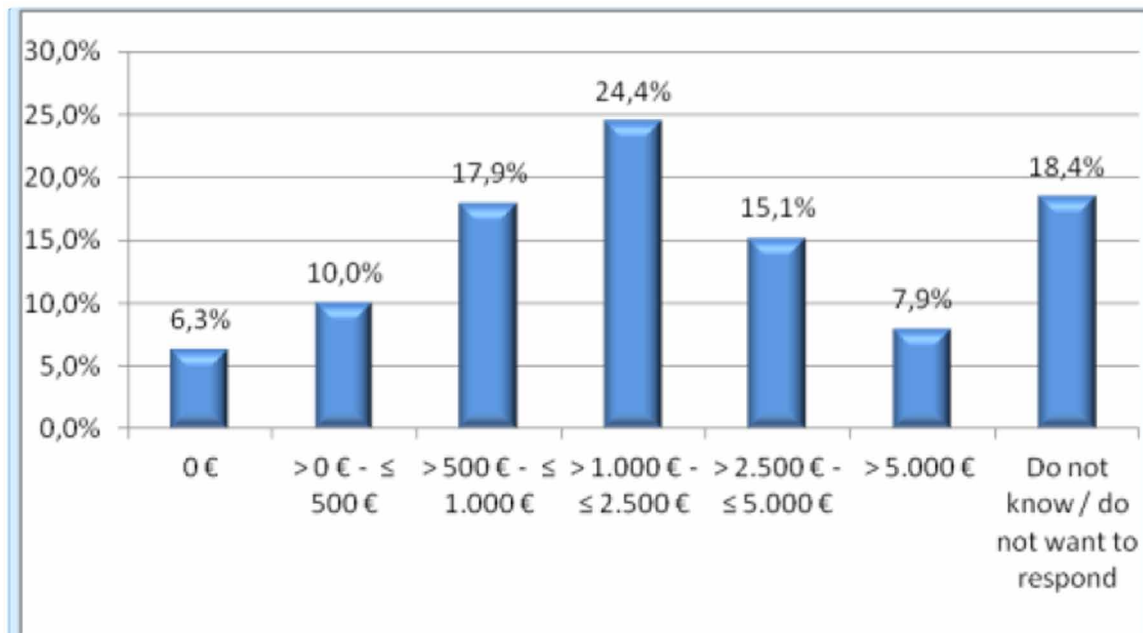
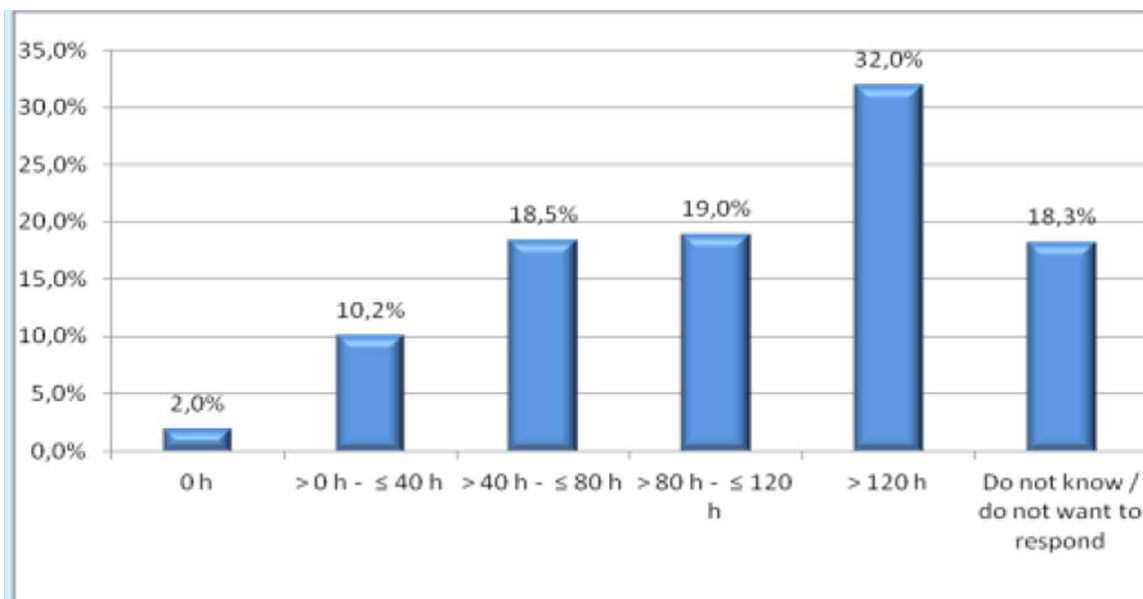


Figure 5. Respondents' perception of the cost of e-accounting implementation (hours)



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Table 5. Effects of professional technical variables on professionals' perceptions

| | | |
|------|-----|---|
| H1.1 | (1) | H_0 : There are no differences in professionals' perception of the level of dependency between accounting and taxation, depending on their professional category (certified accountant and accounting technician); H_a : There are differences in professionals' perception of the level of dependency between accounting and taxation, depending on their professional category (certified accountant and accounting technician). |
| | (2) | Mann-Whitney Test: $U(1574) = 159440$; $p = 0.781 > 0.05$ |
| | (3) | Not reject the null hypothesis (H_0): there are no statistically significant differences in the perception of dependency of accounting and taxation between certified accountants and accounting technicians. |
| H1.2 | (1) | H_0 : There are no differences in professionals' perception of the increasing in the level of dependency between accounting and taxation due to e-accounting implementation, depending on their professional category (certified accountant and accounting technician); H_a : There are differences in professionals' perception of the increasing in the level of dependency between accounting and taxation due to e-accounting implementation, depending on their professional category (certified accountant and accounting technician) |
| | (2) | Mann-Whitney Test: $U(1580) = 147.782.500$; $p = 0.004 < 0.05$ Spearman Correlation: $\rho = -0.044$; $p = 0.083 < 0.05$ |
| | (3) | There are statistically significant differences in the perception of the increasing in the level of dependency of accounting and taxation between certified accountants and accounting technicians. Certified accountants see a more pronounced increase in the level of dependency than accounting technicians. There is no significant correlation. |
| H1.3 | (1) | H_0 : There are no differences in the professionals' ability to view e-accounting as an unsolved problem or as an opportunity, depending on their professional category (certified accountant and accounting technician); H_a : There are differences in the professionals' ability to view e-accounting as an unsolved problem or as an opportunity, depending on their professional category (certified accountant and accounting technician). |
| | (2) | Mann-Whitney Test: $U(1580) = 157404.500$; $p = 0.375 > 0.05$ |
| | (3) | Not reject the null hypothesis (H_0): there are no statistically significant differences in the perception of problem <i>versus</i> opportunity between certified accountants and accounting technicians. |
| H1.4 | (1) | H_0 : There are no differences in professionals' perception of the e-accounting implementation costs, depending on their professional category (certified accountant and accounting technician); H_a : There are differences in professionals' perception of the e-accounting implementation costs, depending on their professional category (certified accountant and accounting technician). |
| | (2) | Mann-Whitney Test: $U(1289) = 92826$; $p = 0.298 > 0.05$ |
| | (3) | Not reject the null hypothesis (H_0): there are no statistically significant differences in the perception the e-accounting implementation costs between certified accountants and accounting technicians. |
| H2.1 | (1) | H_0 : There are no differences in professionals' perception of the level of dependency between accounting and taxation, depending on the way they develop their activity; H_a : There are differences in professionals' perception of the level of dependency between accounting and taxation, depending on the way they develop their activity. |
| | (2) | Kruskal Wallis Test: $H(1574) = 5497$; $p = 0.139 > 0.05$ |
| | (3) | Not reject the null hypothesis (H_0): there are no statistically significant differences in the professionals' perception of dependency, depending on the way they develop their activity. |
| H2.2 | (1) | H_0 : There are no differences in professionals' perception of the increasing in the level of dependency between accounting and taxation due to e-accounting implementation, depending on the way they develop their activity; H_a : There are differences in professionals' perception of the increasing in the level of dependency between accounting and taxation due to e-accounting implementation, depending on the way they develop their activity. |
| | (2) | Kruskal Wallis Test: $H(1580) = 7243$; $p = 0.65 > 0.05$ |
| | (3) | Not reject the null hypothesis (H_0): there are no statistically significant differences in professionals' perception of the increasing in the level of dependency of accounting and taxation, depending on the way they develop their activity. |
| H2.3 | (1) | H_0 : There are no differences in the professionals' ability to view e-accounting as an unsolved problem or as an opportunity, depending on the way they develop their activity; H_a : There are differences in the professionals' ability to view e-accounting as an unsolved problem or as an opportunity, depending on the way they develop their activity. |
| | (2) | Kruskal Wallis Test: $H(1580) = 0.409$; $p = 0.938 > 0.05$ |
| | (3) | Not reject the null hypothesis (H_0): there are no statistically significant differences in professionals' perception of problem <i>versus</i> opportunity, depending on the way they develop their activity. |
| H2.4 | (1) | H_0 : There are no differences in professionals' perception of the e-accounting implementation costs, depending on the way they develop their activity; H_a : There are differences in professionals' perception of the e-accounting implementation costs, depending on the way they develop their activity. |
| | (2) | Kruskal Wallis Test: $H(1289) = 50600$; $p = 0.000 < 0.05$ Spearman Correlation: $\rho = -0.176$; $p = 0.000 < 0.05$ |
| | (3) | Reject the null hypothesis (H_0). There are statistically significant differences in the professionals' perception about the e-accounting implementation costs, depending on the way they develop their activity. Higher implementation costs are perceived by those who work in an accounting office (except for those that come with an "other" classification). There is a significant negative correlation between the two variables. |

continued on following page

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Table 5. Continued

| | | |
|------|-----|--|
| H3.1 | (1) | H_0 : There are no differences in professionals' perception of the level of dependency between accounting and taxation, depending on their professional experience; H_1 : There are differences in professionals' perception of the level of dependency between accounting and taxation, depending on their professional experience. |
| | (2) | Kruskal Wallis Test: $H(1570) = 14,009$; $p = 0.007 < 0.05$ Spearman Correlation: $\rho = -0.056$; $p = 0.028 < 0.05$ |
| | (3) | Reject the null hypothesis (H_0). There are statistically significant differences in the professionals' perception of the level of dependency between accounting and taxation, depending on their professional experience. Higher levels of professionals' perception of dependency are present in professionals with less years of experience and those in the "> 10 to 25 years" range and the lower levels of dependency perception in professionals with more professional experience. There is a significant negative correlation between the two variables. |
| H3.2 | (1) | H_0 : There are no differences in professionals' perception of the increasing in the level of dependency between accounting and taxation due to e-accounting implementation, depending on their professional experience; H_1 : There are differences in professionals' perception of the increasing in the level of dependency between accounting and taxation due to e-accounting implementation, depending on their professional experience. |
| | (2) | Kruskal Wallis Test: $H(1576) = 16,428$; $p = 0.002 < 0.05$ Spearman Correlation: $\rho = -0.056$; $p = 0.026 < 0.05$ |
| | (3) | Reject the null hypothesis (H_0). There are statistically significant differences in the professionals' perception of the increasing in the level of dependency, depending on their professional experience.. Higher levels of the perception of the increase in dependency are present in professionals with less years of experience and those in the "> 10 to 25 years" range and lower levels of increase in dependency are perceived by professionals in the "> 1 to 5 years" range. There is a significant negative correlation between the two variables. |
| H3.3 | (1) | H_0 : There are no differences in the professionals' ability to view e-accounting as an unsolved problem or as an opportunity, depending on their professional experience; H_1 : There are differences in the professionals' ability to view e-accounting as an unsolved problem or as an opportunity, depending on their professional experience. |
| | (2) | Kruskal Wallis Test: $H(1576) = 4.887$; $p = 0.299 > 0.05$ |
| | (3) | Not reject the null hypothesis (H_0): there are no statistically significant differences in the professionals' perception of problem <i>versus</i> opportunity, depending on their professional experience. |
| H3.4 | (1) | H_0 : There are no differences in professionals' perception of the e-accounting implementation costs, depending on their professional experience; H_1 : There are differences in professionals' perception of the e-accounting implementation costs, depending on their professional experience. |
| | (2) | Kruskal Wallis Test: $H(1285) = 27,859$; $p = 0.000 < 0.05$ Spearman Correlation: $\rho = 0.127$; $p = 0.000 < 0.05$ |
| | (3) | Reject the null hypothesis (H_0). There are statistically significant differences in the professionals' perception about the e-accounting implementation costs depending on their professional experience. Higher implementation costs are perceived by those who are at the extremes, that is, professionals with less and more experience. There is a significant positive correlation between the two variables. |

Table 6. Summary of tests results - I

| Explanatory variables tested | Professionals' perceptions | Results |
|---|---|---------|
| Professional category (certified accountants or accounting technicians) | Professionals' perception of dependency between accounting and taxation | X |
| | Professionals' perception on the increasing in the level of dependency between accounting and taxation due to the e-Accounting implementation | X |
| | Professionals' perception about the consequences of the adoption of e-accounting (problem or opportunity) | X |
| | Professionals' perception of the e-Accounting implementation costs. | ✓ |
| Way they develop their activity | Professionals' perception of dependency between accounting and taxation | X |
| | Professionals' perception on the increasing in the level of dependency between accounting and taxation due to the e-Accounting implementation | X |
| | Professionals' perception about the consequences of the adoption of e-accounting (problem or opportunity) | X |
| | Professionals' perception of the e-Accounting implementation costs. | ✓ |
| Professional experience | Professionals' perception of dependency between accounting and taxation | ✓ |
| | Professionals' perception on the increasing in the level of dependency between accounting and taxation due to the e-Accounting implementation | ✓ |
| | Professionals' perception about the consequences of the adoption of e-accounting (problem or opportunity) | ✓ |
| | Professionals' perception of the e-Accounting implementation costs | ✓ |

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Table 7. Summary of tests results - II

| Research Hypotheses | Statistic Hypotheses simplified | Result | Signal |
|----------------------------|--|---------------|---------------|
| H1 | There are differences in professionals' perception of the level of dependency between accounting and taxation among certified accountant and accounting technician. | Not validated | |
| | There are differences in professionals' perception of the increasing in the level of dependency between accounting and taxation due to e-accounting implementation among certified accountant and accounting technician. | Validated | ? |
| | There are differences in the professionals' ability to view e-accounting as an unsolved problem or as an opportunity among certified accountant and accounting technician. | Not validated | |
| | There are differences in professionals' perception of the e-accounting implementation costs among certified accountant and accounting technician. | Not validated | |
| H2 | There are differences in professionals' perception of the level of dependency between accounting and taxation, depending on the way they develop their activity. | Not validated | |
| | There are differences in professionals' perception of the increasing in the level of dependency between accounting and taxation due to e-accounting implementation, depending on the way they develop their activity. | Not validated | |
| | There are differences in the professionals' ability to view e-accounting as an unsolved problem or as an opportunity, depending on the way they develop their activity. | Not validated | |
| | There are differences in professionals' perception of the e-accounting implementation costs, depending on the way they develop their activity. | Validated | - |
| H3 | There are differences in professionals' perception of the level of dependency between accounting and taxation, depending on their professional experience. | Validated | - |
| | There are differences in professionals' perception of the increasing in the level of dependency between accounting and taxation due to e-accounting implementation, depending on their professional experience. | Validated | - |
| | There are differences in the professionals' ability to view e-accounting as an unsolved problem or as an opportunity, depending on their professional experience. | Not validated | |
| | There are differences in professionals' perception of the e-accounting implementation costs, depending on their professional experience. | Validated | + |

Analyzing the information contained in the Figures 4 and 5, it can be seen that most respondents classified their e-Accounting implementation costs, in hours, in more than 120 hours and, in value, mostly between 1,000 € and 2,5000 €. Note, however, that only about 55% of accountants said they already have their professional software certified with SVAT (Validation Seal of the Tax and Customs Authority), which means that many accountants will still have, among other costs, the cost of certifying their professional software, or purchasing new software.

Next, nonparametric tests were performed on previously formulated hypotheses - the results of these tests are summarized in Table 5.

(1) Operationalization; (2) Tests, results and correlations (Strength and sign); (3) Conclusion

According to the data shown in the Table 5 and 6, is possible to verify that:

- The variable “professional experience” has explanatory capacity on professionals’ perception of dependency between accounting and taxation. The results suggest that higher levels of professionals’ perception of dependency are present in professionals with less years of experience and those in the “> 10 to 25 years” range.

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- The variable “professional category” (certified accountants or accounting technicians) and “professional experience” have explanatory capacity on the professionals’ perception on the increasing in the level of dependency between accounting and taxation. The results suggest that certified accountants see a more pronounced increase in the level of dependency than accounting technicians and the higher levels of the perception of the increase in dependency are present in professionals with less years of experience and those in the “> 10 to 25 years” range.
- The variables “way of development of the activity” and “professional experience” have explanatory capacity on the professionals’ perception of the e-Accounting implementation costs. The results suggest that the higher implementation costs are perceived by those who work in an accounting office and by those who are at the extremes concerning professional experience, that is, professionals with
 - with the smallest and the largest less professional experience.
- None of the variables under study has ability to explain the professionals’ perception about the consequences of the adoption of e-Accounting, that is, more as an unsolved problem, or more as an opportunity, namely to “educate” their clients / employers.
- The most capable explanatory variable is professional experience, which has impacts on the perception on the level of dependency between accounting and taxation, as well as on the perception of increasing in the level of dependency and on the perception of e-accounting implementation costs.

The results of the validation and no validation of our research hypotheses are summarized in Table 7.

As can be seen in the information presented in Table 7, the results obtained in the analysis partially validated H1, H2 and H3. None of the research hypotheses has been fully validated, but neither has been totally rejected.

According to the results of the tests performed to H1.2 we verify that the certified accountant respondents see a more pronounced increase in the level of dependency resulting from the e-Accounting implementation than accounting technicians. From our perspective, the explanation for this difference in perception may be the difference in the levels of responsibility assumed in this process by both categories of professionals. In this process the responsibility for creating the conditions for the implementation of e-Accounting lies with the certified accountant, although the accountant may delegate some process tasks to the accounting technicians.

From the tests performed to H2.4 it was found that higher implementation costs are perceived by those who work in an accounting office compared to those who work in accounting and tax departments in larger companies. In our view, this higher cost perception in those who work in accounting offices may be motivated by the need of the accounting offices bear with the costs directly and, then, to pass them on to their customers.

H3.4 testing has shown that younger and older professionals are more aware of the costs of implementing e-accounting than the rest. From our perspective, these differences can have two distinct explanations: regarding to the younger ones, because they are at the beginning of their careers, they feel these changes as added costs; for the older accountants, because they are at the end of their careers and the do not expected to make new investments.

The explanatory hypotheses formulated about the differences detected in the tests performed to H1.2, H2.4 e H3.4 may be excellent clues for future research on this subject.

CONCLUSIONS

Concerning the characterization of the respondents, the authors verify a predominance of certified accountants. Consequently, there are a very small number of answers obtained from accounting technicians, which suggests a greater concern of certified accountants with this theme.

The researchers, also, verify that the level of professional experience of the respondents is high (81,4% of respondents have more than ten years of experience). The respondents mostly develop their activity outsourcing, via accounting offices, with customer portfolios' composed essentially from 51 to 100 clients.

The authors, also, verify that the accounting professionals who answered the questionnaire mostly perceive the level of dependency between accounting and taxation as medium (level 3), however, most of them perceive that the implementation of e-Accounting will increase significantly the level of dependency.

Most respondents perceive the implementation of e-Accounting in the midway between the problem and the opportunity, but the number of professionals who view these changes as an unsolved problem is bigger than those who can understand it as an opportunity to improve the profession. Moreover, in their point of view, the biggest obstacle to the implementation of e-Accounting is the "Failure of customers / employers to meet deadlines for delivery of accounting documents", that is, they put in question more the ability of their customers and employers to collaborate in this process, than their own ability to implement it.

Regarding e-Accounting implementation costs, it should be noted that most respondents pointed to costs in hours already exceeding 120 hours and to costs in value, mainly in the range of between 1,000 € and 2,500 €.

In the context of implementation costs, two facts stand out: (i) almost half of the respondents do not have their professional software certified with the tax and customs authority certification seal, which is mandatory, which will increase the costs of many accounting professionals; (ii) that the majority of the respondents develop their professional activity in accounting firms, this may lead to difficulties in passing on the costs of this process to clients (especially due to the small size of their clients).

Finally, the bivariate analysis allowed the authors to draw some partial profiles regarding the professionals' perceptions about this subject. Thus, the results suggest that: (i) higher levels of professionals' perception of dependency between accounting and taxation are present in professionals with less years of experience and those in the "> 10 to 25 years" range. (ii) Certified accountants see a more pronounced increase in the level of dependency between accounting and taxation than accounting technicians and the higher levels of the perception of the increase in that dependency are present in professionals with less years of experience and those in the "> 10 to 25 years" range. (iii) the higher implementation costs are perceived by those who work in an accounting office and by those who are at the extremes concerning professional experience, that is, professionals with less and more experience.

The researchers propose some future lines of research: firstly, it would be important to check whether the implementation of e-Accounting implies, for some professionals, the hiring of new employees; secondly, to understand which variables may explain the ability of professionals to assume, or not, this process as an unsolved problem, or, on the contrary, as an opportunity to change processes and "to educate" their clients and employers. Finally, the hypotheses formulated to explain the results of some tests with statistically significant differences may also provide clues for future research on this problem.

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ENDNOTES

- ¹ Accounting practices determined by tax rules or the opposite.
- ² System that is based on the accounting results, to which extra-accounting corrections, that only reflect the issues where there are differences between accounting and tax rules, are made, in order to obtain the tax results. The Portuguese case, in the last decades, has been classified in the context of partial dependence.
- ³ Total independence between tax and accounting rules.
- ⁴ <http://www.oecd.org/ctp/administration/guidancenote-guidancefordevelopersofbusinessandaccountingsoftwareconcerningtaxauditrequirements.htm> (accessed in 02.04.2019)
- ⁵ Referred by Porcano and Tran (1998)
- ⁶ Accounting practices determined by tax rules: according to that work, Norway came to the extreme of prohibiting the application of accounting rules contrary to the tax laws.
- ⁷ Ruding Report - It should be noted that this study only had as object of study the Union European countries.
- ⁸ It should be noted that this study only had as object of study the Union European countries.
- ⁹ Phenomenon that means the use of tax rules for both contexts, accounting and taxation.
- ¹⁰ Law No. 1368, from 21/09
- ¹¹ What is even until our days the base of Portuguese partial dependence model. Currently, the 17th article of the CIRC [*Código do Imposto sobre o Rendimento das Pessoas Coletivas*], the Portuguese code of income tax, is considered the bridge between accounting and taxation rules.
- ¹² First Portuguese Official Accounting Plan.
- ¹³ Nationality of the author(s) of each study

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- ¹⁴ Particularly, the objectives of a secondary nature, as those who want to “[...] influence the behavior of economic agents due to the economic and social context of the country.”(Sampaio, 2000:.47, translation)
- ¹⁵ *Ordem dos Técnicos oficiais de Contas* - denomination of the regulatory body of the profession.
- ¹⁶ Certified accountants or accounting technicians.
- ¹⁷ In an accounting office; In an accounting department; As a self employed; Other situations.
- ¹⁸ The authors do not know the existence of official data on the characteristics of accounting technicians.


Chapter 5

The Importance of Financial Theories for SME Capital Structure Decisions

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ABSTRACT

This chapter aims to analyze the importance of financial theories for SME capital structure decisions. The financial theories considered for this study were trade-off theory and pecking order theory. From the various empirical evidences researched in the Web of Science and Scopus database, it was found that most SME capital structure decisions follow the financial theory of hierarchical hierarchy, that is, the SME finance their investment opportunities through retained earnings, debt issuance, and finally stock issuance.

INTRODUCTION

Corporate finance management has received special attention in the academic field in general. In recent years, this focus has been on SMEs, given their important role in the growth of any economy and job creation. According to Daskalakis, Eriotis, Thanou, and Vasiliou (2014) SMEs account for 99.8% of all enterprises in Europe.

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Several studies (Daskalakis et al., 2014; Huang, Boateng, & Newman, 2016; Sharma, Kumar, Yan, Borah, & Adhikary, 2019) highlight that SMEs face many difficulties in accessing finance for large companies as they are considered to be riskier. There are several theories that have been studied in corporate finance.

The promoters of the studies on corporate capital structure decisions were Modigliani and Miller (1958), from which came several other important studies on the subject, mainly concerning the determination of the main factors that influence the capital structure of companies.

To this end, two financial theories have been extensively studied when it comes to corporate capital structure, namely Trade-Off and Pecking Order theories, respectively (Kim, 1978; Modigliani & Miller, 1963; Myers & Majluf, 1984; Serrasqueiro & Caetano, 2015).

Trade-off theory argues that companies seek to achieve an optimal debt ratio in which tax benefits are maximized with very low bankruptcy costs, while Pecking Order theory argues that there is no optimal capital structure and that companies follow a hierarchical order in the financing of their investment opportunities, starting preferentially with internal resources from retained earnings, culminating with external equity, specifically the issuance of shares which, in the case of SMEs, can be a very viable route, rare for not being listed or for the preservation of property, ie, to avoid dilution of a wealth of former shareholders (Myers & Majluf, 1984; Serrasqueiro, Nunes, & Armada, 2016; Shyam-Sunder & Myers, 1999).

Therefore, the fact that most SMEs are unlisted makes them more difficult to finance their investment needs using capital markets, such that SMEs are usually financed by the bank-based financial system (debt) (Müller & Zimmermann, 2009; Serrasqueiro et al., 2016).

The present study aims to analyze the importance of the main financial theories on capital structure decisions of SMEs, which is the class of companies that have contributed significantly to economic growth. Although the problem of capital structure has increased the interest of researchers, most previous studies focus more on determining the factors that may affect the capital structure of SMEs. There are few studies that address the importance of theories adopted by SMEs in making capital structure decisions. The article presents the following structure in addition to an introduction, section two presents the methodological procedures used in the study. Section three deals with financial theories and their evolution. Section four looks at the capital structure and section five present the final considerations.

METHODOLOGY

The present study followed a qualitative methodology, through content analysis, since it is an instrument that allows the researcher to study human behavior indirectly, through the analysis of their communications (Fraenkel & Wallen, 2008). For Gray (2004), with the evolution of new technologies, namely the tools of Web 2.0, the sources of communications are increasingly diverse. Blogs (posts and comments), wikis, online communities and 3D virtual environments, for example, are increasingly being investigated and, consequently, their contents are subject to analysis. Thus, the content analysis considers the articulation between the description and analysis of the described text, and the logical deduction of the factors that determined the characteristics of the characteristic elements (Bardin, 2004).

Thus, placing the focus of attention on the objectives of the study and the theoretical framework, the content analysis was carried out through a series of steps. Based on the authors Bardin (2004), Pardal and Correia (1995) and Carmo and Ferreira (2008), the following phases were established: definition

of categories to separate observable data, the definition of units of analysis and distribution of units of analysis by the categories previously established.

Thus, an extensive search was carried out on the Web of Science Core Collection with the terms Capital Structure, Trade-Off, Pecking Order and SME, between the years 2000 and 2016. The bibliographic compilation of all publications related to this research resulted in 348 results. A filter was applied so that only articles were made available, which reduced the number of results to 304 publications. Since in the 304 publications there were areas of study that were not of interest to the subject, we applied a few more filters, in order to investigate only the articles that explored or worked on these theories. Thus, 279 publications were excluded, with only 25 articles left for analysis (Figure 1).

Figure 1. Methodology



In order to be able to analyze all the information, the publications were exported to Microsoft Excel 2016 with complete records (authors, title, journal, country, keywords, abstract and citations) (Zhi et al., 2015).

LITERATURE REVIEW

The Evolution of Financial Theories

According to García and García (2015), financial theory has been playing an important development in recent years, given the growing globalization of markets in general and in particular the financial market.

Still, the same author states that the studies carried out in the middle of the first half of the last century had a traditional view of finance and from the '50s, after the works of Modigliani and Miller (1958), the studies began to have a Modern approach. Therefore, it was from this moment on that finance came to be considered as part of business science.

From this moment, there are several studies that have been developed in the field of business finance in general and in particular the theories that view the capital structure of companies in two major currents: traditionalist, represented by Durand (1952) and the proposed by Modigliani and Miller (1958).

Traditional Theory

For Brito, Corrar, and Batistella (2007), the traditional theory says that the value of the company is not influenced by its capital structure. This means that the cost of capital of the company is unchanged, regardless of how its capital structure is constituted, ie the cost of capital of others is constant up to a given level of debt. This cost will increase with the increased risk of bankruptcy. The optimal capital

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structure that maximizes company value is one that minimizes the total cost of capital with increasing debt because its cost is lower than that of equity.

From the pioneering work of Modigliani and Miller (1958), research on the composition of the capital structure and its impact on the market value of the company has accelerated. To study this relationship, two theories are considered: the Trade-Off theory and the Pecking Order theory. Modigliani and Miller (1958) consider in this initial paper the assumption that capital markets function perfectly, that is, without taxes, agency costs, bankruptcy costs, and information asymmetry. For them, there is no relevance of the capital structure to the determination of the market value of the company.

The average cost of capital is unchanged whatever the level of indebtedness, ie it does not depend on the capital structure. Therefore, the change in the debt level will have an impact on the cost of equity and consequently on the maintenance of the average cost of capital.

A few years later, Modigliani and Miller (1963) recognized that the previously used model was flawed because it did not consider the effect of taxes on the company's capital structure. With the consideration of taxes, it was found that there are tax benefits to the extent that we use foreign capital to the detriment of equity that naturally contributes to the market value of the company, so companies are encouraged to resort to foreign capital to the financing of its assets. However, the company cannot finance its assets by relying entirely on outside capital to avoid bankruptcy costs.

The tax benefits derived from the use of foreign capital, combined with the effect of bankruptcy costs, have resulted in the Trade-Off approach, which supports the idea that, on the one hand, they bring advantages to the company, on the other, they also drive costs. related to bankruptcy in case of excessive use of foreign capital.

Trade-off Theory

From the '60s with the introduction of the incidence of taxes on corporate income and the asymmetry of information by authors Modigliani and Miller (1963) led to the emergence of Trade-Off theory. This theory emphasizes that the capital structure of a given company is optimal as long as the tax benefits are balanced with the bankruptcy costs related to the level of debt. For Vieira and Novo (2010), there is a certain level of indebtedness in which the probability of the company's bankruptcy costs is irrelevant.

According to Myers (1984), the optimal capital structure of the company is reached to the extent that the debt ratio maximizes the market value of the company, as illustrated in Figure 2.

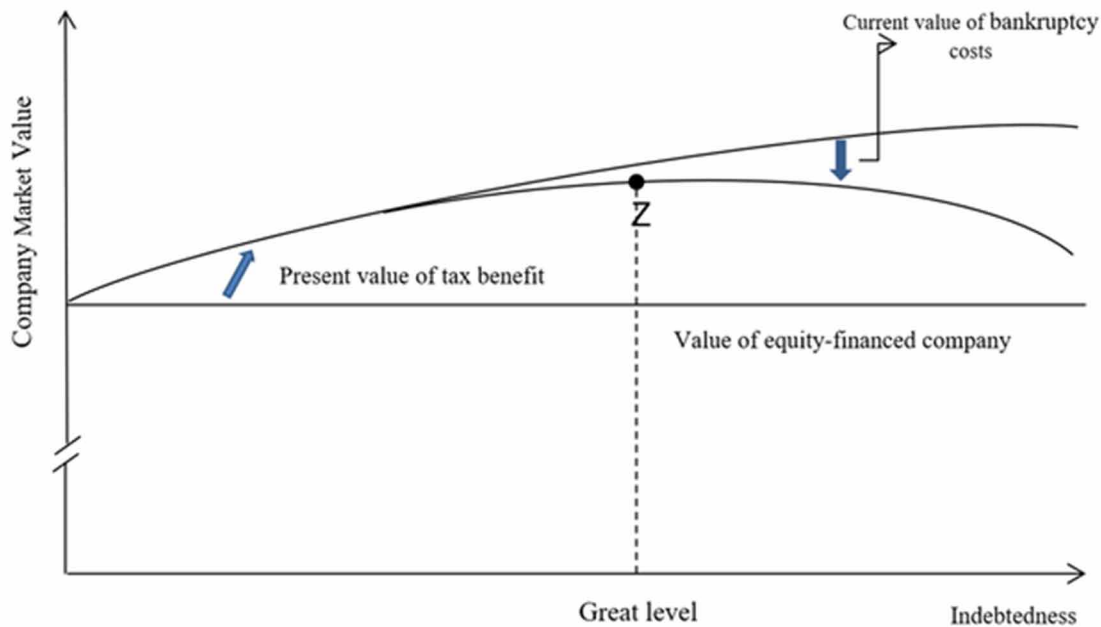
As can be seen from the figure above, point Z represents the optimal point at which the marginal tax benefits resulting from an additional unit of indebtedness are equal to the costs associated with indebtedness, ie it is the point at which the tax benefits and costs of debt are balanced. The static Trade-Off theory is similar to a photograph, as it presents the optimal capital structure of the company over a given period of time (without adjusting the debt ratio).

Once companies adjust their real debt-to-optimal debt ratio by renegotiating debt with creditors, they move from static trade-off theory to dynamic trade-off theory, in the latter one no longer achieves a single point of equilibrium "optimal capital structure" but objective ratio as the firm's lifetime progresses (Maçãs Nunes & Serrasqueiro, 2007).

The dynamic trade-off theory states that companies choose their capital structure or leverage by negotiating the benefits and costs of debt. In its simplest form, business managers are continually optimizing the leverage ratio to maximize business value (Lim, 2012).

Myers (1984) states that the degree of indebtedness is not the same for all companies. On the one hand, companies with higher risk and lower proportion of tangible assets tend to have a low level of

Figure 2. Static Trade-Off Theory



debt because they face higher financial costs. On the other hand, the lower the risk and the greater the proportion of tangible assets, the higher the debt level of the company with lower debt costs.

Bankruptcy Costs

Bankruptcy costs arise as the company uses other people's capital resources to finance its activities. The higher the company's debt ratio, the higher its bankruptcy cost. Therefore, for a company that is in a situation where bankruptcy costs are higher, it will have difficulties in raising the capital of others, that is, debt remuneration tends to be higher, which can negatively affect cash flows and the value from the company. Bankruptcy costs are divided into two categories (direct and indirect). Direct costs are associated with legal and administrative costs and indirect costs are related, for example, the possibility of losing relationships with suppliers and customers (Haugen & Senbet, 1978).

Agency Theory

The in-depth theoretical approach to agency theory began in the 1970s in the United States, when the economy began to work less well and was thus pointed to as the immediate cause of the ineffectiveness of large American companies, the strong dispersion of capital (Coelho, 1993).

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For Jensen and Meckling (1976), they state that agency theory is the result of conflicts of interest existing in companies between equity holders (main) and managers (agent). Shareholders (main) hire and delegate authority to a person (agent) to act and make decisions on behalf of shareholders (main) to create and/or maximize company value.

According to Bosse and Phillips (2016), it is impossible to know in advance, on the part of the main, how much will be maximized of such agreement because of the uncertainty regarding the agent level, effort, and exogenous factors. However, from the contract between both parties, the first, ie the holders of equity, expect the future value to be higher than the present value, which leads to its being designated as expected value $E(V)$.

Jensen and Meckling (1976) state that in an agency relationship the existence of each party is supposed to maximize the utility function. For this reason, the agent will not be acting to maximize the interests of the main thus generating conflict between them and consequently the information asymmetry which may cause the main not to receive the amount of the expected value ($E(V)$) from the agreement, but rather something less: $E(V - C)$, taking into account agency costs (C), as shown in the graph in figure 2 below.

For Bergen, Dutta, and Walker Jr (1992) four fundamental points can be considered that leads to the maximization of agency theory, whatever the situation in which it is implied; (1) conflict between main and agent objectives; (2) uncertainty in risk-sharing between main and agent; (3) information asymmetry; and (4) performance assessment.

The information asymmetry reveals that one of the parties to the agreement, ie the contractors (agent), is the holder of the complete information of the company, which the shareholders (main) have in part or incomplete, taking into account their own interests of main and agent.

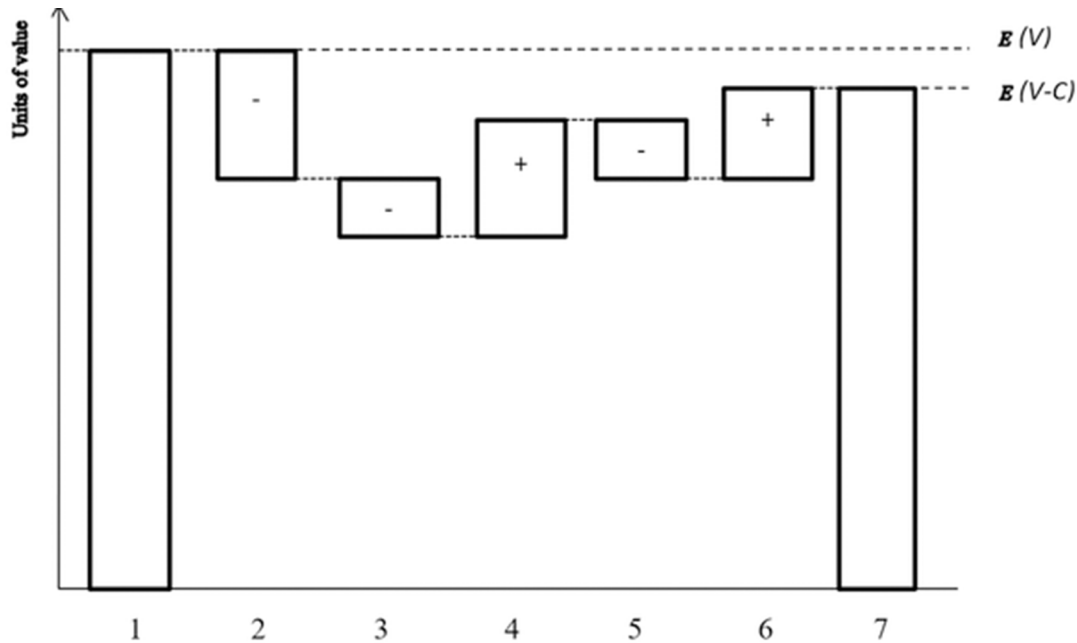
At where:

1. Represents business performance without agency problem;
2. The company presents the absolute agency cost (unmitigated);
3. Cost of the incentive alignment mechanism, ie hiring an agent for the main entails costs for the company;
4. Expected benefit by the main incentive alignment mechanism;
5. Cost of monitoring mechanism, ie hire a specialized team to monitor the services provided by the agent.
6. Expected benefit by the main monitoring mechanism performed;
7. Company performance after mitigation of agency problem.

Figure 2 shows in number one the company's performance without agency problems. Number two shows that there are agency problems, which leads the company to bear agency costs. In number three the agency costs are minimized, the company hires a secondary agent to act on its behalf and maximize

Figure 3. illustrates the standard operation, ie the expected results (performance) of the company with the application of agency theory

Source: Bosse and Phillips (2016)



its interests. At number four the agent’s action reveals a reduction in agency costs. In number five the company hires a team to supervise the activities provided by the agent to reduce his self-interest, which entails costs for the company. At number six with the presence of the supervisory team, the agent performs his tasks maximizing the interests of the company. Number seven presents the company’s performance after reducing the maximization of the agent’s interest and/or after mitigating the agency’s problem.

The mechanism for monitoring the services provided by managers aims at reducing the agency costs generated, taking into account the information asymmetry between managers and equity owners (Fama, 1980; Fama & Jensen, 1983).

To reduce agency costs, Jensen and Meckling (1976) propose that the way to do this is to resort to the use of third-party capital as a way of reducing the opportunistic intent of company managers, taking into account the reduction available cash flows to implement strategies in their own best interests.

In the context of SMEs, it is important to pay attention to agency costs, although these costs are unremarkable, as managers are usually also the owners of their SMEs (Daskalakis et al., 2014). For these authors, in the context of SMEs, agency conflicts are found between owners/managers and creditors. Considering the imperfection of the capital market and the existence of information asymmetry between shareholders and managers regarding the company’s future prospects, Ross (1977) in article “The Determination of Financial Structure: The Incentive Signaling Approach” proposed an incentive signaling model providing financial information to the market based on decisions regarding the company’s capital structure, called signal theory.

Signal theory reveals that company managers have knowledge about the prospects of future cash flows to the detriment of potential market investors who are willing to invest in the company in the form

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of equity (shareholders) or debt (creditors), are not aware of the results of their future flows. However, companies are aware of future cash flows (Caetano, 2011).

Future projections of the company are signaled to the market by managers through their capital structure decisions. If they are good, managers signal the market as a way to raise funds from third parties. Otherwise, companies bear costs.

Pecking Order Theory

According to Jong, Verbeek, and Verwijmeren (2010), Pecking Order theory was first studied by Donaldson Jr (1961). Years later, Myers and Majluf (1984) and Myers (1984) furthered the study of the same theory through the theoretical model that deals with capital structure decisions of firms with external financing needs.

The information asymmetry in companies between managers/owners and investors is one of the reasons for the emergence of the Pecking Order theory (Ross, 1977; Serrasqueiro & Caetano, 2015; Shyam-Sunder & Myers, 1999). The Pecking Order theory rules out the possibility of an optimal capital structure advocated by the Trade-Off theory. In the Pecking Order Theory, the capital structure of companies is formed according to a certain hierarchy regarding the sources of financing. In this case, companies have as their primary source of financing, internal resources (retained earnings). In case of insufficient domestic resources, they resort to external financing, starting from the use of foreign capital (short-term debt), as they present less risk. External equity (issuance of new shares) is a way of financing their growth opportunities (Myers, 1984, 2001; Serrasqueiro & Caetano, 2015). For SMEs, issuing new shares is not ideal given the difficulties of access to the capital market, as most of them are unlisted and also as a means of avoiding dilution of owners' weakness.

The Pecking Order theory says that for companies with a higher rate of return they have a lower debt ratio since higher retained earnings tend to be reinvested in the company (self-financing). The least profitable companies do not have enough retained earnings for self-financing. To finance themselves, they immediately resort to other people's capital (debt). Therefore, less profitable companies have a higher level of indebtedness. There is an inversely proportional relationship between corporate profitability and debt level in the Pecking Order theory (González & González, 2011).

Several empirical studies have been conducted testing both theories to find out which one is appropriate for SME financing, although there is no common consensus on different case studies. Most of these studies provide strong evidence that there is evidence that Pecking Order theory is followed by SMEs to fund their investment opportunities (Frank & Goyal, 2003; Mateev, Poutziouris, & Ivanov, 2013; Serrasqueiro, Armada, & Nunes, 2011; Shyam-Sunder & Myers, 1999).

SME'S CAPITAL STRUCTURE

This section intends to address how SME's capital structure is formed. It was first defined by its approach, although there is still a strong debate on a consensual definition among various researchers on the subject.

The capital structure of SMEs can be defined as the "efficient" combination of different sources of funding, which can be of two types: external sources and internal sources. External sources can be subdivided into foreign capital (short-term debt) such as bank loans, credit from suppliers, among others and external equity (medium and long-term debt) as capital. risk, capital increase, etc. As for internal

(medium- and long-term) sources, resources come primarily from the company's retained earnings to finance its investment opportunities.

SMEs, for the most part, do not use as a source of financing the issuance of shares or capital increase to prevent the expansion of company ownership. Optimizing the capital structure, ie its manipulation towards maximizing company value is the main structural decision in the financial management of a company (Titman & Wessels, 1988).

Factors Influencing the Capital Structure of SMEs

Studies on capital structure have increased in recent years despite the complexity of the subject. These studies have identified a large number of proxies that may be related to firms' level of indebtedness (Correa, Basso, & Nakamura, 2013; Titman & Wessels, 1988; Vřtavu, 2012). Variables or factors that are often considered to be determinants of a company's capital structure may be of a company-specific nature (tangible assets, company size, age, profitability, growth opportunities, liquidity, etc.), of a macroeconomic nature of the region (GDP growth, inflation rate, interest rate, etc.) or according to the characteristics of the business owner/manager (Daskalakis et al., 2014; Gombola, Liu, & Chou, 2019; Mc Namara, Murro, & O'Donohoe, 2017; Palacín-Sánchez, Ramírez-Herrera, & Di Pietro, 2013).

In the context of SMEs, Frank and Goyal (2009) consider that of this set of variables or factors, only a small number of them are really robust and statistically significant in the capital structure: (1) Tangibility of assets - Tangible assets represent one of the important elements in borrowing from outside capital, ie, the greater the tangible assets, the more likely it is that the firm will be financed from outside resources and at lower costs. The relationship between this factor and the company's debt ratio is expected to be positive in both theories (Trade-Off and Pecking Order); (2) Size - Trade-Off and Pecking Order theories mention the existence of a positive relationship between firm size and debt level, although some empirical studies report that there is an inverse relationship between firm size and debt level, that is, in the Pecking Order theory; (3) Growth opportunities - When companies show signs of future growth, they avoid debt because they do not want to offer creditors the ability to interfere with their institutional decisions (Frank & Goyal, 2009).

Therefore, companies with significant future prospects choose to maintain more profit to reduce the cost of capital (Vřtavu, 2012). The relationship between growth opportunities and company value as positive. Growth opportunities and the debt ratio in both theories (Trade-Off, Pecking Order, and Agency Theory) have a negative relationship (Myers, 1977). However, in the Pecking Order theory, for companies whose retained earnings are insufficient, growth opportunities and debt ratios may be positively related; (4) Profitability - Trade-off and agency cost theories indicate a positive relationship between profitability and debt ratio, since the higher the firm's profitability, the higher the debt ratio tends to benefit from tax benefits (Youssef & El-Ghonamie, 2015). For the Pecking Order theory, the relationship between profitability and debt ratio is negative. Generally, most results of empirical studies support hierarchy theory (Myers, 1984; Myers & Majluf, 1984; Pratheepan & Yatiwella, 2016; Titman & Wessels, 1988).

Empirical Evidence of Capital Structure Theories of SMEs

Several empirical surveys have been done on the capital structure of SMEs. From this research, some evidence has been found regarding the theories that SMEs have followed in view of their funding.

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In the context of SMEs from countries such as Greece and France, (Daskalakis et al., 2014) obtained results that suggest that MSEs from both countries follow the Pecking Order theory in capital structure decision making.

Sharma et al. (2019) surveyed Indian SMEs, in which they found evidence indicating that SMEs in this context is closer to the Pecking Order theory than Trade-Off theory in capital structure decisions.

Serrasqueiro et al. (2011) analyzed the capital structure of service providing SMEs. In this research, the authors obtained evidence that the capital structure decisions of service delivery SMEs in Portugal follow the Pecking Order theory rather than the Trade-Off theory. Still, in the context of Portuguese SMEs, Matias and Serrasqueiro (2017) found results that show a greater application of the assumptions of the Pecking Order theory compared to the assumptions suggested by the Trade-Off theory in its financing process.

Research conducted in an Australian family and non-family SMEs. Burgstaller and Wagner (2015) highlight that several studies in this context have found results indicating that family SMEs are increasingly close to the Pecking Order theory of non-family SMEs, regarding capital structure decision making.

Adair and Adaskou (2015) researched the determinants of the French SME capital structure and concluded that the Pecking Order theory better explains these decisions than the Trade-Off theory.

FINAL CONSIDERATIONS

This research was based on several studies on capital structure decisions found on the Web of Science and Scopus, from a literature review, aiming to understand the importance of financial theories associated with the capital structure of SMEs. The various empirical evidence has been taken into account. Thus, it can be argued that the decisions of the SME's capital structure are based on the financial theories and the financing of their investment opportunities. In this context, the capital structure of SMEs generally follows the assumptions of the Pecking Order theory rather than the Trade-Off theory. The justification given above is due to the fact that most SMEs are not listed in order to preserve their ownership.

The results also show that SMEs have faced many difficulties in accessing external financing because they are considered riskier and taking into account agency costs between owners/managers and creditors, in addition to the preference for internal resources of the company. Therefore, it can be concluded that financial theories are of fundamental importance in the financing and / or decision making of the capital structure of SMEs, whatever the context in which the enterprise is inserted.

Regarding the limitations presented in this research, it is the fact that it is theoretical. Thus, empirical studies are required to confirm the study results.

As future lines of research, an empirical analysis of the importance of financial theories for SMEs in different contexts is suggested, particularly in developing countries. The study of the theme can be done by sectors of activity. Further bibliometric studies on the subject are recommended.

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Chapter 6

Extremal Index Estimation: Application to Financial Data

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ABSTRACT

In finance it is crucial to understand the risk of occurrence of extreme events such as currency crises or stock market crashes. It is important to model the distribution of extreme events. Extreme value theory is known to accurately estimate quantiles and tail probabilities of financial asset returns. These kinds of data are usual related to heavy tailed distributions, where a relevant parameter is the tail index. Fitting data to heavy tail distributions usually assumes independent observations. However, the most usual real market scenario describes clusters of extreme events rather than isolated records over some period of time. In that case, estimating tail probabilities includes estimating the extremal index. This chapter describes the usual extremal index estimators based in different approaches and illustrates their values for a real financial data set. Computations are provided by the use of suitable R packages.

INTRODUCTION

Financial institutions need to know appropriate models for predicting market evolution. They must be prepared for all possible outcomes. If there is a crash in stock market it is vital to have an adequate notion of the magnitude of the consequences. Managing a portfolio involves measuring risk, associated to the ability to overcome some low values that might occur. Central banks need to provide safety limits to protect bank clients from a catastrophic event with a fund reserve. Banks need to develop tools that provide early warning indicators of periods of crisis.

Extreme Value Theory (EVT) models the occurrence of rare events such as high (low) values of stock market or other kind of asset returns over some period of time. In financial markets there is a special interest related to the behaviour of maximum (minimum) values as they might represent a big difference to the owner's assets value. These kind of values occur in different ways, being observed either with an isolated frequency or, as it happens most of the times, in clusters of high (low) values. They may also occur in periods of low volatility and others of greater fluctuation. The extreme value distribution is

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thus one of the most important issues to study for assuring a good perspective of the market evolution. The study of the limiting distribution for a long period a time offers a different knowledge of the tail model. When clusters of extreme values are present, this limiting distribution is affected by an extra parameter, the so-called extremal index. This index is somehow related to the dependence structure of the sequence of observed values and measures, in some way, the magnitude of the periods in which extreme values occur.

In this chapter, extreme value theory is revisited, beginning with a review of the main concepts when dealing with independent and identically distributed (i.i.d.) samples. In this case the limiting distributions of the maxima, under suitable transformations comes from the well-known theorem of Fisher-Tippet (Fisher & Tippet, 1928).

For some particular sequences that verify suitable conditions related to its dependence structure, it is also possible to obtain the limiting maximum distribution which depends on the extremal index. The second part of the chapter summarizes the required conditions for studying the extremal index and its most popular estimators are presented. Most of the recent estimator proposals that are included are based on different approaches. The chapter concludes with an application to real data, beginning with an exploratory analysis and then the estimation process. This illustration example is supported with special designed available R-packages (R Core Team, 2015) and also presents the applied R-code so the reader can replicate by himself the obtained results.

Extreme Value Theory

EVT is particularly useful in finance namely, to estimate probabilities of extreme events. For example, if $\{R_n\}_{n \geq 1}$ is a sequence of random variables representing some stock returns over some period of time, it is crucial to have proper estimates of the (usual) small probabilities of overcome some high (low) value. Extremes refer to the maximum or minimum value of such a sequence. If some “safety” threshold is known, the probability of the minimum of a sequence of stock returns being bellow that threshold means that there is a probability of falling into dangerous limits.

Although studies related to EVT begun in the 1920s with Boortkiewicz, Fréchet, Von Mises and Tippet (Gumbel, 2004), (Beirlant, Caeiro, & Gomes, 2012) and received some attention later (Gnedenko, 1943), it is only in the 1950s that a serious development takes place. This “lift off” of the EVT research is associated with a catastrophic event of floods in the Netherlands in the 1st of February of 1953, originated by a great storm in the North Sea: 1850 died because of the failure of several dykes that didn’t stood up facing the strength of the waters (Woo, 1999). To avoid a similar disaster, the Dutch government made some investments: a commission was nominated with the purpose of performing an econometric analysis, in order to establish an optimal safety level to build robust higher dykes. The research to find solutions to solve this kind of problems was therefore intensified by the mathematicians and names like Laurens De Haan have given big contributions towards the state of knowledge that EVT has nowadays (David & Edwards, 2001), (Fraga Alves, Gomes, & De Hann, 2003) (Gomes & Guillou, 2015).

There are two distinct ways of covering the study of extreme observations. One way is the so called “Block Maxima” approach that implicates the study of the distribution of maximum values identified over some disjoint set of blocks. The other way, known as “Peaks Over Threshold” (POT) method, consists of defining some upper threshold and then analyse the excesses above that threshold. The first results on fitting the Generalized Extreme Value (GEV) distribution and verify the necessary assumptions. The

second admits to fit a Generalized Pareto (GP) distribution to the excesses. The two limit distributions are related as demonstrated by Pickands (Pickands, 1975), (Balkema & De Haan, 1978).

Independent and Identically Distributed Sequences

Consider an independent sequence of random variables, $\{X\}_{n \geq 1}$ with common distribution function (d.f.) F_X and $M_{X_n} = \max\{X_1, X_2, \dots, X_n\}$. It is well known that the distribution of the maximum, $F_{M_{X_n}}$ is related to F_X . In fact, $F_{M_{X_n}} = (1 - F_X)^n$. So, once F_X is known, it is possible to obtain the probability of observing a maximum value above a chosen threshold. If the minimum is the variable of interest, the simple existing relation between the two variables, $\{X_1, X_2, \dots, X_n\} = \min\{-X_1, -X_2, \dots, -X_n\}$, reduces the study to one of them. The problem is that this distribution is not usually known.

Taking its limit when n tends to infinity, providing some suitable normalizing constants, one can identify the limiting distribution of the maxima summarized in the Fisher-Tippett theorem:

Theorem 1 Fisher-Tippett (1928)

Consider a sequence of i.i.d. random variables, X_1, X_2, \dots, X_n with $M_{X_n} = \max\{X_1, X_2, \dots, X_n\}$. If there exist normalizing constants $a_n \in \mathbb{R}$, $b_n > 0$. such that, for some non degenerate d.f. G

$$P\left(\frac{M_{X_n} - a_n}{b_n} \leq x\right) \xrightarrow{d} G(x),$$

Then, $G(x)$ belongs to one of the next three types of distributions:

Type I (Gumbel): $\Lambda(x) = \exp(-e^{-x})$, $x \in \mathbb{R}$;

Type II (Fréchet): $\Phi_\gamma = \begin{cases} 0, & x \leq 0 \\ \exp(-x^{-\alpha}), & x > 0 \end{cases}$, $\gamma > 0$;

Type III (Weibull): $\Psi_\gamma = \begin{cases} \exp[-(-x)^\alpha], & x \leq 0 \\ 1, & x > 0 \end{cases}$, $\gamma > 0$.

A single representation of the three types of limit distributions is possible due to Von Mises (Von Mises, 1936) and Jenkinson (Jenkinson, 1955) which is referred to as the Generalized Extreme Value distribution:

Theorem 2 GEV distribution

The maximum distribution of a sequence of i.i.d. random variables, $G_\xi(x)$. is given by

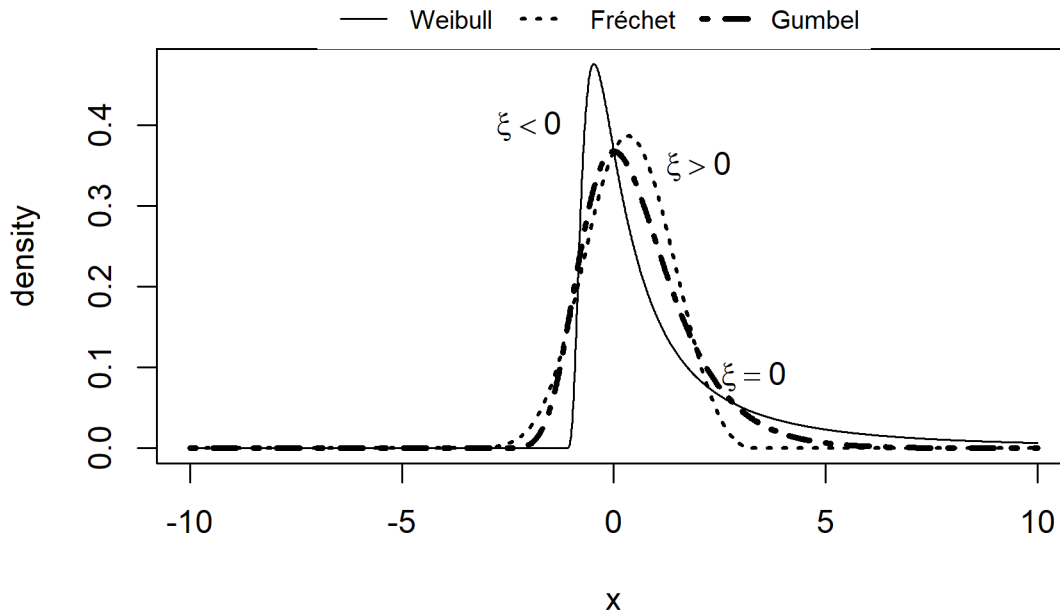
$$G_\xi(x) = \exp\left[-\left(1 + \xi \frac{x - \mu}{\sigma}\right)^{-1/\xi}\right], \forall x \in \mathbb{R} : 1 + \xi \frac{x - \mu}{\sigma} > 0. \tag{1}$$

The GEV distribution depends therefore on location and scale parameters, μ and σ respectively. Further details can be found at (Fraga Alves & Neves, 2016) or (P Embrechts, Klüppelberg, & C. Mikosch, 2001). Different distribution type shapes arise upon different values on the ξ parameter, as it may be

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visualised in Figure 1. A Fréchet distribution corresponds to a shape parameter $\xi > 0$. The larger the value of ξ the thicker the distribution tail. It is related to the tail index, α being its reciprocal $\xi = 1/\alpha$. For a value of $\xi < 0$ it results the Weibull law, characterized by a thin tail distribution and if $\xi = 0$, it comes the Gumbel distribution.

Figure 1. Density functions for GEV distributions ($\xi=-0.3$ for Weibull and $\xi=0.8$ for Fréchet)



From the Fisher-Tippett theorem results the concept of Maximum Domain of Attraction (MDA). We may say that a probability distribution of the cumulative distribution function F belongs to the MDA of one of the EVT limit distributions, Fréchet, Gumbel or Weibull, if the normalized maximum has a distribution that converges to such a distribution. This property might be particularly relevant to fields of applications of EVT as it is relevant to study mostly the behaviour of the tail, not so much what happens in the central part of the data.

Definition 1. *Maximum domain of attraction (MDA):* If there exist sequences of real numbers a_n and $b_n > 0$ such that

$$\lim_{n \rightarrow \infty} P\left(M_{X_n} \leq a_n + b_n x\right) = \lim_{n \rightarrow \infty} F^n\left(a_n + b_n x\right) = G(x), \quad (2)$$

for every continuity point x , then the cumulative d.f. F belongs to the maximum domain of attraction of G , i.e., $G \in D(G)$.

Pickands theorem, stated e.g. in (Fraga Alves & Neves, 2016), applies to distribution functions that belong to the domain of attraction of the GEV distribution, showing the tail equivalence with the GP distribution, as defined next:

$$GP_\xi(x) = \begin{cases} 1 - (1 + \xi x)^{-1/\xi}, & 1 + \xi x > 0, x \in \mathbb{R}^+, \text{ if } \xi \neq 0 \\ 1 - \exp(-x), & x \in \mathbb{R}^+, \text{ if } \xi = 0 \end{cases} \quad (3)$$

Dependent Sequences: Some Results

Financial analysts often have to deal with situations where data structure is far away from an independent scenario. In this case it is still possible to obtain a limit distribution for the maximum. In Leadbetter (Leadbetter M. R. & Rootzén, 1983) an exhaustive work is available, describing the features of sequences for which the same kind of limit distribution law for maximum is attainable as it happens for the i.i.d. case.

Suppose $\{X_n\}_{n \geq 1}$ is a dependent sequence with common d.f. F_x and consider an associated independent sequence, i.e., an i.i.d. sequence $\{Z_n\}_{n \geq 1}$ with the same marginal d.f.. For some stationary sequences (Castillo, 2005) with an asymptotic behaviour similar to the one of independent sequences, a generalization of the extremal type's theorem (Theorem 1) may be applied.

Definition 2. *Stationary sequence: a sequence $\{X_n\}$ of random variables is said to be stationary if for any integers p, q*

$$F_{i_1, i_2, \dots, i_p}(x_1, x_2, \dots, x_p) = F_{i_1+q, i_2+q, \dots, i_p+q}(x_1, x_2, \dots, x_p).$$

Such a behaviour is present in sequences that verify a weak mixture condition D, defined next (Leadbetter M. R. & Rootzén, 1983) (P. Embrechts, Klüppelberg, & Mikosch, 1997):

Definition 3. *Condition $D(u_n)$: Consider a sequence $\{u_n\}$ of real numbers. $D(u_n)$ is said to hold for the stationary sequence $\{X_n\}$ if for any integers p, q and n , $1 \leq i_1 < \dots < i_p < j_1 < \dots < j_q \leq n$ such that for $j_1 - i_p \geq l$*

$$\left| P\left(\max_{i \in A_1 \cup A_2} X_i \leq u_n\right) - P\left(\max_{i \in A_1} X_i \leq u_n\right) P\left(\max_{i \in A_2} X_i \leq u_n\right) \right| \leq \alpha_{n,l},$$

where $A_1 = \{i_1, \dots, i_p\}$, $A_2 = \{j_1, \dots, j_q\}$ and $\alpha_{n,l} \rightarrow 0$ for some sequence $l = l_n = o(n)$.

Leadbetter (Leadbetter M. R. & Rootzén, 1983) proves a similar result to Theorem 1 for the stationary sequences that verify D condition or stronger mixing conditions.

Some results related to the study of extremes in dependent sequences need also the condition $D^2(u_n)$ (Chernick, 1991), (Leadbetter & Nandagopalan, 1989) of local dependency presented next. In sequences that verify $D^2(u_n)$, if a sequence takes a value above some threshold and then goes below it, the probability of the sequence going up again in the same cluster tends to zero. This assures that the clusters are separated from each other.

Definition 4. *Condition $D^2(u_n)$. Consider a sequence $\{u_n\}$ of real numbers and a sequence $\{X_n\}$ that verifies D condition. $D^2(u_n)$ is said to hold for the sequence $\{X_n\}$ if*

$$nP\left(X_j > u_n, X_{j+1} \leq u_n, M_{j+2, r_n} > u_n\right) \rightarrow 0, \text{ as } n \rightarrow \infty.$$

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being $\{r_n\}$ a sequence of block sizes such that $\frac{n}{r_n} \rightarrow \infty$.

Theorem 3 Extreme value distribution for stationary sequences

Assume that for some chosen constants $b_n > 0, a_n \in \mathbb{R}, \left(\frac{M_{X_n} - a_n}{b_n}\right)^d \rightarrow G(x)$, for some nondegenerate d.f. G . If $D(b_n x + a_n)$ is true for each real x , then G is an extreme values distribution.

Theorem 3 allows identifying the type of the maximum limit distribution of a stationary sequence, as long as the limit $\lim_{n \rightarrow \infty} P(M_{X_n} \leq u_n)$ exists. The type of dependence structure inherent to a stationary sequence is strictly related to the way extreme values occur. If the sequence is weak dependent or asymptotically independent, the behaviour of the maximum of the sequences $\{X_n\}_{n \geq 1}$ and $\{Z_n\}_{n \geq 1}$ is similar. This means that exceedances above high values tend to happen in an isolated way. When this is not the case, those extreme values appear in clusters. Stronger dependence structure corresponds to larger size clusters. In Figure 2 and Figure 3, different types of dependent sequences are illustrated. M-dependent models as defined in (Castillo, 2005) and max-autoregressive models are studied, for example, in (Alpuim, 1989).

Figure 2. m -dependent models with marginal unit Fréchet distribution with different values of extremal index; lower values of θ corresponds to larger dimension of clusters of high values. In this case a 2-dependent model with extremal index of 0.5 (left) and a 5-dependent model with extremal index of 0.2 (right)

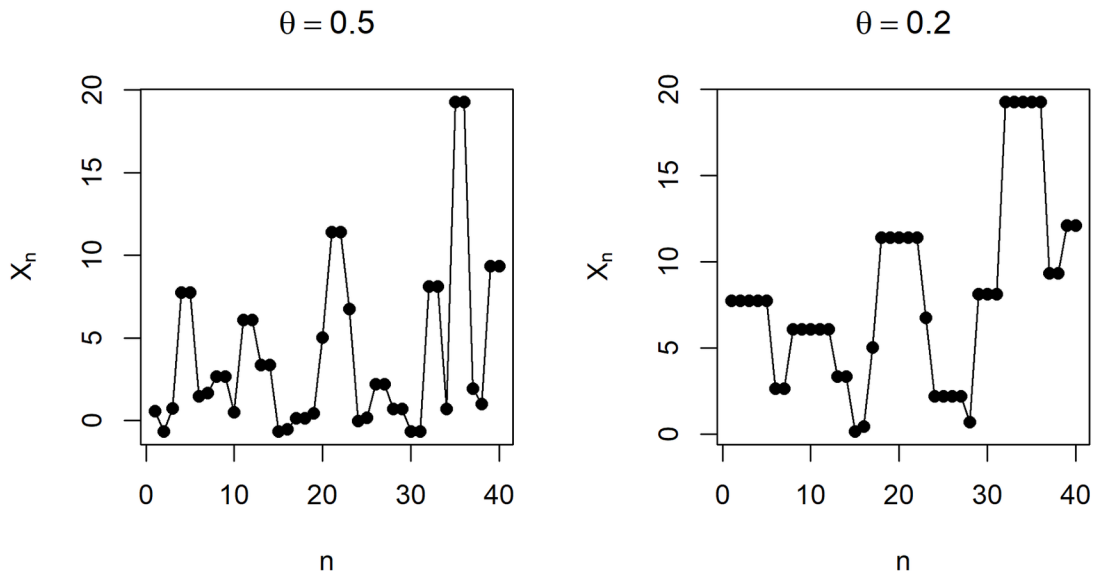
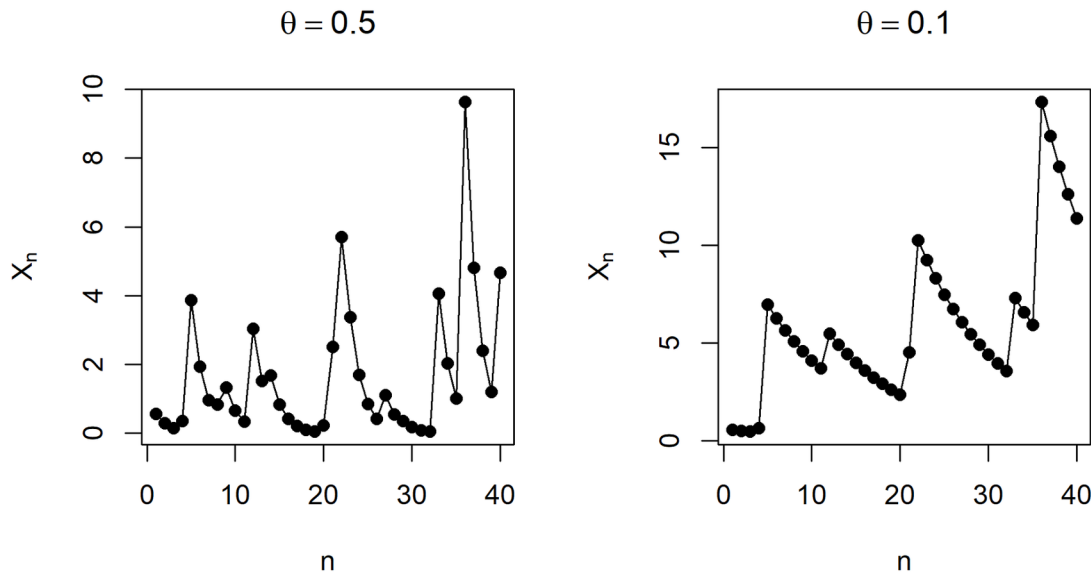


Figure 3. Max-autoregressive models as defined in (Alpuim, 1989) with marginal unit Fréchet distribution with different values of extremal index; note the size of the clusters of high values with $\theta=0.1$ (right) in contrast with a greater value of $\theta=0.5$ (left)



The way different extreme values behave in dependent sequences is related to an additional parameter that characterizes the extreme value distribution in such dependent structures – the extremal index (EI), θ .

Definition 5 *Extremal index*

The sequence $\{X_n\}_{n \geq 1}$ is said to have an extremal index $\theta(0 \leq \theta \leq 1)$ if for each $\tau > 0$

- i. There exists $u_n(\tau)$ such that $n(1 - F(u_n(\tau))) \rightarrow \tau$,
- ii. $\lim_{n \rightarrow \infty} P(M_{X_n} \leq u_n(\tau)) = e^{-\theta\tau}$.

Results from Leadbetter and Rootzén (Leadbetter M. R. & Rootzén, 1983) show that a sequence $\{X_n\}_{n \geq 1}$ for which $P(M_{X_n} \leq u_n(\tau))$ converges for some τ and verifies $D(u_n(\tau))$ condition has an extremal index $\theta(0 \leq \theta \leq 1)$. In their work, they also prove an important result that relates the asymptotic distribution of the maximum of the two sequences $\{X_n\}_{n \geq 1}$ and $\{Z_n\}_{n \geq 1}$: if $\{X_n\}_{n \geq 1}$ has an extremal index $\theta > 0$ then, for any sequence of real numbers (u_n) and $\tau > 0$ if the limit distribution of M_{Z_n} exists and is of the same type as an extreme value distribution, H , then for conveniently chosen constants, $c_n > 0$ and $d_n \in \mathbb{R}$.

$$c_n^{-1} (M_{Z_n} - d_n)^d \rightarrow H \Leftrightarrow c_n^{-1} (M_{X_n} - d_n)^d \rightarrow H^\theta, \tag{4}$$

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So, one can easily see that for $\theta = 1$, there is no changes in the limit distribution of M_{X_n} compared with M_{Z_n} distribution. This is the case when the sequence is independent or weakly dependent. If $\theta = 0$, this means that the M_{X_n} limit distribution is degenerated. The closest to zero is the value of the extremal index, the stronger will be the structure of dependence. In (P Embrechts et al., 2001) several examples with sequences with known values of θ are illustrated.

The value of theta produces a shrinkage in high values and can be seen as determinant of how stochastically larger M_{Z_n} is from M_{X_n} . (Gomes, Hall & Miranda, 2005), (Miranda & Gomes, 2007).

The relation between the two asymptotic distributions may be stated in terms of the GEV parameters of shape, location and scale, whenever the adequate conditions are fulfilled (Chavez-Demoulin & Davison, 2012), (Fraga Alves & Neves, 2016). If H^θ has location parameter μ , σ for scale and ξ for shape, $\mu, \sigma \in \mathbb{R}$ and $\xi > 0$, the H distribution parameters will be

$$\mu_z = \mu - \frac{\sigma}{\xi}(1 - \theta^{-\xi}), \sigma_z = \sigma\theta^\xi \text{ and } \xi_z = \xi \quad (5)$$

Note that there will be no relevant difference in both upper tails distributions due to the same value of the shape parameter, ξ , related to the upper tail.

Tail Index Estimation

The tail index estimation is a topic that has been intensely explored in the EVT literature over the last decades. Different approaches have been proposed and many advances have been achieved to provide more accurately estimates. Although it is not the scope of this chapter to present a deep study of this subject, the most popular estimators are presented. Nevertheless, for someone that wants to know more about this topic, there are several papers that give an overview of the original ideas and recent developments. The works of Beirlant et al. (Beirlant et al., 2012) and (Gomes, Canto e Castro, Fraga Alves, & Pestana, 2008) are particularly relevant and offer an up-to-date summary about the extensive work published within this topic.

Parametric and semi-parametric solutions have been discussed, involving the limit EVT distributions or even some wider distributional assumptions. In the former case there is an assumption of an underlying parametric distribution, requiring the estimation of the distribution parameters, location, shape and scale. In the latter case, only a set of upper order statistics (o.s.) or excesses over some high random threshold contributes to compute the estimator. With semi-parametric approach it is enough to consider an underlying distribution belonging to the domain of attraction of one of the distributions in (1), assuming a different shape, depending on the value of the shape parameter.

Parametric approach includes maximum likelihood and regression methods - see for example (Tsay, 2010) for more details. The main differences in this sort of estimator methodologies depend on how the extreme observations are defined (Beirlant et al., 2012). Other forms of estimator proposals come from semi-parametric approaches (Fraga Alves et al., 2003), (Gomes & Guillou, 2015), (Beirlant et al., 2012).

In this chapter, two of the most widely extreme value index estimators are mentioned, the Hill estimator and the Pickands estimator.

The Hill Estimator

The most popular tail index estimator for heavy tails distributions is the Hill estimator

$$\hat{\xi}_k = \frac{1}{k} \sum_{i=0}^{k-1} (\log(X_{n-i:n}) - \log(X_{n-k:n})), \quad (6)$$

where k represents the number of upper order statistics. The choice of this value is difficult to make, and different values might generate different estimates of the parameter. In fact, much part of the literature dedicates to the reduction of bias of this estimator, looking for expressions that result in a more balanced relation between bias and variance (Caeiro, 2002), (Gomes, Hall, & Miranda, 2008), (Gomes, Miranda, & Viseu, 2007). Studies also have been directed towards the method of choosing this particular value, k , or equivalently the choice of a threshold above which extreme observations are considered (J Danielsson, De Haan, Peng, & De Vries, 1997) (Ledford & Tawn, 2003). The authors summarize these methods in two distinct groups: one resulting from theoretical asymptotic grounds and the other deriving mostly by heuristic arguments arising from practitioners. The first group provides an optimal choice of the parameter with the application of bootstrap methodologies and asymptotic theory results (Gomes, Caeiro, Henriques-Rodrigues, & Manjunath, 2016), (Drees & Kaufman, 1998) (Longin, 2016). The second group is dominated by a heuristic and easy method most recurrently used in fields of economy and finance: plotting the parameter estimate value against the number of upper order statistics, using a so-called Hill-plot, and identify the region where the estimate presents more stability. This means that a good value for k will be some value included in a plot region with a moderated bias and reduced variance (typically a Hill-plot presents a steady region followed by increased bias of the estimate as k increases). This procedure is known as the “Eye ball technique”. One other approach consists in taking a fixed percentage of the total sample to compute the estimate. In a recent working paper, Danielsson et al. (Jon Danielsson & Ergun, 2016) propose an alternative framework, based on minimizing the distance between the empirical distribution and a semi-parametric distribution.

The Pickands Estimator

As referred by Drees (Drees, 1995), there is a rich literature concerning the estimation of the extreme value index parameter and one of the most addressed estimator is the Pickands (Pickands, 1975) estimator defined as

$$\hat{\xi}_p(k) = \frac{1}{\log(2)} \log \left(\frac{X_{n-k+1:n} - X_{n-2k+1:n}}{X_{n-2k+1:n} - X_{n-4k+1:n}} \right), k \leq \frac{n}{4}. \quad (7)$$

This estimator is consistent for any intermediate sequence $(k_n) \rightarrow \infty, \left(\frac{k_n}{n}\right) \rightarrow 0$ but is asymptotic poorly efficient and very sensitive to changes in the k values. See (Dekkers & De Haan, 1993) for more details.

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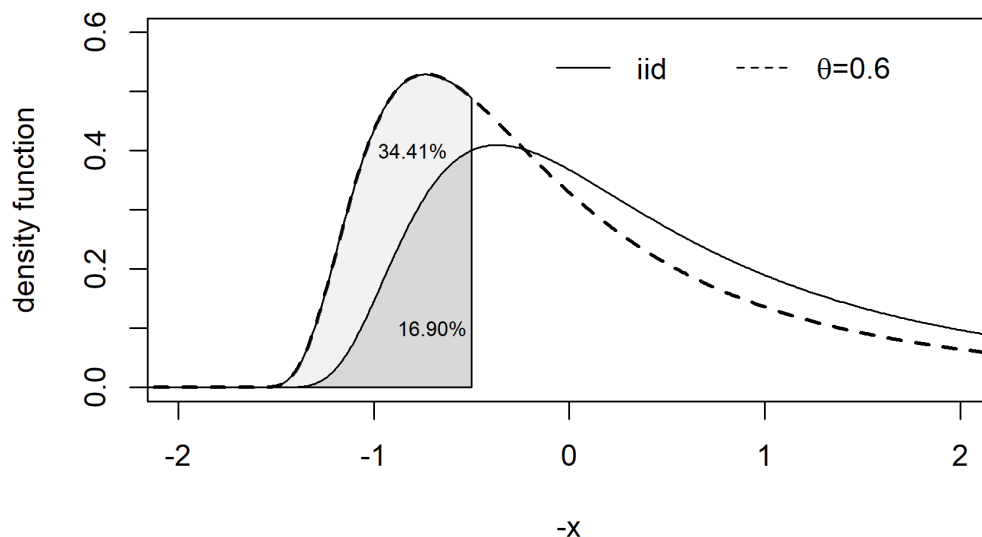
Financial risk management needs to be prepared for unexpected big losses or surprisingly high values. The central part of data distribution is not as important as it may be the tails distribution. Consequently, the main interest lies on a correct estimation of the tails distribution so high quantiles or probabilities of exceedances are estimated properly. The use of an incorrect value for the extremal index may result in severe problems when dealing with real situations. As an example, take the VaR (Value at risk) measure. One of the ways to compute the VaR value requires the minimum (maxima) asymptotic distributions. Longin (Longin, 2000) suggests a sequence of eight steps for computing the VaR of a market position, providing an excellent guide for action for those who have to deal with real data. The question addressed here holds at the 5th of those steps. A proper estimation of the distribution parameters is essential to obtain realistic conclusions regarding, in this case, to the amount of assets necessary to overcome a greater loss in some investment, with a preset usual small probability of overcome such value.

The VaR concept has been widely spread among the financial risk management community. It was originally proposed in J.P. Morgan's Risk Metrics in 1993 (P. Embrechts, Furrer, & Kaufmann, 2009) and is defined as a quantile of order p of a risk cumulative distribution F_X . The p probability usually assumes high values such as 0.95, 0.99 or 0.999 corresponding thus to high distribution quantiles.

In the EVT approach the minimum distribution function is considered. The choice of the probability value obeys to regulators requirements which are constantly evaluating the existing instruments and looking for more efficient methodologies that can turn the analysis more up-to-date (Basel Committee & on Banking Supervision, 2011).

Imagine a sequence of dependent returns treated as an i.i.d. sequence: the value 1.5 would be computed as a VaR of $p=0.83$, using a GEV distribution with $\theta = 1$ (corresponding to a i.i.d. or asymptotically independent sequence); the same value, however, would be obtained with a probability of 0.66 if $\theta = 0.6$ is included as a parameter of the distribution. The difference is illustrated in Figure 4. So, relaxing the dependent structure of some set of data might result in a misleading assumption of this critical value.

Figure 4. Different values of VaR computed considering or not a dependent data structure



So, using the GEV distribution to fit a set of data requires the estimation of two fundamental parameters in order to accurately describe the extremes behavior: the shape parameter ξ and the extremal index θ . The first is widely studied and great developments have been achieved leading to estimators with good performances. The most famous of all and a reference for comparing with new proposals is the Hill estimator (Hill, 1975). Beirlant (Beirlant et al., 2012) provides a good perspective of the state of the art with respect to the tail index estimation as well as the latest developments. The second parameter is the main issue of the present chapter.

There are several approaches to obtain an estimator for the extremal index. As mentioned before, the Extremal Index will assume a value different from one in cases of some dependent sequences and in such cases high values appear close to each other, forming clusters of extreme observations. Depending on how these groups are identified so a different form of estimator may be defined. Although not so spread as the tail index in the literature, the extremal index has gained increased attention from researchers of statistics of extremes fields over the last two decades. This chapter aims to give the reader an overall idea of the main estimators and recent developments in the study of the extremal index relative to a univariate sequence.

First it is necessary to establish which observations are considered as extremes among the highest values. One way to do this is by considering some conveniently chosen threshold (might be some financial secure asset value). One can then identify a cluster of extremes looking for sequences of successive observations above (bellow) that chosen value. One option is to divide the sample in k blocks of length r and counting clusters as the ones that have at least one exceedance above the threshold. This approach leads to one of the most popular extremal index estimators – the *blocks* estimator (Smith & Weissman, 1994). The *runs* estimator results from a different scheme: a cluster is identified each time there are at least two exceedances separated with less than some pre-set number r of non-exceedances. The two proposals are engaged with an extra practical difficulty – the choice of the r value. Ledford and Tawn (Ledford & Tawn, 2003) suggest a possible solution related with the long-range extreme independence sufficient conditions, choosing an m value such that independence between clusters is observed. A third option is to consider the inter-exceedance times (Ferro & Segers, 2003) associated to the intervals estimator. This proposal overrides the need of such parameter, obtaining the clusters from data estimation. For details see, for example, (Beirlant, Goegebeur, Teugels, & Segers, 2004).

Each of these three main different proposals to estimate the extremal index has deserved some attention in the recent years, providing new improved versions. sliding blocks (Robert, Segers, & Ferro, 2009), improved log blocks (Smith & Weissman, 1994) and gaps estimator (Süveges, 2007).

The main differences that distinguish the described approaches are based on possible diverse interpretations of the extremal index and are stated as an effect of key results of convergence demonstrated by Hsing (Hsing, 1993), O’Brian (O’Brien, 1987), Nandagopalan (Nandagopalan, 1990), Leadbetter (Hsing T. & Leadbetter, 1988), Ferro and Segers (Ferro & Segers, 2003). Some valuable works summarising these results can be find in (Ferreira, 2018) or (P. Embrechts, Klüppelberg, & Mikosch, 1997). A note to refer the benefit of a diagnosis procedure to verify $D^m(u_n)$ conditions proposed in the work of (Süveges, 2007) and (Ferreira & Ferreira, 2012) which presents an advance for practitioners to check their sets of data.

Extremal Index Estimation

The Blocks Estimator

Consider a partition of a sample of size n in k_n blocks of length r_n , $r_n = o(n)$ and take some sequence of thresholds u_n . In this case each cluster corresponds to each block that have at least one exceedance above that chosen threshold. It is possible to determine the distribution of the cluster size, π_n (Leadbetter M. R. & Rootzén, 1983), (Hsing T. & Leadbetter, 1988), (Ancona-Navarrete & Tawn, 2000) and its relation with the extremal index in (9). The extremal index may thus be interpreted as the reciprocal of the limiting mean cluster size:

$$\theta^{-1} = \lim_{n \rightarrow \infty} \sum_{j=1}^{r_n} j \pi_n(j; u_n, r_n). \quad (9)$$

Given a sample of a stationary sequence $\{X_n\}_{n \geq 1}$, count the total number of exceedances N_n and the number of clusters C_n *i.e.*, the number of blocks that includes at least one exceedance over some threshold u_n . The sample mean size cluster is then obtained dividing the total number of exceedances by the number of clusters. In its simplest form, the blocks estimator is then defined as the ratio:

$$\hat{\theta}_B = \frac{C_n}{N_n}. \quad (10)$$

Smith and Weissman, (Smith & Weissman, 1994) propose an improved version for the blocks estimator, asymptotically equivalent if the ratios C_n/k_n and N_n/n are small:

$$\hat{\theta}_W = \frac{\log(1 - C_n / k_n)}{\log(1 - N_n / n)}. \quad (11)$$

The Intervals Estimator

To overcome the need of adopting some specific value for the number of blocks in (9) or the length of the run in (10), Ferro and Segers (Ferro & Segers, 2003) propose an estimator based on the moments method and the distribution of the inter-exceedance times. If S_i , $i = 1, \dots, N$ denotes the times of occurrence of exceedances above some threshold (u_n), let $T_i(u_n) = S_{i+1} - S_i$, $i = 1, \dots, N - 1$. The intervals estimator is then defined accordingly to (12):

$$\hat{\theta}_I = \frac{2 \left(\sum_{i=1}^{N-1} (T_i - 1) \right)^2}{(N-1) \sum_{i=1}^{N-1} (T_i - 1)(T_i - 2)}. \quad (12)$$

The authors prove consistency of the intervals estimators for m -dependent sequences - see, for example (Castillo, 2005) for a formal definition on dependent sequences - which are known to verify conditions D and D^2 (Miranda, 2004).

The Runs Estimator

A different approach is based on the work of O'Brien (O'Brien, 1974, 1987) whom proved that the extremal index may also arise as the limit of the probability of occurring a down-crossing through some threshold, u_n . This leads to the runs estimator defined by dividing the number of down-crossing (or equivalently up-crossings) of some threshold, u_n , W_n , by the total number of exceedances, N_n .

$$\hat{\theta}_R = \frac{W_n}{N_n} . \tag{13}$$

Instead of deciding the number of blocks to consider, the idea is to set the length r_n of consecutive observations below some threshold and this way defining two clusters of exceedances. This corresponds to the Nandagopalan estimator (Nandagopalan, 1990). Weissman and Novak (Weissman & Novak, 1998) proved consistency and asymptotic normality for these estimators.

The Gaps Estimator

In the past two decades, the extremal index has gained growing attention in the literature. Several authors have suggested different approaches or tried to improve some of the existing ones, searching for better and better results and looking for an estimator that provides good results. The proposal of Nandagopalan (Nandagopalan, 1990) or Jackknife methodologies (Gomes, Hall, et al., 2008) (Gomes M. I. et al., 2005) were applied, new versions of the blocks estimator like the sliding blocks estimator (Robert et al., 2009), or with the use of two thresholds simultaneous (Laurini & Tawn, 2003). Improvements on the runs estimator (Ferreira & Ferreira, 2012) and robust procedures (Gomes, Miranda, & Souto de Miranda, 2019). Such an exhaustive study is beyond the scope of the present chapter, nevertheless the reader is invited to explore other solutions. One of the latest proposals follows the work of Ferro and Segers (Ferro & Segers, 2003), introducing an iterative scheme to obtain the gaps estimator. It results from an iterative process that combines alternatively the estimation of the mean cluster size with the fitted distribution of inter-cluster times in such a way that each one improves the other, stopping when there is an agreement between their values.

Besides the three main forms of estimating the extremal index (blocks, runs and intervals) the author chooses to present also the gaps estimator, among other possibilities, as recent simulation work (Gomes et al., 2019) indicates a good performance of this method and as it is one of the estimators implemented in R-packages, making it easier to compute its value. It was firstly proposed by Süveges (Süveges, 2007) and requires the verification of condition D^2 . A new variable is defined related to the $T(u_n)$ in (12), $S_g = T(u_n) - 1$, the gap exceedances. As pointed in (Ferro & Segers, 2003), the standard exponential quantile-quantile plot of $(1 - F(u_n))S(u_n)$ can be fitted by a model where there is a segment composed by zeros and a line with slope $(\theta - 1)$, intersecting each other at $(-\log \theta, 0)$. Süveges (Süveges, 2007) suggests an algorithm with a weighted least squares procedure to obtain the Gaps extremal index estimator.

An Application to Financial Data

This section includes the analysis of real financial data. The initial exploratory analysis as well as the rest of computational work is done with the help of some suitable packages of R-Project (R Core Team, 2015). The reader may want to follow the process to obtain the same results by replicating the presented R-code with the same data set or eventually adapting it to a different set, replacing the initial object with their own data set. Lines of R code are thus presented with comments preceded by the cardinal symbol wherever it might seem to be worthwhile.

In finance analysis there is an interest in the variation of price values assets more than in the values themselves. Different ways of defining returns may be found in (Tsay, 2010). The simple return R_t relative to some price asset P_t over a period t is computed as defined in the following expression:

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}}. \quad (14)$$

The compound return (or log-return) r_t is then obtained taking logarithms through the relation:

$$r_t = \ln(1 + R_t) \cong R_t. \quad (15)$$

In R code these compound returns are easily computed with the *diff* operator. After reading the file named PSI20 and once it is attached, the code may refer directly to the variable name, *Close* in this case.

R Code – compound return r_t

```
attach(PSI20)
log.ret.psi=diff(log(Close))
```

For an investor, it is crucial to follow the trends of the stock market. The decisions to buy or sell shares will be closer to a good performance of its portfolio, making profit or, at least, not suffering severe losses. As for the governments, obliged to make resolutions about the financial, tax and economic system, it is of most importance to be aware of the financial “health” of the companies in their country, as well as the performance of the international partners. The behaviour of the financial markets interacts deeply with politics and might be responsible for radical changes in society and economy, apart from ruling the gains (or losses) of an individual investor. The way these connections carry out is now much faster than in the past century. Access to information has suffer an enormous transformation over the last decade and today, there is a great amount of information regarding different financial indicators - easily available data that provide almost immediate backup to decision making.

Most of the developed countries have created special stock exchange markets, restricted to sets of companies that fulfil some chosen criteria, such as profit, size, and other important requests. Shares can then be acquired and then sold (hopefully) with a higher price through the mediations of banks or

other institutional dealers. Measures to determine the directions of these markets are guidance to better understand the market behavior, fundamental to have success in trade.

The definition of an indicator that reflects the trends of a market acts like a beacon for investors and stake holders. One of the first financial indicators is the Amsterdam Stock Exchange and was set up in 1602 (Shiryaev, 1999). The NYSE (New York Stock Exchange) and the AMEX (American Stock Exchange) as well as the NASDAQ are the most known financial indexes in the USA market. Dow-jones indexes are associated to different fields of companies' activity and the Standard & Poor 500 is an international recognised reference.

At a smaller scale, Portugal, one of the south European countries, also has a similar measure; the PSI-20 (Portuguese Stock Index) is a Portuguese stock exchange based on the twenty top companies quoted by EURONEXT. Consider the daily close values of PSI-20, from January 1999 to July 2019, available at the official site of EURONEXT ("PSI 20 | Bolsa de Lisboa," n.d.), <https://www.bolsadelisboa.com.pt/products/indices/PTING0200002-XLIS>. The data to be analysed consists of the daily log-returns, obtained from the set of the initial raw data. A primary analysis of the data is performed getting out the most relevant information. Plots represent a precious tool for this task, and if complemented with some descriptive measures allow a realistic description of the main characteristics of a set of data. Depending on the features exhibited, convenient models may then be sketched to better fit the data. A primary graphical aid gives directions to choose the theoretic models that seem more adequate. If some theoretical assumptions are possible, then the realization of appropriated tests will eventually confirm the graphical outputs or, on the contrary, redirect to new searches for some different models. Once selected the most resemble model, it is necessary to estimate the correspondent parameters.

Preliminary Exploratory Analysis

The first plot, in *Figure 5*, results of plotting the original PSI20 daily close price values along the period of observed time. In *Figure 6* the same plot is presented with the transformed data with the log returns as defined in (15).

Figure 5. PSI-20 daily closing value from January 1999 to July 2019



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Figure 6. PSI-20 daily log returns from January 1999 to July 2019

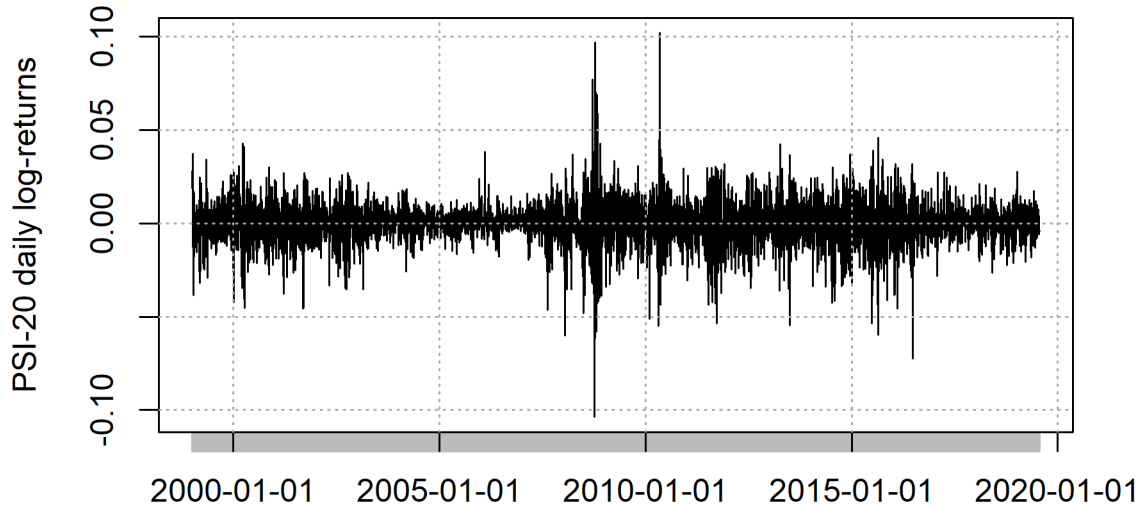
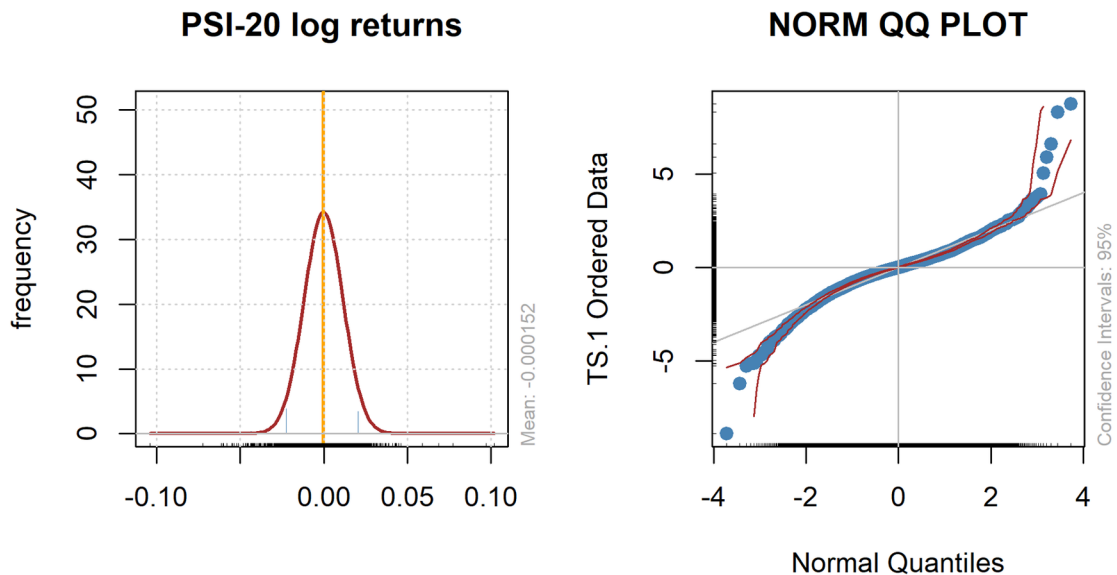


Figure 7. PSI-20 histogram and quantile plot



The daily log returns time series still presents some threats to the desirable stationarity with respect to volatility but seems to keep a steady line concerning the mean value. The raw data, however, departs from a stationary behavior in both mean and volatility. The data series represented in *Figure 6* shows a period with low volatility followed by some swift ranges of higher values. The shifted behaviour around 2008 matches the known international financial crisis, with the breakdown of the famous investment bank of Lehman Brothers. Clusters of high and low values can be identified, as it is usual to happen with financial returns.

Plots are important to get a first picture of the main characteristics present in the data. The aim is to describe the main features of the data and then compare them with a known distribution law. Some descriptive measures of location shape and scale permits to characterize even more the set of data. With a histogram, one can visualize the shape of the data distribution and check, for example, for symmetry. Looking at the histogram, it may happen that some distribution functions are excluded as candidates to fit data, as they obviously present a graphical lack of fit.

An initial exploratory analysis reveals in this case, a heavier tailed than Normal distribution as it is often the case with this type of data. This may be observed in the histogram in *Figure 7*, where a leptokurtic shape can be visualized with great amount of observations around the mean. The Quantiles Normal plot is a graphic test to fit Normal distribution. It also shows a clear departure from Normality in both tails of the data distribution.

For obtaining the graphs in *Figure 6* and *Figure 7* you can use the following R-code:

Computer Code – Figure 6 and Figure 7

```
library(fBasics)
library(timeSeries)
Psi=timeSeries(log.ret.psi,charvec=Data[-1])#creates a time series object
#with time in column named Data.
plot(Psi,at="pretty",ylab="PSI-20 daily log-returns")
par(mfrow=c(1,1))#to obtain the next two plots in line
histPlot(Psi,title=FALSE)
title(main="PSI-20 log returns",ylab="frequency")
qqnormPlot(Psi)
```

Table 1 shows descriptive statistics for the daily log returns of PSI20 closing prices. The value of the skewness (-0.252139) is coherent with the almost symmetric shape in the histogram, not far from

Table 1. Descriptive statistics of daily log returns of PSI20

| Number of observations | 5228 |
|--------------------------|-----------|
| Minimum | -0.103792 |
| Maximum | 0.101959 |
| 1 st Quartile | -0.005745 |
| 3 rd Quartile | 0.006006 |
| Mean | -0.000152 |
| Median | 0.000140 |
| Sum | -0.793817 |
| SE Mean | 0.000161 |
| Variance | 0.000136 |
| Standard deviation | 0.011670 |
| Skewness | -0.252139 |
| Kurtosis | 5.992770 |

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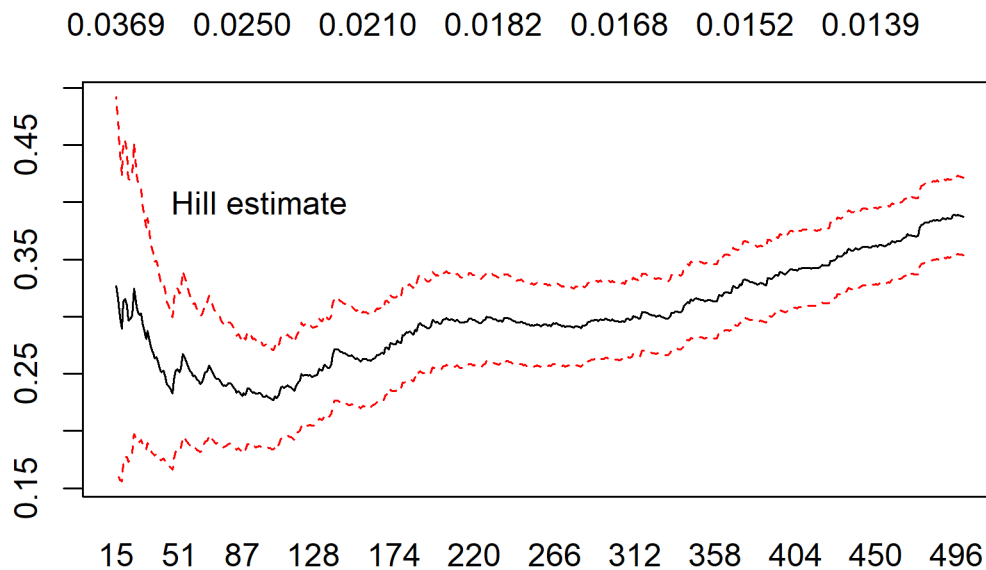
the Normal corresponding value (0). The kurtosis value however (5.992770), denotes lack of normality and shows signs of fat tails, as it happens frequently with financial returns data. A distribution is called to have fat or heavy tails when compared to the Normal tails, if its density $f(x)$ decreases slower as x grows to infinity.

Computer Code –Table 1

```
basicStats(Psi)
```

From the observation of the plots and considering the values of Table 1, it is possible to conceive a distribution in the domain of attraction of a Fréchet family inherent to daily PSI20 log return data. Therefore, the Hill estimator may be considered to estimate the shape parameter of the distribution underlying the data. In *Figure 8* the Hill plot is presented against the number of upper order statistics, k , with 95% confidence lines. Although the initial values point to a value of 0.3 for the shape parameter, it seems that a value of 0.25 might be preferable for the shape parameter, as it seems to be the value that corresponds to the steadier region of the plot. A possible way to perform the Hill plot with R-code is with the *evir* package (Pfaff, Zivot, McNeil, & Stephenson, 2018).

Figure 8. PSI-20 daily log returns Hill plot

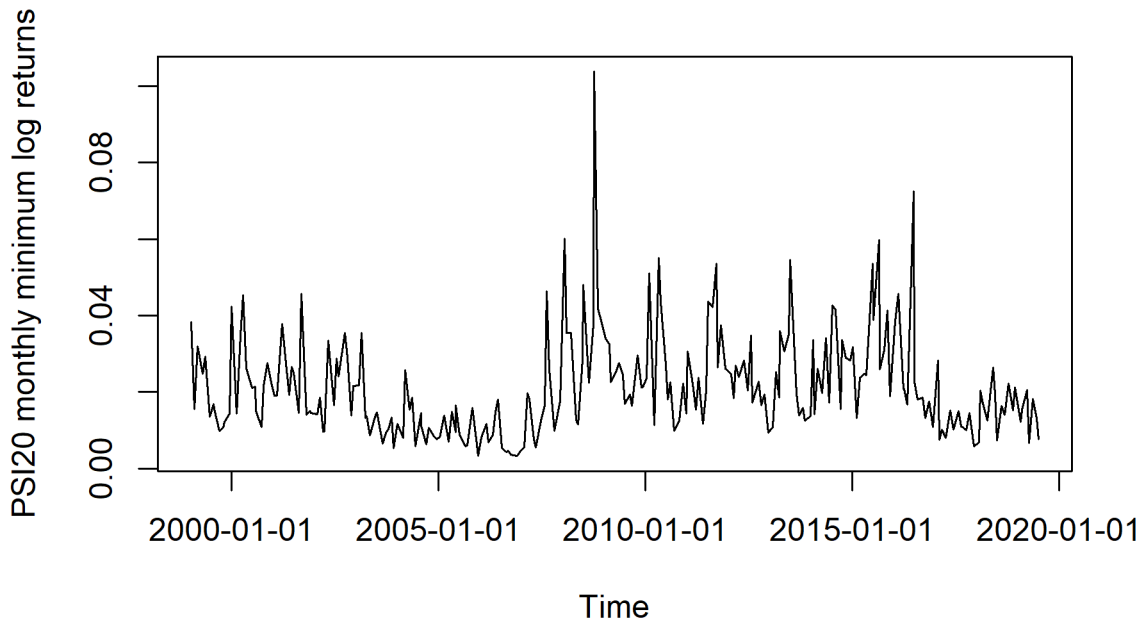


Computer Code –Figure 8

```
library(evir)  
hill(Psi,option=c("xi"),end=500)
```

It may be of interest to consider the set of maximum values over some specific period. Monthly maxima or a maxima for each trimester values, for example, can be evaluated obtaining a new sequence. Figure 9 shows monthly maximum log returns of PSI20 closing price from January 1999 to July 2019. The aim will be to find which of the maximum limit distributions is the one that agrees more with the behavior of this maximum values sequence. Performing a similar analysis as the previous one turns the perception of how much more away from Normal distribution is this set of data (compare Figure 7 and Figure 10). To extract block (month, trimester or other) maximum from the data, there is the need of a special R-function that is included in the *fExtremes* package (Wuertz, Setz, & Chalabi, 2017).

Figure 9. PSI-20 monthly maximum log returns from January 1999 to July 2019

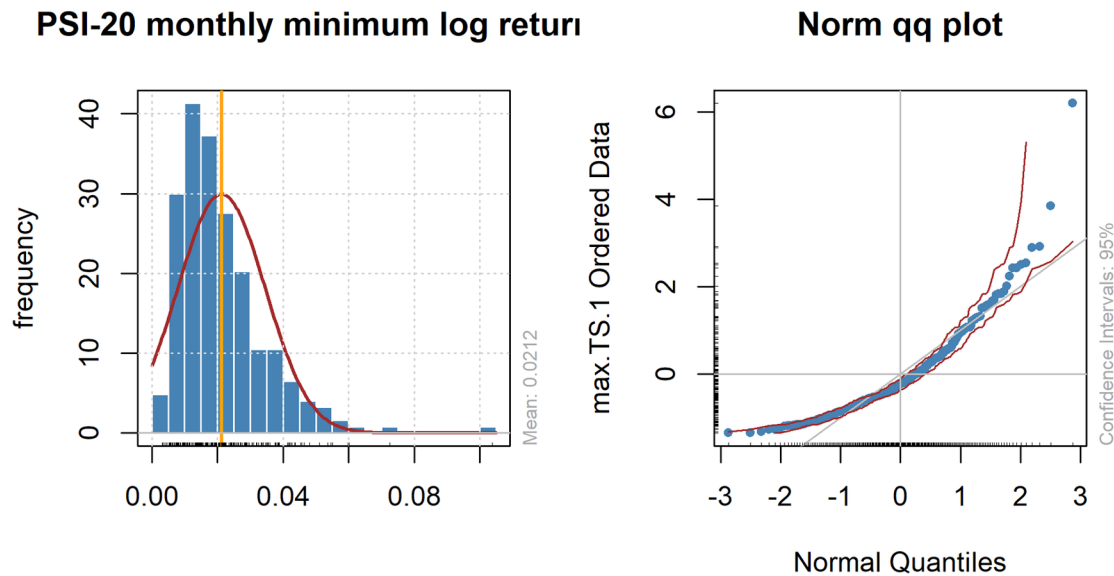


Computer Code –Figure 9 and Figure 10

```
library(fExtremes)
basicStats(Psi)#compute descriptive statistics
maximos.M=blockMaxima(-Psi,block="monthly")
maximos.Q=blockMaxima(-Psi,block="quarterly")#if trimester maximum wanted
plot(maximos.M,ylab="PSI20 monthly minimum log returns")
par(mfrow=c(1,2))#to obtain the next two plots in line
histPlot(maximos.M,title=FALSE)
title(main="PSI-20 monthly minimum log returns",ylab="frequency",cex=.6)
qqnormPlot(maximos.M,title=FALSE,main="Norm qq plot",cex=.6)
```

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Figure 10. PSI-20 monthly minimum log returns histogram and quantile plot



Having in mind that the focus of the present analysis is the extremal index estimation, a simplistic approach is adopted for the selection of the number of top order statistics to use in the estimation of the shape parameter of the distribution. Note though that successful methodologies have been proposed to obtain a suitable value of k (Neves, Gomes, Figueiredo, & Gomes, 2015). To simplify the process of the choice of a k value in this case, some values of k located in the steadier region of the plot are selected. This is a common practice in similar analysis. The results are posted in Table 2.

Considering values of k o.s. from 40 to 240 as indicated in Table 2, it is possible to see that the shape parameter estimates goes approximately from 0.23 to 0.3. The Hill plot also denotes a more stable region around the value of 0.25. If, for example, a shape value estimate of $\hat{\xi}_k = 25$ is considered and if data were to be considered as i.i.d., this value would allow to compute the estimated distribution quantiles using (1). The other parameters of the distribution may be obtained with Maximum Likelihood (ML) estimators. Three scenarios are considered, corresponding to evaluate the maximum values of the PSI20 daily log return referring to blocks of different dimension: maximums over each year, semester, quarterly maximums and maximum observations registered for each trimester. The results are shown in table Table 3.

Table 2. Values of the Hill Estimator and correspondent standard deviation (sd) for selected values of k – the number of upper order statistics of the Psi20 daily log return data

| Number of upper o.s. k | 40 | 60 | 80 | 100 | 240 |
|--------------------------|----------|----------|----------|----------|----------|
| | 0.257516 | 0.249019 | 0.242984 | 0.231159 | 0.299902 |
| sd | 0.040717 | 0.032148 | 0.027166 | 0.023116 | 0.019359 |

The values presented in Table 2 are computed with a built in R-function, similar to the one used in (Tsay, n.d.) and included in the next block of R-code.

Computer Code –Table 2

```
library(evir)
#built in function to compute Hill estimates
Hill=function(x,k){
# Compute the Hill estimate of the shape parameter.
# x: data and k: the number of order statistics used.
xord=sort(x)
T=length(x)
ist=T-k
y=log(xord[ist:T])
hill=sum(y[2:length(y)])/k
hill=hill-y[1]
sd=sqrt(hill^2/k)
cat("Hill estimate & std-err:",c(hill,sd),"\n")
}
#using the funtion to compute Hill estimates for different values of k:
Hill40=Hill(Psi[1:5200],40
hill60=Hill(Psi[1:5200],60
hill80=Hill(Psi[1:5200],80
hill100=Hill(Psi[1:5200],100
hill240=Hill(Psi[1:5200],240
```

The data in Table 3 is also computed with the same package *evir*. After establishing an approximate number of trimesters, quarterlies or semesters to define de number of blocks to be considered, the function *gev* is applied to obtain the estimated values of the block maxima distribution.

Table 3 Values of the ML estimators for the GEVd.f. of the maximum values of Psi20 log return data

| Period (block) | | | |
|----------------|-------------|-------------|-------------|
| 12 months | 0.124466734 | 0.006914843 | 0.014564158 |
| 6 months | 0.168206645 | 0.007182601 | 0.017704848 |
| 4 months | 0.178396311 | 0.007952404 | 0.019429165 |
| 3 months | 0.19213093 | 0.00842872 | 0.02119862 |
| 1 month | 0.22224155 | 0.01131169 | 0.02680420 |

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Computer Code –Table 3

```

library(evir)
n=length(Psi)
y=floor(n/255)#number of years
s=y*2#number of semesters
q=y*3#number of quarterlys
t=y*4#number of trimester
m=y*12#number of months
gev(Psi,y)#considering anual maxima
gev(Psi,m)#considering monthly maxima
gev(Psi,s)#...
gev(Psi,t)
gev(Psi,q)

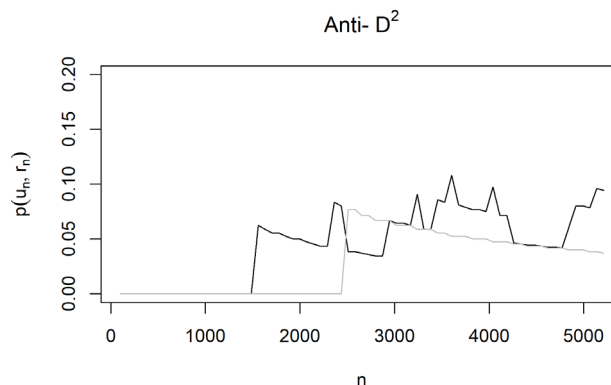
```

Before proceeding with the extremal index estimation it is convenient to check data for $D^2(\mathbf{u}_n)$ condition. Following the empirical approach in (Ferreira & Ferreira, 2012), compute the proportion of events anti- $D^2(\mathbf{u}_n)$ for different values of normalized levels (\mathbf{u}_n) and block sizes r_n :

$$p(\mathbf{u}_n, r_n) = \frac{\sum_{j=1}^{n-r_n+1} \mathbb{I}\{X_j > u_n, X_{j+1} \leq u_n, M_{j+1, r_n+j-1} > u_n\}}{\sum_{j=1}^n \mathbb{I}\{X_j > u_n\}}, \quad (16)$$

with $\mathbb{I}(\cdot)$ denoting the indicator function and $M_{ij} = \max\{X_{i+1}, \dots, X_j\}$. To illustrate the procedure, two high quantiles were considered for a block size $r_n = 7$ and a sequence of growing sample size incremented by $b_n = [\log(n)]^2$. If $D^2(\mathbf{u}_n)$ holds for the data then it is expected to have the points $(n, p(\mathbf{u}_n, r_n))$ approaching to zero as $n \rightarrow \infty$. Figure 11 shows the resulting plot where values of $(n, p(\mathbf{u}_n, r_n))$ close to zero can be observed.

Figure 11. Observed proportions of anti- $D^2(\mathbf{u}_n)$, for PSI-20 daily log returns for 0.99 (black) and 0.995 (gray) quantiles and $b_n = [\log(n)]^2$



Computer Code – Figure 11

```

x=log.ret.psi
q1=.99
q2=.995
p.ur=function(x,r){
n=length(x)
quantiles = c(q1,q2)
ordered=sort(x)
thresholds = ordered[floor(quantiles*length(x))]
keep.pp=NULL
for (u in thresholds){
s=matrix(0,nrow=3,ncol=(n-r+1))
ds=0
for(j in 1:(n-r+1)){
s[,j]=c(sign(x[j]-u),sign(x[(j+1)]-u),sign(max(x[(j+1):(r+j-1)])-u))
if(identical(s[,j],c(1,-1,1))==TRUE) ds=ds+1}
ex=sign(x-u)
exc=sum(ex[ex>0])
pp=ds/exc
keep.pp=c(keep.pp,pp)}
keep.pp
}

n=length(x)
b=floor(log(n)^2)
m=seq(100,n,by=b)
r2=matrix(0,ncol=2,nrow=length(m))
for (j in 1:length(m))
r2[j,]=p.ur(x[1:m[j]],7)
plot(m,r2[,1],type="l",ylim=c(0,0.2),xlab="n",ylab=expression(p(u[n],r[n])),main=expression(paste("Anti- ",D^2)))
lines(m,r2[,2],col="gray")

```

There are some R-packages specially directed to the study of extreme value behavior. The *fExtremes* package (Wuertz et al., 2017) covers most of the related issues and includes some of the more popular existing proposals to estimate the Extremal Index. This is a package particularly devoted to finance fields. In this package it is possible to find a built-in function to compute the Extremal Index value estimates with an option that allows to choose between some different methodologies to estimate this parameter. The traditional blocks method referred in (10), the runs method in (13), and the method of Ferro and Segers defined in (12) are included. Another popular R-package used in extreme value applications is *extRemes* (Gilleland, 2019). *Evir* (Pfaff et al., 2018), *mev* (Belzile et al., 2019) and *texmex* (Southworth, Heffernan, & Metcalfe, 2018) also contains precious functionalities that make the task of

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analyzing extreme observations easier. The recently updated *mev* package offers the computations of the gaps estimator, a recent and promissory proposal to estimate the Extremal Index, as already mentioned.

Beginning with the computation of the blocks estimator, the choice of the number of blocks to consider takes into account the financial nature of the data, thus considering the periods of three, four and six months, as those periods were also already considered to find the maximum values and the estimates of the GEV distribution. To illustrate the process, the case in which the number of blocks is settled to periods of three months is presented. Table 4 shows the computed values of $\hat{\theta}_B$ relative to the selected empirical data quantiles, the corresponding high thresholds, the number of exceedances found in each one of the blocks and the number of top o.s. used. Figure 12 illustrates the performance of the blocks estimator, depending on the values of k .

Table 4. Values of the Blocks estimator for θ relative to Psi20 daily log return data

| Quantiles | Thresholds | Exceedances | k (number of upper o.s.) | |
|-----------|------------|-------------|----------------------------|-----------|
| 0.900 | 0.01164394 | 589 | 53 | 0.2620359 |
| 0.911 | 0.01251489 | 533 | 53 | 0.2913042 |
| 0.922 | 0.01348254 | 477 | 51 | 0.2702867 |
| 0.933 | 0.01449828 | 421 | 50 | 0.2847934 |
| 0.944 | 0.01553868 | 364 | 48 | 0.2886661 |
| 0.955 | 0.01679319 | 307 | 46 | 0.3047919 |
| 0.966 | 0.01784641 | 252 | 45 | 0.3527382 |
| 0.977 | 0.01927535 | 195 | 43 | 0.4114096 |
| 0.988 | 0.02190013 | 138 | 38 | 0.4543753 |
| 0.999 | 0.02531348 | 82 | 34 | 0.6329735 |

Computer Code –Table 4 and Figure 12

```
library(fExtremes)
n=length(Psi)
t#number of trimesters
blockTheta(Psi,block=t,quantile=seq(0.9, 0.999, length = 10))
exindexPlot(Psi,block=t)
```

The runs estimator may be obtained with one of the functions available. In the case of the *extRemes* package, a single value corresponding to a selected threshold is the resulting output. If the intent is to have information about the behavior of the estimates for different values of thresholds then writing some extra code is needed. For example, suppose that the 90% quantile of the distribution is settled as determining the threshold to be used to estimate the Extremal Index due to some practice reason. In that case, the function included in *extRemes* package displays the wanted value. Changes in the values of the run length originate considerable differences in the estimates as Table 5 illustrates. To have some proximity with the number of blocks considered to get the Blocks estimates in Table 1 the run length is established as 12.

Figure 12. Sample paths of Blocks Theta estimator, $\hat{\theta}_B$, for PSI-20 daily log returns (blocks of three months)



The plot in Figure 13 shows a picture of the estimates path over different values of thresholds, for two values of the run length, namely 1 and 12.

Table 5. Value of the Runs estimator for θ relative to Psi20 daily log return data

| Quantile | Thresholds | Number of clusters | Run length | |
|----------|------------|--------------------|------------|-----------|
| 0.900 | 0.01272946 | 422 | 1 | 0.8068834 |
| 0.900 | 0.01272946 | 107 | 12 | 0.2045889 |

Computer Code –Table 5 and Figure 13

```
library(extRemes)
extremalindex(Psi,quantile(Psi,.9),method="runs")
extremalindex(Psi,quantile(Psi,.9),method="runs",run.length = 12)
#initializing objects...
qi.psi=NULL
Teta.Run=matrix(0,nrow=length(quantiles),ncol=3)
```

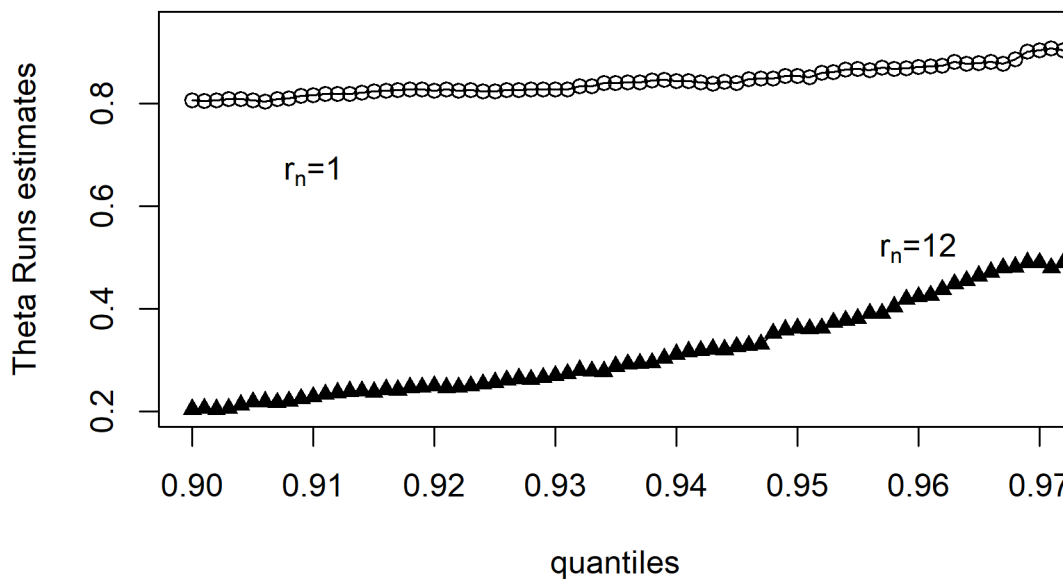
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```

Teta.Run.12=matrix(0,nrow=length(quantiles),ncol=3)
quantiles=seq(.9,.999,length = 100)#defining quantiles
for (i in 1:100)
{qi.psi[i]=quantile(Psi,quantiles[i])#computing empirical quantiles of the data
Teta.Run[i,]=extremalindex(Psi,qi.psi[i],method="runs")}
#to obtain the values with run length=12
for (i in 1:100)
{qi.psi[i]=quantile(Psi,quantiles[i])
Teta.Run.12[i,]=extremalindex(Psi,qi.psi[i],method="runs",run.length = 12)}
#making the plot
plot(quantiles,Teta.Run[,1],type="o",ylab="Theta Runs estimates",xlim=c(0.9,.97),ylim=c(.2,.95))
lines(quantiles,Teta.Run.12[,1],type="o",ylab="",lty=6,pch=17)
text(.91,.67,expression(paste(r[n],"=1")))
text(.96,.52,expression(paste(r[n],"=12")))

```

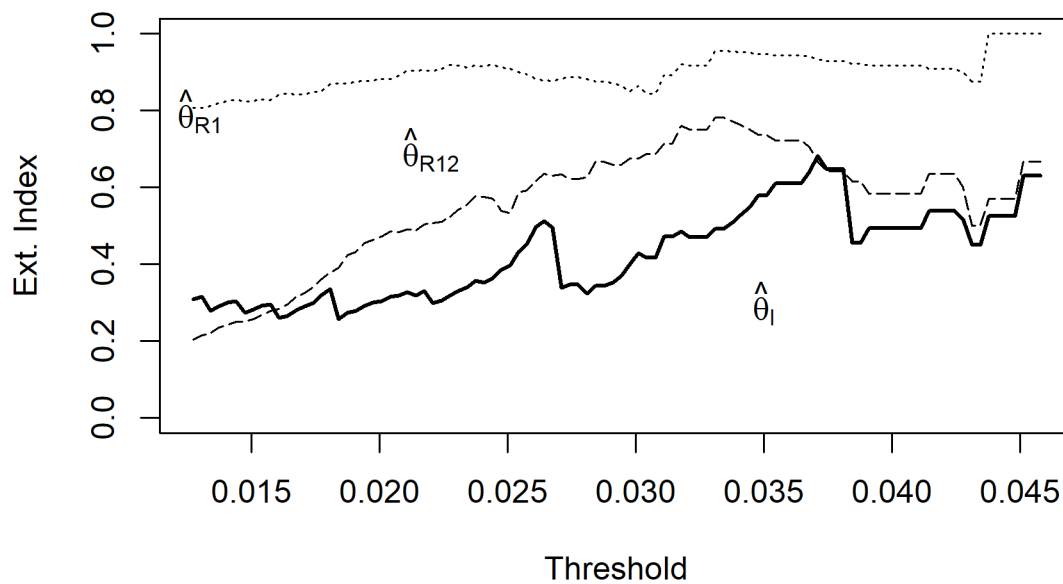
Figure 13. Sample paths of Runs Theta estimator, $\hat{\theta}_R$ for PSI-20 daily log returns (run length=1 and 12)



The intervals estimator defined in (12) is the estimator most implemented in the R-packages dedicated to the extreme value study. For example, the *evd* package (Stephenson, 2002) offers the possibility of estimating the extremal index with the runs estimator (13) or with the intervals estimator. The result of the intervals estimator after selecting the 90% quantile of the data as a threshold is the value $\hat{\theta}_I = 0.30948$.

The performance of the two forms of estimators depending on the thresholds may be visualized, plotting the Intervals estimator with the Runs estimator for different values of the run length. Observe in Figure 14 the disparity in the obtained values and the regions of desired stability in terms of bias; the Intervals estimator presents values closer to the Runs estimator for run length of 12 but the region of stability is greater in the Intervals Estimator.

Figure 14. Sample paths of Intervals Theta estimator, $\hat{\theta}_I$, for PSI-20 daily log returns compared with $\hat{\theta}_R$ (run length=1 and 12)



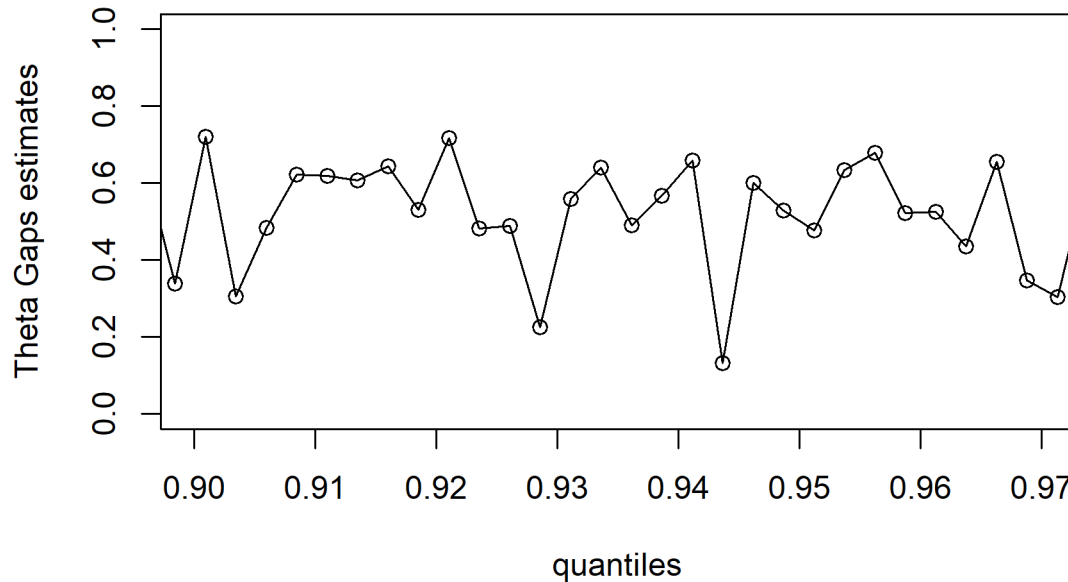
Computer Code –Figure 14

```
library(evd)
exi(Psi, quantile(Psi,.9), r = 0)#
q1=quantile(Psi,.9)
q2=quantile(Psi,.999)
exiplot(Psi,tlim=c(q1,q2),r=0,lwd=2)#intervals estimator
exiplot(Psi,tlim=c(q1,q2),r=1,add=TRUE,lty=3)#runs estimator r=1
exiplot(Psi,tlim=c(q1,q2),r=12,add=TRUE,lty=5)#runs estimator r=12
text(0.013,.8,expression(hat(theta)[R1]))
text(0.022,.7,expression(hat(theta)[R12]))
text(0.035,.3,expression(hat(theta)[I]))
clusters(Psi,.9,r=0)
```

Extremal Index Estimation

Finally the Gaps estimator is computed with *mev*, the only R-package that includes it. The correspondent plot is displayed in Figure 15. The R-code to obtain the values and the plot applied to the data under study is presented.

Figure 15. Sample paths of Gaps Theta estimator, $\hat{\theta}_G$, for PSI-20 daily log returns



Computer Code –Figure 15

```
library(mev)
q=seq(0.9, 0.999, length = 100)
gap=ext.index(Psi,q,"wls")
ext.index(Psi,q=.9,"wls")
plot(q,gap,type="o",ylab="Theta Gaps estimates",xlim=c(0.9,.97),ylim=c(0,1),xlab="quantiles")
```

The increased attention over the Extremal Index estimation for the last years has visible results looking at the set of R-packages available. Table 6 presents a summary of some R-packages that include functions to estimate this parameter.

Considering the topics of EVT analysis in general, the work by Gilleland et al. (Gilleland, Ribatet, & Stephenson, 2013) is a good starting point for someone that wants to start using R-code in its analysis of extreme financial data. Although not referring to financial data, a good example of application of some of these packages to extreme observations is made by Penalva et al. (Penalva, Neves, & Nunes, 2013).

To conclude this example, select the value of theta round 0.3 given by the Intervals estimator as it seems to be the correspondent to a steadier region. With the obtained Hill estimate for the shape param-

Table 6. Summary of some of the possibilities of computing extremal index estimates with R-packages

| Package | | | | $\hat{\theta}_G$ | function |
|------------------|---|---|---|------------------|---------------------------------------|
| <i>evir</i> | x | | | | <i>exindex</i> |
| <i>mev</i> | | | x | x | <i>ext.index</i> |
| <i>fExtremes</i> | x | x | x | | <i>(blocks/runs/ferrosegers)Theta</i> |
| <i>extRemes</i> | | x | x | | <i>extremalindex</i> |
| <i>texmex</i> | | x | x | | <i>extremalindex</i> |
| <i>evd</i> | | | x | | <i>exi</i> |

eter and Maximum Likelihood estimates for the scale and location parameters, proceed to estimate the fitted distribution function to the month minima. If theta is not taken into consideration, the quantile 0.9 (VaR) is $Q_{0.9} = 0041$; when the scenario of dependency is reflected, then this value changes to $Q_{0.9} = 0.025$. Another frequently useful financial measure is the probability of overcome some fixed value. In this case one would be interested in knowing the probability of observing lowers values, e.g., the probability of having a minimum daily log return less than 0.01. This probability is 0.156 considering independence but rises to 0.573 if the fact that extreme values occur in clusters is reverted on the form of the fitted distribution. These values are obtained with the next R-code syntax:

Computer Code –Quantiles and probabilities for estimated distributions

```
library(ismev)
gevI=gev.fit(maximos.M,shinit = .25)
mu.i=gevI$mle[1]
sigma.i=gevI$mle[2]
qsi=.25
teta=.3
mu.d=mu.i-sigma.i*(1-teta^qsi)/qsi
sigma.d=sigma.i*teta^qsi
library(evd)
q.9.i=qgev(.9,loc=mu.i,scale=sigma.i,shape=.25)
q.9.d=qgev(.9,loc=mu.d,scale=sigma.d,shape=.25)
p.01.i=pgev(0.01,loc=mu.i,scale=sigma.i,shape=.25)
p.01.d=pgev(.01,loc=mu.d,scale=sigma.d,shape=.25)
q.9.i
q.9.d
p.01.i
p.01.d
```

FUTURE RESEARCH DIRECTIONS

The financial analyst needs proper tools to accurately model data, so that he can evaluate the behavior of the variables under study and so may take wised decisions and give precious advises to investors and policy developers. The properties of a good estimator are fundamental to achieve a realistic model fit. The Extremal Index estimation needs to be improved, looking for more efficient ways of reducing its bias without neglecting the estimator variance. There is work to be done in order to find new forms of estimators or to look for the existing proposals and turning them better. As seen above, the choice of the number of o.s. considered is a key point. Seeking for proposals of efficient methodologies for selecting that value is a complementary path for developing research.

CONCLUSION

This chapter presents an overview of the main results for estimating the extremal index and provides a series of instruments ready to use, so the analysis of data can be performed. It was intended to help practitioners with the analysis of extreme observations, typical in financial data. Many authors have dedicated their work looking for improvements in the existing forms of estimating the Extremal Index and searching for alternatives that might prove to give better results. The aim is to achieve an estimator that has good properties in terms of bias and variance. Being hard to prove the preference of an estimator comparing to another in theoretical arguments, most results are extrapolated with simulation methods, considering large dimension samples. It should be noted that the known theoretical results are deduced in an asymptotic framework so it is necessary to guarantee large dimensions of samples when dealing with finite samples. The R-code is included in a vast group of software possibilities particularly dedicated to statistical analysis. It has two enormous advantages that justify its dissemination among the academic community: one strong motive to use it is the fact that it is open source; the second and even stronger reason derives from the fact that it is maintained and constantly improved by a huge academic community of researchers, practitioners, students and teachers. All of them contribute to give answers to new questions and developments that refine the existing instruments.

The present text also intends to call the attention for some sensitive aspects relative to the choices and methods that have still to be better evaluated. There is work still to be done and questions that wait for accurate answers.

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Chapter 7

Evaluating Microeconomic Factors, Financial Crisis, and Stock Price Dynamics: Evidence From MENA Region

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ABSTRACT

The purpose of this chapter is to examine the impact of microeconomic factors and the global financial crisis (GFC) on stock prices in the Middle East and North Africa (MENA) region. The study employs panel data techniques covering a sample of 277 firms listed in seven MENA countries for the period 2000-2015. The empirical model consists of eight microeconomic (firm-specific) variables and a dummy variable to capture the impact of global financial crisis. The results suggest that microeconomic factors play a vital role in determining stock prices in the MENA region. More specifically, factors such as return on equity, book value per share, dividend per share, earnings per share, and price-earnings ratio positively influence stock prices, while dividend yield and gearing have negative impact on stock prices. In addition, firm size posits a positive and statistically significant relationship with stock prices. However, the GFC seems to be insignificant determinant of stock prices in the case of MENA countries in the sample studied. This chapter provides several practical implications.

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INTRODUCTION

The current geopolitical tensions coinciding with the long standing 2007 global financial crisis has had excruciating repercussions on the economic and financial conditions of the global community especially on stocks, oil and share prices in the first quarter of 2018. This wave of uncertainty hit the emerging markets as well. It is here that the issue of stock market integration surfaces because a highly integrated stock markets pre-supposes similar prices as well as parity in risk premiums. On the other hand, studies by Granger and Morgenstern (1970), Agmon (1973), and Hilliard (1979) purports that share price interdependency is more intense within a county than among countries. Jiang et al. (2017) discuss various market integration theories, the information spillover effect offers an ideal rationale for the same. The spillover effect hypothesis argues that “since the opening times of stock market are different in different countries and regions, the information of the stock market will, in turn, reflect on their assets price, which leads to the correlation between different stock markets” (Jiang et al., 2017, p. 3). The same conclusion was found by Awartani et al. (2013) who studied the directional spillovers from the U.S. and the Saudi Market to Equities in the Gulf Cooperation Council Countries. Dornbusch et al. (2000) assigns these cross-market linkages which is an outcome of a particular shock in a specific economy to a concept called the Contagion effect. They further discusses two root causes of contagion in emerging markets (see also Masson, 1998 and Wolf, 1999) the first being the result of interdependence due to financial linkages and the second being the result of investors withdrawing funds many other markets (also known as the irrational phenomena) due to financial panics, loss of confidence and increased risk aversion.

According to Verrecchia (2001), it is the financial reporting systems that provide firms’ vital information to the capital market and when investors generally trade stocks on the basis of aforesaid information, the stock prices converge to their fundamental values. Additionally, such information is considered value relevant if they reflect on stock price movements. However, current realms of uncertainty mandates investors to comprehend some indisputable analytical tools which will aid them in making sound, rational and judicious investment decisions over and above deciphering their relationship with stock prices (hereafter SP). That said, a few relevant models embraced by the investing community serve as possible explanations for SP fluctuations. The most fundamental approach employed is inarguably the Gordon (1962) growth model where investors base stock prices on the discounted present value of future expected dividend payments. Also, Ross’s (1976) Arbitrage Pricing Theory offers two dimensions namely macroeconomic forces and internal forces for investors to base their decisions related to assessing the SP. While the former relates to changes in governmental regulations, business cycle volatilities, changes in investor’s attitude, fluctuating market conditions, natural calamities and contingencies like strikes, lock outs etc., the latter focuses on internal forces in a company such as financial statements, as determinants of SP.

Needless to say, investor purchasing behaviour is apparently preceded by several supporting theories. To begin with, the efficient market hypothesis propounded by Fama (1991) explicitly assigns a strong connection between accounting information and SP, as such information seamlessly diffuses into the market (Chambers, 1974) and reflects in the form of demand fluctuations thereby affecting the SP. However, De Bondt (1991) advocates the concept of ‘mean reversion’ where in stock prices mean reverting in the long run suggests a low stock price being followed by a relatively higher return, thus encouraging groups such pension funds to invest in equity markets after an apparent stock market slump (see also Vlaar, 2005). This acts as a forerunner to the overreaction hypothesis proposed by De Bondt and Thaler (1985, 1987) that investors tend to overreact to extreme price variations due to the ingrained nature of overweighing current information over prior ones. Alternatively, Spierdijk and Bikker (2012) in their

research purports the concept of ‘home bias’ as postulated by behavioural science experts as a precedent to investors precluding to invest in international markets due to lack of sufficient information associated with foreign markets (see also Barberis & Thaler, 2003). Another seeming rationale for investor purchasing behaviour is the existence of “investor herds”, thereby causing stock price volatiles (Christie & Huang, 1995, p 31). Bikhchandani and Sharma (2001) adds on that investor exhibit this herd culture as they consciously imitate the actions of others. Interestingly, investor behaviour is assigned a relationship with financial crisis by Minsky (1977) in his “financial instability hypothesis” where he advocates that financial crisis has a paramount role to play in fluctuations in economic activity and that as the economy emerges out of the crisis, behaviour changes in such a way as to reduce the financial system’s ability to withstand further shocks, thus increasing the likelihood of another potential financial crisis. This is because the risk-averse investors frequently employ inadequate information to estimate future prospects to allocate their portfolios, thus committing erroneous investment decisions.

Narrowing down the scope to the Middle East and North Africa (MENA) region, consisting of the GCC and 13 other nations¹, the region is renowned for its progressive economic and political transformations as well as privileged geographic location with access to international markets. However, a stark contrast between MENA stocks and international stock markets is evident due to the former being susceptible to turbulences such as local and international equity market spillovers, regulatory inefficiencies, information asymmetry and illiquidity. On the contrary a number of structural tailwinds such as the countries’ ambitious and reformative policy changes in economic and regulatory policies whilst hosting a diversified list of business sectors apart from deregulating the finance and tourism sector have transformed the investment landscape by harnessing incremental global portfolio investor flows specifically to the GCC market.

MENA Stock Markets- An Overview²

The MENA region is renowned for its economic heterogeneity. IMF (2018) reported that the MENA region’s GDP was USD 2.37 trillion in 2017, representing only 3% of the global GDP while OECD (2019) showed that MENA stock markets represented only 1.42% of the world market capitalization, thus revealing the embryonic status of MENA capital markets. The financial and economic crisis in 2008 as well the so-called Arab spring in 2011 has added to pre-existing economic, social and political challenges in the region in the form of lower annual output growth rates (World bank, 2014) and inefficient financial markets (Acemoglu et al., 2017). In the aftermath of the former events, several other unprecedented factors such as high levels of external debt and fiscal deficits coupled with a deteriorating external environment featuring high volatility in oil prices and revenues, Brexit, Euro crisis and appreciation of real effective exchange rates further put additional strains on the region’s macroeconomic performance. This is mainly because MENA region is an open economy and the more open an economy, the more it is vulnerable to external shocks (Neaime & Gaysset, 2018).

Nonetheless, the persistent desire to attract FDI and wean itself away from hydrocarbons have led to the establishment of financial centers to woo foreign investors (Deutsche Bank, 2012). It is here where capital markets steal the limelight as a major contributor to economic growth allocation (King & Levine, 1993; Naceur et al., 2017) as resource allocation is moderated through the former organizations. Ersel and Kandil (2007) examine relationship between financial development and economic growth in the MENA region and argue that although MENA regions are successful in mobilizing financial resources, they are inadequate in efficiently allocating them. This is mainly attributed to the dominance of public banks

in these regions which favor state enterprises or larger firms, thus posing capital access difficulties for SME's and other start-up firms in the MENA regions. However, Lagoarde-Segot and Lucey (2007) assert that markets signal low connectivity in the MENA region and regulatory practices often differ widely across countries.

Although equity markets and banking systems are generally well developed in the MENA region, non-banking financial institutions and debt markets are immature with a few large public sector companies reining the equity markets. In spite of the fact that the region aims for financial inclusion which are pivotal to achieve various advantages such as growth and employment goals, increased private sector access to financing sources and finance to strategic infrastructure projects and efficient capital allocation along with improved risk sharing, wide gaps are noticeable in terms of access to finance for SMEs, women and youth. The first stock exchange in the MENA region was established in Egypt in the late 19th century and several others joined the race from then. Although MENA regions have made monumental progress in developing stock markets by introducing new capital market laws (Saudi Arabia, Bahrain and Qatar), establishing new regulatory bodies (the UAE, Saudi Arabia, Qatar and Kuwait), enhancing corporate governance, and easing restrictions on foreign investors, weak investor protection rights and weak corporate governance stalls the expected development. The OECD issued a report in 2009 highlighting the role of stock exchanges in corporate governance. The report exerted the pivotal role played by a stock exchange with regards to the issuance of listing and disclosure standards and the monitoring of compliance with these standards. In the MENA region few stock exchanges have the status of a self-regulatory organization. Despite past global process of demutualisation and privatization, majority of the stock exchanges in the MENA region are state owned or organized as public institutions. Figure 1 below reveals the ownership structure in MENA stock exchanges.

MENA stock exchanges vary greatly with respect to market capitalization. Tadawul (Saudi Stock Exchange) has the largest market capitalization at USD 451 billion, which represents approximately 40% of the total MENA market at the end of 2017. However, the global financial crisis dragged down the stock market capitalization in most MENA jurisdictions and is yet to catch up with global levels. Surprisingly, Al Said (2019) states that there was a surge of almost 15% in MENA equities in 2018, outperforming both emerging markets equities and developed markets equities (which fell by almost 15% and 9%, respectively). Table 1 below highlights the attributes of MENA stock market in terms of number of companies listed and market capitalization.

MENA markets are constantly evolving but the MSCI classifies majority of them as frontier markets. As of April 2018, only three countries namely Egypt, UAE and Qatar fall under the MSCI Emerging Markets Index while jurisdictions under Bahrain, Jordan, Kuwait, Lebanon and Oman markets are considered "frontier markets", where the former exhibits limitations in their regulatory and operational environments to foreign investors. Lately Saudi Arabia's entrance into the MSCI emerging market index is another milestone for the country to increase investor confidence, research coverage and market liquidity.

The GCC in particular is an alliance of six countries including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates (UAE), established on May 25th, 1981 whose enduring advantages are rooted in cultural commonalities, strategic positioning, independent Sharia based judiciary system, incessant socio-economic reforms and a minimal corporate tax regime. Recent reports by Forbes Middle East reports the top five stock markets in the Arab world where Saudi Stock Exchange (Tadawul) dominates the list with a market capitalization worth \$450.6 billion while UAE stock markets, Abu Dhabi Securities Exchange (ADX) and Dubai Financial Market (DFM) take the second and third places respectively, with a total market capitalization of \$232.7 billion. Although the MSCI Emerging Market

Figure 1. MENA stock exchange ownership structure

Source: OECD (2018), OECD-MENA Survey of Corporate governance frameworks

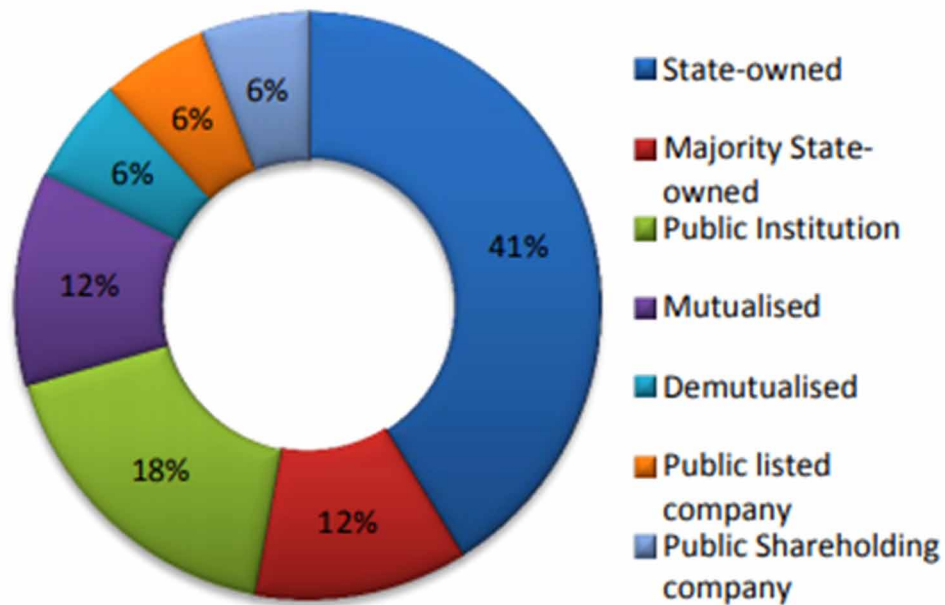


Table 1. MENA stock markets characteristics

| Jurisdiction | Number of Listed Companies | Market capitalization of listed domestic companies (Bn USD) | Market capitalization of listed domestic companies (% of GDP) | Stocks traded, total value (bn USD) | Stocks traded, total value (% of GDP) | Stocks traded, turnover ratio of domestic shares (%) |
|----------------------|----------------------------|---|---|-------------------------------------|---------------------------------------|--|
| Algeria ¹ | 5 | 0,37 | - | - | - | - |
| Bahrain | 43 | 22 | 62.18 | 0,56 | 1.61 | 2.6 |
| Egypt | 254 | 47 | 19.63 | 14,42 | 6.08 | 30.7 |
| Iraq ¹ | 101 | 9 | 4.51 | 0,75 | 0.37 | 8.4 |
| Kuwait ¹ | 175 | 93 | 77.06 | 19,02 | 15.80 | 20.5 |
| Lebanon ¹ | 10 | 11 | 22.33 | 0,76 | 1.48 | 6.6 |
| Morocco | 73 | 67 | 61.05 | 4,22 | 3.85 | 6.3 |
| Jordan | 194 | 24 | 59.20 | 2,33 | 5.55 | 9.7 |
| Oman | 112 | 21 | 28.67 | 2,38 | 3.21 | 11.2 |
| Palestine | 48 | 4 | 29.04 | 0,46 | 3.50 | 12.1 |
| Qatar | 45 | 131 | 78.52 | 18,33 | 11.02 | 14 |
| Saudi Arabia | 188 | 451 | 66.00 | 218,301 | 31.93 | 48.4 |
| Tunisia ¹ | 81 | 9 | 22.15 | 0,97 | 2.41 | 11 |
| United Arab Emirates | 127 | 239 | 63,53 | 43,04 | 11.40 | 18 |

index includes only UAE and Qatar equity markets, Saudi Arabia, whose stocks account for more than 50% of the GCC market capitalization is hopeful to make its way into the index by 2018-2019 due to the countries decision to open equity markets to foreign investors, well aware that the index is a pertinent dictator of where equity market money flows. On the other hand, The Amman Stock exchange, a public shareholding company has been playing a phenomenal role in harnessing capital for the growth of the economy thereby posting a market capitalization \$ 24.71 billion as of March 2018, thus constituting to more than 65% of the GDP. That said, MENA stock markets are still in its formative stages and is yet to be integrated with international stock markets. This explains why MENA stocks especially the GCC stocks remains non vulnerable to the volatility spill-over or “contagion” effects (see Paskelian et al., 2013), implying that to a certain extent, GCC stocks are shielded from undulations in stock prices, exchange rates and capital flows resulting from diffusion of shocks from international markets. Forbes and Rigobon (2000) also sets forth the situation where contagion might not surface. They argue that stock price correlations are less evident if there is change in economic fundamentals, risk perception and overall preferences, once again proving the heterogeneity in the US and MENA outlook.

The motivation for this study mainly arises from the soaring local and international appetite for GCC stocks in comparison to their emerging peers. Khatoun (2017) confirms the former statement by enlisting few reasons for a surge in demand for GCC stocks. He reasserts that major fiscal reforms such as the VAT application across GCC, capital market liberalisations such as Saudi Arabia opening doors for foreign participation in equities, consistency in earnings growth, attractive and guaranteed dividend yields apart from the two global transmission mechanisms namely the ongoing US dollar strength and rising crude oil prices are dovetailing investors interests to MENA’s favour. More notably, the relentless efforts by the GCC in reducing their dependence on hydrocarbons by engaging in monumental projects such as the EXPO 2020 (UAE), VISION 2030 (KSA) BAHRAIN VISION 2030 (Bahrain) NEW KUWAIT (2035) OMAN VISION 2040 (Oman) reflects the fervent efforts adopted to raise the region standards to a global investment hub. Furthermore, incessant debates and inconclusive outcomes on the effect of financial crisis on stock prices motivated the authors to investigate the issue in the MENA setting. Therefore, the main aim of the current study is to equip potential investors interested in GCC stocks with knowledge on internal financial metrics which will empower them to outguess market anomalies whilst assuring them reasonable rates of return on investment.

This chapter is of paramount significance and contributes to finance literature in several ways. Firstly, the present study attempts to investigate the impact of eight microeconomic (firm-specific) variables and the GFC on the stock prices of firms listed in MENA capital markets, namely; Saudi Arabia, UAE, Qatar, Kuwait, Bahrain, Oman, and Jordan over the period 2000 to 2015. Ullusever and Demirer (2017) point out that GCC exchanges are predominated by short term retail investors who have smattering financial knowledge and accede to the actions of fellow traders resulting in “herd behaviour”. Therefore, the determinants identified will provide knowledge to the potential investors about the key factors affecting share prices and accordingly assist them in optimizing their investment decisions and portfolio diversification structure. Secondly, the study opens a vista for potential comparative empirical research as the paper encompasses a large data set of nonfinancial companies listed in the GCC and Amman stock exchange. Thirdly, the incorporation of a comprehensive set of eight firm-specific fundamentals as factors affecting SP sets managerial implications, as the evidence derived from the paper cautions managers to properly structure and reflect those metrics commonly used as a benchmark for instigating investor decisions. Finally, the paper investigates the global financial crisis (GFC), and examines whether it has any significant impact on SP in the case of MENA region. To recap the GFC, it originated in 2007

due to the collapse of US subprime mortgage market followed by the dismal fall of Lehman brothers in 2008, all of which led to full-fledged global credit crunch engulfing several countries, the aftereffects of which are still looming in economies due to the volatility spillovers from the past global meltdown.

The remaining part of the study highlights evidence from prior literature, elaborates on the methodology and enumerates the key findings. The paper finally concludes by suggesting some policy implications and recommendations for future research.

Literature Review and Research Hypotheses

The observed pattern of the influence of company specifics as determinants of SP has evoked mixed responses in prior research. In a pioneering study, Collins (1957) examines the determinants of share price for the US market and he identifies several firm-specific characteristics including dividend, net profit, operating earnings and book value as the prominent factors affecting share prices in the US. Ever since, a significant body of theoretical and empirical literature has evolved that considers the determinants of market price of shares. One of the earliest studies conducted by Patell (1976) on NYSE indicates that disclosures of forecasted EPS are accompanied by significant price adjustments.

More recently, Irfan and Nishat (2002) examine the factors that influence share prices in Karachi Stock Exchange (KSE) for the period from 1981 to 2000. The study employs cross-sectional weighted least square regression and analyses the impact of six variables, namely; firm size, dividend yield, payout ratio, asset growth, leverage and earning volatility on share prices. Of these, the payout ratio, firm size, leverage and dividend yield emerged as important factors affecting the stock market prices in KSE, once again suggesting the relevance of firm-specific factors as significant determinants of SP (see also Amidu & Abor, 2006)

Furthermore, three relevant studies from the Indian economic setting by Das and Pattanayak (2009), Nirmala et al. (2011), and Om and Goel (2017) document the contribution of company fundamentals in determining the SP. Das and Pattanayak (2009) examine 30 shares constituting the Bombay Stock Exchange –Sensitivity Index in order to study the factors affecting stock price movements. The analysis reveals that higher earnings, return on investment, growth possibility and favorable valuation have positive impacts on the market price of shares while higher risk and volatility have inverse impacts on SP. Similarly, Nirmala et al. (2011) use panel data and examine three sectors namely auto, healthcare and public-sector undertakings over the period 2000-2009 in order to infer the main factors affecting share prices in India. The study employs the fully modified ordinary least squares method and the results reveal that dividend, price-earnings ratio and leverage are the major determinants of share prices for all the sectors under consideration. Findings by Om and Goel (2017) are in lines with the above studies emphasizing a positive relationship between earning per share, dividend per share, dividend payout ratio, total asset turnover ratio, return on equity and SP while debt equity ratio and dividend yield exhibiting a negative relationship with SP.

Other studies including Black and Scholes (1974), Capstaff, Klaeboe, and Marshall (2004) analyse the relationship between dividend policy and stock return. The results show a positive relationship between the two variables. It could be argued that, investors place more value on dividend-paying firms as every investor prefers a consistent dividend policy. On the other hand, a negative relationship between dividend policy and share price changes have appeared in Baskin's (1989) study. This is mainly attributed to the dividend irrelevant hypothesis and the notion among investors that dividend payments are the outcome of the past performance of the firm rather than a reflection of future performance. Denis and Osobov

(2008) and Chen and Dhiensiri (2009) in their study of New Zealand and Nigerian markets, respectively arrived at similar results. A more focused study of the impact of dividends (measured by dividend yield and dividend payout ratio) along with other control variables on share prices are studied by Okafor and Mgbame (2011) in the Nigerian market. The multivariate regression analysis is applied on 10 firms for the period 1998-2005. The evidence shows a negative impact of dividend yield on share price changes while dividend payout ratio reveals inconsistent results of positive and negative relationships during the different years studied.

Therefore, as shown in the previous literature, share price changes are associated with changes in company fundamental variables that are relevant for share valuation such as book value per share, dividend coverage ratio, dividend per share, earnings per share, dividend payout ratio, price-earnings ratio, return on equity, market capitalization, cash flow-price ratio, cash from operating activities per share, dividend-price ratio, net asset value per share, and firm size (Wilcox, 1984; Rappaport, 1986; Downs, 1991; Ferson, 2008; Somoye et al., 2009; Al-Shubiri, 2010; Aveh & Awunyo-Vitor, 2017; Mousavii & Karshenasan, 2017; Avdalovic & Milenkovic, 2017)

In more recent literature, Bhattarai (2014) and Gautam (2017) analyse data from the Nepal Stock Market and arrived at conflicting results. Developing a multiple regression model, Bhattarai (2014) examines nine Nepalese commercial banks over the period 2006-2014. His results show that earning per share and price-earnings ratio are significantly positively correlated with share price while dividend yield exhibits an inverse relationship with share price. On the other hand, Gautam (2017) investigates 20 commercial banks over the period 2008/09 to 2015/16, reaching a conclusion that leverage, market capitalization, dividend payout and dividend yield are positively associated with stock return and book to market, growth of assets, and earnings-price ratio are negatively associated with stock returns, thus warranting further investigation.

In the context of MENA region, Midani (1991) studied 19 listed Kuwaiti companies and finds that earnings per share is an important determinant of share price (see also Al Tamimi et al., 2011 for the UAE market). Sharing similar views, Obeidat (2009) demonstrates the importance of earnings per share and book value per share as vital contributors to SP in his study of 38 companies listed in the Abu Dhabi Stock Exchange. Meanwhile, Sharif et al. (2015) analyse a panel data set of 41 companies listed in the Bahrain stock exchange for the period 2006-2010 employing pooled OLS regression with robust standard errors as the estimation technique. The results indicate that the variables return on equity, book value per share, dividend per share, dividend yield, price earnings, and firm size are significant determinants of share prices in the Bahrain market. Recent attempts to investigate the Jordanian capital market has also produced similar results at par with market price literature. For example, empirical findings by Almunani (2014) show that there is a statistically significant positive relationship between price earnings ratio, book value per share, earnings per share and SP of Jordanian banks, while dividend related variables have insignificant relationship with SP. Similarly, AL Qaisi et al. (2016) examine twenty insurance companies listed at Amman stock exchange during the period 2011-2015 and report that return on assets, debt ratio, company's age and size significantly affect SP.

On the other hand, another stream of empirical studies has developed recognizing the qualitative internal factors in addition to the quantitative factors (i.e. fundamentals) as share price determinants. A study carried out by Lee (2006) over the period 1920-1999 on NYSE testing both; fundamental and non-fundamental information impact on share prices conclude that investors overreact to non-fundamental information but underreact initially to fundamental information such as book value, earnings, and dividends. Additionally, a study conducted by Sloan (2012) using quarterly data on 30 companies constructed

the index (i.e. DJIA) from different sectors except the financial services as they are best representing the NYSE capital market. The study model includes wide range of financial (i.e. quantitative) as well as non-financial (i.e. qualitative) indicators to investigate stock returns determinants. Conspicuously, the examples of financial determinants which primarily affected SP were dividends, current assets, total assets, current liabilities, total liabilities, total equity, earnings, earning per share, net income, and cash flow.

On another note, several studies assessing the relationship between GFC and SP emerged from various economic settings. Extant global financial crisis literature alludes to the over lending as one of the debilitating effects of financial liberalization which can surface due to limited regulatory monitoring, irrational bank judgements and the presence of an explicit or implicit insurance against banking failures (Aghion et al., 1999). In light of the former, Lim et al. (2008) investigate the effects of the 1997 financial crisis on the efficiency of eight Asian stock markets and show that most of the Asian markets were adversely affected due to the herding effect (see also Bowe & Domuta, 2004). Additionally, Aktan et al. (2009) examine the impact of GFC on BRIC nations and Argentina where the vector autoregression model confirms that stock price fluctuations were evident in the emerging markets as well (see also Dimitriou et al., 2013). On the contrary, studies by karunanayake et al. (2010) find that the Asian and GFC did not pose any significant effects on stock return in developed economies such as Australia, Singapore, the UK and the USA (see also Jenrola & Daisi, 2012). Similar justifications are provided by Dajcman et al. (2012) on their study involving developed markets such as England, Germany, France and Austria where they observe a nonuniformity in the degree of stock market co-movements as a result of GFC (see also Granger & Morgenstern, 1970; Agmon, 1973; Hilliard, 1979). Khamis (2010) indicates that GCC banks were less prone to GFC shocks than their developed economies counterparts due to the limited exposure to sub-prime assets and the focus on traditional lending and savings mobilizations techniques. Moving to the MENA region, Moosa (2010) analyses the impact of GFC on GCC countries and concludes that there was limited evidence of the contagion effect on these countries. The paper specifically highlighted the importance of microeconomic factors as vital to stock fluctuations. On the contrary, using EGARCH model, Khallouli and Sandretto (2012) examine the contagion effect of the GFC on eight MENA stock markets and conclude that MENA countries have been affected to varying degrees

An overview of prior literature deciphers a commonality attached to the past empirical work and shows the evidence that firm-specific factors are inevitable components affecting SP in any economic setting thus forming a baseline for investment decisions. Ironically, the proliferation of studies leaves the relationship between firm specific factors, GFC and SP equivocal, presumably due to the fact that SP is a joint outcome of both micro and macro factors. A severe void is also noticed with respect to the economical settings studied leaving a lacuna in the MENA setting, as most of the studies concentrate on mature markets. In this case further insight into the issue is valuable as emerging markets like MENA region are partially segmented from global factors thus compelling the local factors to be a reason for fluctuating returns (see also Bilson et al., 2001).

This paper will therefore contribute to the ongoing debate by conducting a comprehensive study of eight firm-specific factors, namely; return on equity (ROE), earnings per share (EPS), dividend yield (DYIELD), dividend per share (DPS), book value per share (BVPS), total debt to total assets (DEBT), price earnings ratio (PER) and firm size (SIZE) to determine their extent of impact on the share prices for listed companies in all the GCC countries and Jordan, thus forming a reliable sample from the MENA region.

Accordingly, guided by relevant models and theories such as the Gordon's growth model, Ross's Arbitration theory and Fama's efficient market hypothesis, all offering a conceptual foundation to proceed with the study, along with supporting prior literature by Black and Scholes (1974), Wilcox (1984), Baskin (1989), Lee (2006), Das and Pattanayak (2009), Bhattarai (2014), Al Qaisi et al. (2016), Om and Goel (2017), and Mousavii and Karshenasan (2017), amongst others, that firm specific factors have a significant impact on SP, the following testable research hypotheses are formulated:

H₁: Ceteris paribus, there is a positive association between return on equity and SP.

H₂: Ceteris paribus, there is a positive association between book value per share and SP.

H₃: Ceteris paribus, there is a positive association between dividend per share and SP.

H₄: Ceteris paribus, there is a positive association between earnings per share and SP.

H₅: Ceteris paribus, there is a negative association between dividend yield and SP.

H₆: Ceteris paribus, there is a positive association between price earnings ratio and SP.

H₇: Ceteris paribus, there is a negative association between total debt ratio and SP.

H₈: Ceteris paribus, there is a positive association between firm size and SP.

H₉: Ceteris paribus, there is a negative association between global financial crisis and SP.

Data, Empirical model and Estimation method

Data

The data for the present study is derived from OSARIS database of public companies listed in the MENA capital markets, namely Saudi Arabia, UAE, Qatar, Kuwait, Bahrain, Oman, and Jordan. The database provides firm-level financial data on public listed companies. Initially, data was collected for 979 companies covering the period 2000-2015. However, 702 companies are dropped due to missing data, resulting in a final sample of 277 companies distributed as follows: Saudi Arabia (47), UAE (21), Qatar (15), Kuwait (13), Bahrain (3), Oman (8), and Jordan (170).

In order to gain maximum possible observations, pooled cross-section and time-series data is used. In this case, the total number of observations should be 4432 firm-year observations (277×16). However, negative values for price earnings and other missing figures reduces the number of observations to 1919 firm-year observations. As the number of observations for each company is not identical, this results in an unbalanced panel. Panel data is used because of advantages over cross sectional data. For example, panel data gives "more informative data, more variability, less co-linearity among the variables, more degrees of freedom and more efficiency" (Baltagi, 2001, p.6)

Empirical Model

Considering the research hypotheses formulated above and following the standard literature on the relationship between microeconomic factors (or company fundamentals) and GFC and common stock prices, the following empirical model to be estimated, for firm *i* in period *t*, can be written as:

$$SP = \beta_0 + \beta_1 ROE + \beta_2 BVPS + \beta_3 DPS + \beta_4 EPS + \beta_5 DYLED + \beta_6 PER + \beta_7 DEBT + \beta_8 SIZE + \beta_9 CRISIS + \varepsilon \quad (1)$$

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where the variables are defined in Table 2 below and the expected signs of the coefficients are $\beta_1, \beta_2, \beta_3, \beta_4, \beta_6, \beta_8 > 0$ and $\beta_5, \beta_7, \beta_9 < 0$.

Table 2. Summary of variables used in the analysis

| Variable | Definition | Symbol |
|-------------------------|--|--------|
| Stock Price | Year-end share price | SP |
| Return on equity | Net Income/ Shareholders equity | ROE |
| Book value per share | Total shareholders' equity/Number of shares outstanding | BVPS |
| Dividend per share | Dividends paid/Number of shares outstanding | DPS |
| Earnings per share | Net Income/Number of shares outstanding | EPS |
| Dividend yield | Dividend per share/Price per share | DYIELD |
| Price earnings ratio | Stock price/EPS | PER |
| Debt to total assets | Total debt/Total assets | DEBT |
| Firm Size | Natural log of market capitalization | SIZE |
| Global financial crisis | Dummy variable equals 1 for the crisis period 2007/2008 and 0 otherwise. | CRISIS |

Estimation Methods

The purpose of this study is to examine the impact of company fundamentals on market price of shares for selected MENA countries. The paper also aims at examining the impact global financial crisis on SP. The previous section showed the empirical model to be tested, which consists of nine testable hypotheses with their proxy variables. In order to estimate Equation (1), we first run a standard pooled OLS regression. Next, we performed OLS assumptions tests namely heteroscedasticity and autocorrelation. The results of Breusch-Pagan/Cook-Weisberg test for heteroscedasticity (test-statistic=2455.88, p -value=0.000) and Wooldridge test for autocorrelation (test-statistic=19.717, p -value=0.000) suggest that the null hypotheses of constant variance and no first-order autocorrelation, respectively, have been rejected. In this case, OLS produces biased and inefficient estimates. Therefore, to account for both problems and obtain more efficient estimates of the regression parameters, Equation (1) will be estimated using Feasible Generalized Least Squares (FGLS) estimator (see, for example, Greene, 2003).

Robustness Check: GMM Framework

In addition to FGLS estimator, to address the potential endogeneity problem and as a robustness check, we use Generalized Method of Moments (GMM) framework, which is the two-step system-GMM developed by Arellano and Bover (1995) and Blundell and Bond (1998) (see e.g. Al-Malkawi & Javid, 2018). As reported by Arellano and Bond (1991), the estimates of standard errors for two-step GMM estimator is found to be downward biased. To tackle this issue, we employ the Windmeijer (2005) finite sample correction (WC-robust estimator) for two-step GMM estimation. "It is important to note the distribution of the Sargan test is not known after specifying Windmeijer corrected (WC-robust) standard

errors. Specifying WC-robust standard errors also produces variance-covariance estimates that are robust to heteroskedasticity” (Daher et al., 2014, p. 14).

Empirical Results

Table 3 below reports the descriptive statistics such as mean, standard deviation, minimum, maximum and coefficient of variation values for the variables employed in the analysis. The minimum and maximum values for the variables ROE (Min= -8.33; Max = 2.98) and EPS (Min=-2.40; Max=8.28) show a wide spread, indicating major fluctuations in earnings pattern which is attributed to geopolitical issues engulfing the region. This also evident by the high values of the coefficient of variation for both variables, 4.60 and 2.69 respectively. Similarly, the dividend policies of companies measured by DPS and DYIELD show a wide variation among companies listed in the MENA capital markets. The small value of CV of PER implies low degree of variation, suggesting, in general, similar growth rates among the sampled companies. Similarly, the low value of CV of SIZE variable, measured by log market capitalization, suggests a small variation in the size among the companies studied.

Table 3. Descriptive Statistics of the Dependent and Explanatory Variables

| Variable | Mean | Std. Dev. | Min. | Max. | CV |
|----------|-------|-----------|--------|--------|-------|
| SP | 5.350 | 7.941 | 0.056 | 70.775 | 1.484 |
| ROE | .0687 | 0.316 | -8.331 | 2.989 | 4.600 |
| BVPS | 2.018 | 2.900 | -1.105 | 40.522 | 1.437 |
| EPS | 0.216 | 0.582 | -2.406 | 8.285 | 2.694 |
| DPS | 0.122 | 0.371 | 0.000 | 14.104 | 3.041 |
| DYIELD | 0.027 | 0.079 | 0.000 | 3.571 | 2.926 |
| PER | 1.257 | 0.417 | -0.474 | 4.454 | 0.332 |
| DEBT | 0.125 | 0.170 | -0.122 | 1.361 | 1.360 |
| SIZE | 5.044 | 1.078 | 2.788 | 8.232 | 0.214 |
| CRISIS | 0.875 | 0.3308 | 0.000 | 1.000 | 0.378 |

Notes: Variables are defined in Table 1. CV is the coefficient of variation (Std. dev. / Mean).

Table 4 below shows the correlation matrix and VIF test to detect possible multicollinearity issue. As can be seen from Table 4, the intercorrelations among variables and the VIF values are low, (below 10, the rule of thumb) indicating the absence of multicollinearity problem.

Table 5 below presents the estimation results of FGLS regression. As stated earlier, the FGLS estimator is chosen after performing pre-estimation tests on our panel data model. The Wald test statistics reject the null hypothesis that the slope coefficients are jointly equal to zero (p-value=0.000).

As can be seen from Table 5, the results show that all the estimated coefficients are statistically significant and possess the expected signs, with the exception of CRISIS which is statistically not different from zero. As anticipated, the coefficients of ROE, BVPS, DPS, EPS and PER are positive and statistically significant at less than 1% level (z-stats = 8.44; 11.37; 20.71; 13.35 and 15.04 respectively). This suggests that these company fundamentals positively influence share prices in the MENA region.

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Table 4. Correlation Matrix and Variance Inflation Factors (VIF) for the Explanatory Variables

| | ROE | BVPS | DPS | EPS | DYIELD | PER | DEBT | SIZE | CRISIS |
|-----------------|--------|--------|--------|-------|--------|--------|--------|--------|--------|
| ROE | 1.000 | | | | | | | | |
| BVPS | 0.117 | 1.000 | | | | | | | |
| DPS | 0.325 | 0.501 | 1.000 | | | | | | |
| EPS | 0.567 | 0.719 | 0.605 | 1.000 | | | | | |
| DYIELD | 0.093 | 0.038 | 0.695 | 0.073 | 1.000 | | | | |
| PER | -0.484 | -0.121 | -0.153 | 0.297 | -0.158 | 1.000 | | | |
| DEBT | 0.088 | 0.128 | 0.038 | 0.098 | -0.017 | -0.023 | 1.000 | | |
| SIZE | 0.391 | 0.382 | 0.288 | 0.426 | 0.015 | -0.130 | 0.431 | 1.000 | |
| CRISIS | -0.051 | 0.046 | -0.007 | 0.018 | -0.037 | 0.014 | -0.002 | -0.007 | 1.000 |
| VIF | 2.63 | 3.16 | 5.51 | 5.19 | 3.52 | 1.44 | 1.25 | 1.69 | 1.01 |
| Mean VIF | 2.81 | | | | | | | | |

Note: Variables are defined in Table 2.

Table 5. FGLS estimation results

| Variable | Dependent variable: Stock Prices (SP) | | | Expected Sign |
|----------------------------|---------------------------------------|------------|---------|---------------|
| | Coefficient | Std. error | Z-stat. | |
| ROE | 9.892 | 1.169 | 8.44* | + |
| BVPS | 0.486 | 0.043 | 11.37* | + |
| DPS | 8.396 | 0.405 | 20.71* | + |
| EPS | 3.781 | 0.283 | 13.35* | + |
| DYIELD | -34.682 | 1.875 | -18.50* | - |
| PER | 3.842 | 0.255 | 15.04* | + |
| DEBT | -3.159 | 0.626 | -5.05* | - |
| SIZE | 1.217 | 0.108 | 11.28* | + |
| CRISIS | -.040 | 0.242 | -0.17 | - |
| Constant | -9.840 | 0.655 | -15.06* | |
| No. of obs. | 1919 | | | |
| Wald test (p-value) | 0.000 | | | |

Notes: Variables defined in Table 2. * indicates significance at $P < 0.001$

This result is consistent with the findings of Sharif et al. (2015); Almumani (2016) and Om and Goel (2017) amongst others. Needless to say, this indicates that all the former factors reflect a direct relationship between investment perceptions in companies with positive development and earnings potential that act as a furor to an increase in SP. The former justification is specifically attributed to the results received for ROE, EPS and DPS, all which stands parallel to SP. Similar arguments hold well for PER. A high PER indicates that investors expect positive and high earnings from the company thus signaling

the trust attached to the companies operating fundamentals. This acts as a reason to further push the SP. As for BVPS, the metric is employed by investors to scrutinize variations in stock price valuation. Investors view high BVPS stocks are more valuable thus leading to an increase in stock price of shares. This can be justified with the rationale that BVPS is a major representation of owners' funds and signals the amount shareholders would receive during cases of dissolution, thus suggesting a higher BVPS to affect the stock prices in a positive way.

In line with previous findings by Om and Goel (2017); Okafor and Mgbame (2011) and Bhattarai (2014), the variable DYIELD exhibits a negative and statistically significant relationship ($z\text{-stat} = -18.50$) with SP. The theory of clientele effects offers a justification for this result whereby dividend policies impact various investors in different ways. While a certain group base their investment decision on dividend policies in order to get quick returns on investment, the other skeptical group prefers to avoid tax on dividends thus targeting capital gains. Investors in the MENA region studied presumably fall in the latter category. Invariably, DEBT shows a negative and statistically significant relationship with SP ($z\text{-stat} = -5.05$) implying that investors use this metric to gauge the extent of debt employed in financing projects. The results are in lines with several studies reviewed in prior literature (see Sharif et al., 2015; Om & Goel, 2017; Al Qaisi et al., 2016). Investors in the MENA region fear that aggressive leverage practices are directly associated with volatile earnings and increased risk levels due to the burden of interest expenses. Increased cost of debt therefore acts as a deterrent to increasing the SP due to these investors vacillating between investing in low debt or high debt companies. As evident from Table 5 the variable SIZE exhibits a positive and statistically significant relationship with SP ($z\text{-stat} = 11.28$) denoting that MENA investing community perceives size as a vital indicator of accompanies risk aversion, operational and performance capability which later on becomes a precursor to high SP.

As expected, the variable CRISIS shows a negative relationship with SP, however the estimated coefficient is not statistically different from zero ($z\text{-stat} = -0.17$). This implies that companies in the MENA region are less vulnerable to the spillovers of the financial crisis. A possible explanation for that the majority of the markets in the MENA region are not co-integrated with world's stock markets (see Neaime, 2016; Paskelian et al., 2013). Another validation for the former phenomenon is Boorman et al. (2010) and Chibber et al. (2009) justification that implementation of timely policy reforms by emerging and developing countries helped them withstand negative impacts whilst bouncing back with full vigour. This is clearly evident from the in house governance regimes and expansionary policies followed by the MENA governments to skillfully tackle the crisis. For example, the UAE, Saudi Arabia, Kuwait, Sudan, Qatar, and Lebanon have set up robust macro-fiscal units to strengthen their fiscal framework and wean themselves away from the income clutches of hydrocarbons while Algeria has recently adopted a new budget law with a strong medium-term orientation, all of which has been specially lauded by the IMF. Bahrain has initiated a new fiscal program to tide over the medium term while Morocco, Jordan, and Lebanon have created strides with medium-term public investment planning and execution. A budgeted fiscal risk statement along with an internal budget risk assessment is now prepared by Egypt on a yearly manner. These concerted efforts of global standards offer a vital role in risk mitigation and immunization from global shocks. Beyond fiscal reforms, MENA markets capital market liberalisation could prove as a fillip to the regions stock markets especially as Kuwait and Saudi Arabia vie for the covetous inclusion in the MSCI Emerging Markets Index.

Robustness Check (System-GMM Estimation Results)

As stated earlier, in order to address the potential endogeneity problem and to assure that our results are robust, we also estimate our empirical model using system-GMM estimator. The results of the two-step GMM estimator is reported in Table 6. The Wald test statistics reject the null hypothesis that the slope coefficients are jointly equal to zero (p-value=0.000). The Arellano-Bond test reveals that there is first-order serial correlation of the differenced errors (AR (1) z-statistic is significant with p-value=0.0076) but not a second-order correlation (AR (2) z-statistic is not significant with p-value = 0.3994) suggesting that there is no evidence of model misspecification. Note that in STATA, Sargan test of over-identifications of the validity of instruments cannot be performed with `vce(robust)` which is the Windmeijer (2005) WC-robust estimator.

As can be clearly seen from Table 6, the system-GMM estimator produces same results as FGLS estimator in terms of both the statistical significance of estimated coefficients and the expected relationship with stock prices. The estimated regression coefficients are statistically significant at the 1% (BVPS, DPS, DYIELD, PER and SIZE) and 5% (ROE, EPS, and DEBT) levels and also have the anticipated signs, with the exception of CRISIS, statistically insignificant. Hence, the outcomes of GMM estimator are consistent with our previous results based on FGLS regression suggesting that our findings are robust and not sensitive to estimation methods. Furthermore, consistent with the previous research (e.g. Nautiyal and Kavidayal, 2018), the results show that the lag dependent variable (SP_{t-1}), which appeared as an expiatory variable in the GMM model, is positive and statistically significant at less than 1% level indicating that last year stock prices influence current year prices. This suggests that potential investors may build their expectations on previous stock prices.

To conclude, the results of both FGLS and GMM estimators show that, for the sample studied, stock prices in the MENA region are positively influenced by firm-specific factors including return on equity, dividend per share, earnings per share, price-earnings ratio and firm size while negatively affected by dividend yield and financial leverage. The present study also found a positive association between current stock prices and previous year prices. The evidence also shows that the global financial crisis is not an important determinant of stock prices in the MENA region.

CONCLUDING REMARKS

Over the past decade, the MENA region especially the GCC countries have been at the epicenter as far as momentous capital market reforms are concerned, thanks to the geopolitical stability, persistent rise in GDP and persistent progressive economic and social policies. This fundamental restructuring in the form of deregulation and other regulatory reforms in the capital markets are all indicators of a surge in both an equity culture as well as increased financial intermediation through unconventional channels in the MENA region. As a result, this obviates the role of traditional banks and lays emphasis on enhancing the ability of capital markets in channelizing funds for the overall development of the economy. This further urges the regulators to encourage secondary trading, enforcing mandatory corporate governance policies whilst harnessing and broadening a vibrant investor base by ensuring them an efficient and transparent capital market.

Table 6. System-GMM estimation results

| Variable | Dependent variable: Stock Prices (SP) | | | Expected Sign |
|---------------------|---------------------------------------|----------------------|---------|---------------|
| | Coefficient | WC-Robust Std. error | Z-stat. | |
| ROE | 11.187 | 5.452 | 2.05* | + |
| BVPS | 0.552 | 0.183 | 3.03** | + |
| DPS | 5.200 | 1.352 | 3.85** | + |
| EPS | 2.097 | 0.826 | 2.54* | + |
| DYIELD | -28.363 | 6.966 | -4.07** | - |
| PER | 2.572 | 0.809 | 3.18** | + |
| DEBT | -7.583 | 3.719 | -2.04* | - |
| SIZE | 4.366 | 0.862 | 5.06** | + |
| CRISIS | 0.342 | 0.285 | 1.20 | - |
| SP _{t-1} | 0.082 | 0.004 | 22.97** | +/- |
| Constant | -24.149 | 3.930 | -6.14** | |
| No. of obs. | 1702 | | | |
| Wald test (p-value) | 0.000 | | | |
| AR (1) test | -2.557* | | | |
| AR (2) test | 0.821 | | | |

Notes: Variables defined in Table 2. ** and * indicate significance at $P < 0.01$ and $P < 0.05$, respectively.

AR (1) and AR (2) are Arellano-Bond test for zero autocorrelation in first-differenced under the null hypothesis of no autocorrelation. WC-robust is Windmeijer corrected standard errors.

The current study examined the impact of eight microeconomic (company-specific) factors namely ROE, EPS, DYIELD, DPS, BVPS, PER, DEBT and SIZE on the stock prices of 277 listed companies in the MENA region. The FGLS is employed to estimate the parameters and results suggest that firm specific factors play a vital role in determining the SP. We also used system-GMM estimator to address the potential endogeneity issue and to assure the robustness of our findings. The results of both FGLS and GMM estimators showed that variables such as ROE, BVPS, DPS, EPS and PER are positively related to SP, while DYIELD and DEBT are negatively associated with SP. Moreover, for the sample studied, under both estimation methods, the evidence did not support the hypothesis that the GFC had significant influence on stock prices. The present study also found a positive association between current stock prices and previous year prices. These findings clearly indicate the relevance of firm-specific factors in basing investment decisions thus mandating companies to incorporate sound corporate governance principles such as accounting audits and financial disclosures to remove inherent information asymmetries between management and shareholders, thus ensuring timely dissemination of material facts to potential investors. Ensuring transparency in financial disclosures and avoiding accounting opacities can aid in boosting SP of respective companies thus channelizing investments towards it. The inherent herding behavior prevalent among MENA investors is another issue to consider. Evidently, the impact of herding on price volatility is a result of change in investor confidence and not the herding factor in particular. Herding following a low investor confidence leads to increased price volatilities and vice versa. It is the need of the hour to transform such behaviors into more informed ones. Increasing inves-

tors' awareness by organizing frequent investment decision making workshops is further recommended to avoid judgment errors related to assessing a firms' worth.

Furthermore, several implications surface from the results obtained in this empirical study. Firstly, the study sheds light on potential explanatory variables need to be considered by investors while structuring their investments portfolio and evaluating stock prices. Secondly, listed companies should focus on improving the figures emerged as significant variables that affect the market price of shares. Thirdly, on a macroeconomic level, this study will help investors in making rational decisions and allocate resources efficiently and effectively leading to higher economic growth and standard of living. Moreover, a prudent and concerted stance by the respective governments on monetary, fiscal and diversification policies can improve economic fundamentals to build resilience and wean itself from such shocks in future.

Yet, the study is not free from limitations. The elimination of several companies due to non-availability of data poses as a hurdle in providing clarity to the firm specific factors affecting SP. Moreover, the non-inclusion of macroeconomic factors, except for the GFC, eclipses a comprehensive perspective to the determinants of SP. That said, impending studies can focus on a more inclusive approach of including both micro and macro factors affecting SP. Future studies can further expand the scope of research by incorporating other competitive markets such as Egypt, Morocco and Algeria. Nevertheless, MENA markets burgeoning investment ecosystem along with its robust investment dynamics demonstrates the region potential to usher in a new investment paradigm for investors to diversify their portfolio and access new markets. For this, the sagacious use of specialized and customized indexes and metrics are most likely to play the dominant role in assisting investors to actively manage their portfolio and to navigate through uncertainties in order to reap fair and positive returns on investment.

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ENDNOTES

- ¹ Algeria, Egypt, Iran, Iraq, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia, and Yemen.
- ² This section is heavily based on OECD (2018) report on Capital Market Development and Access to Capital in MENA.

Section 2

Corporate Governance and Business Performance

Chapter 8

Corporate Governance and Firm Innovation: The Effect of Ownership and Board of Directors on R&D Investments

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ABSTRACT

Innovation is a key factor for firms’ competitive advantage in the long-term and for their financial success. Scholars highlight the underinvestment problem with respect of R&D investment. This chapter focuses on two relevant variables of corporate governance that influence firms’ innovation performance: firm ownership and board of directors. In the first section, the effect of ownership structure on R&D investment is analyzed. More specifically, the chapter will illustrate the effects of family ownership and institutional ownership on innovation investments. The second section explores the main theoretical perspectives investigating the functions of board of directors and the main board tasks. Lastly, three attributes of board structure and their effect on R&D investments are explored.

INTRODUCTION

A firm’s innovation ability is essential because it leads to a new combination of its resources and generates effects throughout the lifetime of the firm. Firms’ competitors are not able to possess adequate resources to adopt an imitation strategy (Miller & Shamsie, 1996). Accordingly, innovation activity represents one of the fundamental pillars of competitive advantage, mostly because it is an inimitable resource (Monreal et al., 2012).

Using the consolidated process-based conceptualization (Tidd & Bessant, 2009), technological innovation can be viewed as the set of activities through which a firm identifies, designs, produces, and introduces a new product, technology, system, or technique (Freeman, 1976). To start and continue to drive

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this process, investments in Research and Development (R&D) are essential. They permit the exploration and exploitation of activities and, accordingly, the identification of new products or new processes.

If, on one hand, scholars acknowledge that investment in R&D represents a key driver for firms' enduring competitive advantage, on the other hand, within the context of public companies, it is not obvious that managers have incentive to undertake R&D investment at their optimal level.

Drawing on the corporate governance literature, scholars emphasize the main mechanisms aimed at aligning the interests of management and owners. This chapter focuses on two of these mechanisms that may discourage the R&D underinvestment problem. More specifically, ownership structure, board of directors' attributes, and their effects on R&D investments are investigated. These are relevant ways that scholars have emphasized to solve some managerial opportunistic behaviors, such as ones connected to R&D underinvestment.

The discussion of the main issues regarding the relationship between innovation and the corporate governance mechanisms mentioned above allows us to illustrate the research areas where scholars find a consensus and other areas where the literature shows conflicting results and debate is still open. In order to explore the effect of corporate governance on R&D investment, empirical studies will be examined, and the interpretation of the results will rely on the main theoretical frameworks used within the corporate governance literature.

We used a systematic selection process to select the eligible literature for our analysis. The literature review was limited to articles published in peer-reviewed journals, identified through three databases: ABI/Inform ProQuest, Business Source Complete (EBSCO), and EconLit (EBSCO). We searched for all articles up to 2019, using diverse combinations of keywords—("duality"; "CEO-chairman duality" or "dual leadership"), ("board size"), ("outside directors" or "independent directors"), ("ownership structure"), ("ownership concentration"), ("family ownership"), ("institutional ownership)—as well as three innovation-linked terms ("R&D investment", "R&D expenditures", and "innovation input"). We confirmed the importance of the articles by reading all abstracts, checking for a discussion related to the relationships among ownership structure, board of directors, and R&D investment. The rest of articles were read in their entirety, controlling for substantive relevance by checking for a discussion related to innovation strategies from a corporate governance perspective.

The chapter is divided into three sections:

- 1) The first section illustrates the debate around the R&D underinvestment problem within the context of public companies. This theme has produced a very interesting strand of corporate governance literature exploring the mechanisms able to stimulate management's propensity to undertake R&D investments, and, in turn, to increase firms' long-term competitiveness. Therefore, this section represents a starting point for the following literature review.
- 2) The second section is focused on studies exploring the effect of ownership on R&D investment. More specifically, this section first analyzes the R&D investment level, taking into account two different ownership structures: a fragmented ownership structure and an ownership structure with the presence of a large shareholder, emphasizing that the latter may represent a partial solution to the free-riding problem. After investigating the degree of ownership concentration, this section explores the potential identities of large shareholders and their influence on R&D strategies. Family shareholders and institutional shareholders are particularly investigated.

- 3) The third section examines the role of the board of directors in the process of monitoring and stimulating R&D expenditures. In order to investigate the effect of the board of directors on the innovation policies, this section illustrates the main theories advanced to highlight the different roles of the governing body. More specifically, we consider the perspectives of agency, stewardship, and resource dependence to examine the effect of some board attributes (the presence of outside directors, CEO duality, the number of directors) on R&D investment.

R&D Investments and the Underinvestment Problem

R&D expenditures are a peculiar kind of investment. In fact, they are uncertain, in that they may not generate any payoff, may produce profits only in the long run, and have a high probability of failure (Baysinger et al., 1991). Additionally, not all R&D is productive: higher R&D investment does not necessarily entail higher innovation outputs (Bebchuck & Stole, 1993). Besides, in some countries accounting rules permit considering R&D activities as costs rather than as investments; therefore, their reduction artificially boosts earnings (Bushee, 1998) and balances stock return (Chakravarty & Grewal, 2011). In any case, investments in R&D are key drivers for achieving an enduring competitive advantage (Porter, 1985). These investments are essential for firms operating in high-tech industries, such as the pharmaceutical and biotechnology sectors. Their features and their relevance for firms' survival and growth make the decisions that concern these types of investments very challenging.

More specifically, features of R&D investments may disincentivize public companies' managers from undertaking them. In fact, an information asymmetry occurs between investors and managers (Stein, 1988), and it represents a key factor to understand the management incentive to invest in R&D and therefore the relationship between ownership structure and innovation. Indeed, managers may be disinclined to communicate R&D projects, because by discussing R&D projects they reveal relevant details to competitors and place themselves at a competitive disadvantage (Bhattacharya & Ritter, 1983). Therefore, managers may not disclose information about firms' R&D programs. Consequently, investors experience several difficulties in scrutinizing management's long-term objectives, and they will judge the effects of strategic choices by observing quarterly earnings (Lee & O'Neill, 2003). The investor's short-term behavior may be disruptive within the R&D investment framework. In fact, R&D expenditures reduce current profit and lead short-term stockholders to sell their shares (Froot, Perold, & Stein, 1992). A large sale of stocks causes a decline in the stock price, and external investors—attracted by low prices—may be incentivized to launch hostile takeovers and replace the incumbent management. Therefore, an R&D underinvestment problem may arise because of the short termism caused by the threat of takeovers (Stein, 1988). Put differently, the short-term horizon of investors affects management behaviors, and, in turn, their long-term strategic decisions.

However, even if shareholders may appreciate risky initiatives because they may preserve their investment by diversifying their own portfolio, managers invest all their human capital in a single firm and are not able to implement any diversification strategy. These features may reduce managers' incentive to undertake risky investments and stimulate short-term payoffs (Hansen & Hill, 1991). In other words, the risk of failure of R&D expenditure may increase top manager's *employment risk* (Alchian & Demsetz, 1972), and consequently they view R&D expenditures as sunk-cost investments (Kor, 2006; Wu, 2008). Consequently, the divergent shareholders' and managers' interests relative to R&D expenditures are subject to an agency problem (David et al., 2001).

Recent evidence is mixed with respect to innovation investment within public companies context. Findings of Asker et al. (2015) support a view that short-termism alters investment and innovation decisions in U.S. public firms. However, Acharya and Xu (2017) show that public listing stimulates innovation of firms in industries that are more dependent on external finance. Kaplan (2018) views the biotech booms of recent decades as evidence against the short-termism U.S. corporations managers.

Ownership Structure and R&D Investments: Theoretical Background

The literature emphasizes the role of ownership structure in influencing management decisions concerning R&D investments. In fact, a small investor does not have an adequate incentive to monitor top managers' activities because while the investor sustains the entire cost (in terms of money and time), other stockholders will benefit from this activity, and a free-riding problem may be generated (Grossman & Hart, 1980). Therefore, every single stockholder relies on the monitoring activity of someone else and, in the end, there is a risk that nobody will monitor top management activities. In addition, R&D investments require specialized knowledge, and it is very difficult to judge the appropriateness of managerial decisions within a short time period (Zona et al., 2011).

In contrast to a small investor, a large shareholder has a higher fraction of firms' shares and therefore the adequate incentive to gather more detailed information on firms' investment programs and to evaluate managerial choices relative to the firm's innovation. Large shareholders may solve the free-riding problem because they have financial motivation to scrutinize whether management decisions are aligned with their own preferences or not (Anderson & Reeb, 2003).

Consequently, stock concentration represents an indicator of shareholder incentive to decrease the information asymmetry about firm investments. Shareholders may use voice and exit options (Hirschman, 1970). The first option refers to an attempt to repair or improve the incumbent decisions by useful criticism and proposals for change. The second option leads shareholders to withdraw from the business by selling their own shares. But when a large shareholder adopts the exit strategy, he or she faces a liquidity problem because an effect on stock-price level will occur. In fact, a block holder may not sell its shares without generating a significant reduction in the stock price. Put differently, selling large holdings in a firm generates a drop in the stock prices that makes this decision unappealing (Aoki, 1984). Consequently, large shareholders have incentives to exert their voice so as to affect managerial decisions aimed at maximizing firm value and, sometimes, to remove management by launching a proxy fight or a takeover (Shleifer & Vishny, 1997).

Therefore, on one hand, a large shareholder has adequate incentive to monitor managers' investment activities, stimulating those more apt to produce innovation; on the other hand, managers will depend on evaluations of firms by block holders. This mutual dependence creates a strong incentive to reduce information asymmetry, and it reduces the risk associated with the shorter horizons of atomistic investors that can cause managers to postpone R&D investments (Froot et al., 1992; Stein, 1988). Therefore, the large shareholder may monitor the management behavior and prevent the underinvestment problem relative to R&D investments (Lee & O'Neill, 2003).

The Effect of Family Ownership on R&D Investments

The literature points out that when a large shareholder is in the form of a family owner, a firm tends to get lower R&D investment (Chen & Hsu, 2009; Munoz-Bullon & Sanchez-Bueno, 2011). The reasons

are several. First, when family managers take a strategic decision they evaluate not only the effects on financial wealth but also the effects on affective wealth, so-called socioemotional wealth (Gómez-Mejía et al., 2007; 2011). The family members' control over strategic decisions, their identification with the firm, their social ties within and beyond the firm, their emotional attachment to the firm, and their sense of dynasty represent the five main pillars of socioemotional wealth (Berrone et al., 2012). According to Gómez-Mejía (2007): "for family firms a key criterion, or at least one that has greater priority, is whether their socioemotional endowment will be preserved." The preservation of this wealth represents an end in itself, and it is linked to a deep psychological level among family owners whose identity is strictly intermeshed with the organization.

In order to undertake R&D investments, firms require highly qualified personnel (Zingales, 2000), because R&D programs are knowledge-based investments (Jensen, Solberg, & Zorn, 1992). Nevertheless, family firms may suffer from a lack of talented personnel (Fernandez & Nieto, 2006). Nepotism may tend to favor unqualified family members over outside professionals (Weidenbaum, 1996), reducing the willingness to invest in innovation projects. Therefore, in order to undertake R&D investments, family firms need to hire nonfamily managers with technical backgrounds and experience (Daellenbach et al., 1999). Nevertheless, the family could be reluctant to hire nonfamily managers to avoid the dilution of its control over the decision process, which, in turn, diminishes socioemotional wealth (Berrone et al., 2012).

R&D investments may also require additional funds (Lessard, 1985). However, if, on one side, external financial funders would provide additional resources, on the other side they would influence the decision-making process, thus reducing the influence and the control of the family over the business. Consequently, the family members could be reluctant to seek external sources of finance to avoid the dilution of their control over the decision-making process, which, as said above, decreases their socioemotional wealth (Berrone et al., 2012).

Another relevant cultural feature of family businesses is altruism, which is described as a utility function that positively links the welfare of a parent to the welfare of one's children and stimulates thoughtfulness among family members (Lubatkin et al., 2005). Altruism and the lack of self-control by principals can create different kinds of agency costs. A first kind is linked to an adverse selection problem: because the hiring of a family agent is based on family status as well as on professional competencies, altruism can generate a deficiency of ability, which, in turn, can cause low performance (Eddleston & Kidwell, 2012). Secondly, the generosity of parents to their children can hinder their activity of monitoring and disciplining them. As a consequence, parental altruism may produce free-riding behavior and shirking in their children (Lubatkin et al., 2005). Some family members protected by altruism may not have the appropriate competencies to allocate resources into innovation projects (Chang et al., 2010).

In family firms, agency conflicts between owners and managers do not appear as a critical issue because family members are often top managers, and family shareholders have enough information to monitor nonfamily managers (Munoz-Bullón & Sanchez-Bueno, 2011). Nevertheless, the agency problem can emerge between majority and minority shareholders. Controlling owners often use pyramids, multiple classes of shares, and cross-holding to control a larger percentage of votes than that enabled by their proportion of cash flow rights (Villalonga & Amit, 2009). Such situations can produce very high agency costs (Bebchuk et al., 2000) because of nonaligned interests (Jensen & Meckling, 1976) and entrenchment (Fama & Jensen, 1983).

The divergence of cash flow and voting rights can lead majority shareholders to extract monetary and nonmonetary private benefits because minority shareholders bear the costs (Sacristán-Navarro et al., 2011). Some private benefits are represented by i) "special dividends or (...) business relationships with

the companies they control” (Shleifer & Vishny, 1997, p. 758); ii) related party transactions (Cheung et al., 2006; Friedman et al., 2003); iii) empire building; and iv) assignment of family members to management roles (Bjuggren & Palmberg, 2010). Such behaviors may lead family members to misallocate resources, using them to maximize family welfare at the expense of R&D investments (Chen & Hsu, 2009).

Finally, while atomistic investors can reduce specific risk by creating diversified portfolios, family members invest high fractions of their wealth in the family firm and are not as able to diversify their portfolios (Thomsen & Pedersen, 2000). This may lead them to avoid risky investments (Zellweger & Sieger, 2012) because the consequences of negative returns are more crucial than the perquisites of potential gains.

There is an ample body of empirical studies highlighting a negative effect of family ownership on R&D investments (e.g.: Munari et al., 2010; Munoz-Bullon and Sanchez-Bueno, 2011; Chrisman & Patel, 2012; Choi et al., 2015). Matzler et al. (2015) find that family involvement in management negatively affects innovation input but has a positive effect on innovation output. The studies of Duran et al. (2016) and Merono-Cerdan et al. (2017) confirm higher productivity of investment in innovation and higher conversion rate of innovation input in output within family firms context. Family involvement in management seems to improve the conversion rate of innovation inputs into process innovation outcomes (Dieguez-Soto et al., 2018) and negatively moderates the relationship between R&D intensity and continuous technological innovation (Dieguez-Soto et al., 2016).

The propensity to undertake investment in R&D completely alters their behaviour when performance hazards occur (Gómez-Mejía et al., 2014). Family and economic goals converge in vulnerable contexts, and family-managed firms are likely to boost R&D expenditures (Patel & Chrisman, 2014).

Anyway, family management negatively influences the relationship between performance below aspiration levels and the firm’s conversion rate of innovation efficiency in both the short and the long-term (Manzaneque et al., 2018)

The Effect of Institutional Ownership on R&D Investments

Many studies emphasize the relationship between stock concentration, institutional ownership, and R&D investments. In a sample of 94 US firms operating in research-intensive industries, Hill and Snell (1988) propose a model in which distinct interests of managers and stockholders influence corporate strategy and a firm’s profitability. More specifically, while managers favor strategies maximizing their own utility, stockholders prefer maximizing their wealth. The empirical results point out that manager-controlled firms tend to adopt diversification strategies, through which managers tend to, on one hand, increase their prestige and visibility, and, on the other hand, reduce the failure risk. When stockholders dominate, firms tend to adopt innovation strategies. In addition, R&D investments positively influence firm profitability.

Another valuable study was conducted by Hansen and Hill (1991) on a sample of 129 firms based in four research-intensive industries. The authors highlight that a high fraction of institutional ownership positively affects R&D expenditures. The authors point out that while an individual shareholder may adopt a myopic behavior, large institutional stockholders do not show a short-term horizon because they may achieve economies of scale in gathering and analyzing information. Brav et al. (2017) show that firms backed by activist hedge funds tend to have lower R&D expenditures but produce higher innovation output. Luong et al. (2017) show that foreign institutional investors increase innovation but do not explore the effect on long-term investment and employment. Bena et al. (2017), going a step

further, find that foreign institutional investors have a positive effect on long-term investment in tangible, intangible, and human capital. Foreign institutional ownership also stimulates significant increases in innovation output despite of popular portrait that depicts foreign investors as predominantly driven by short-termism, often at the expense of long-term investment, employment, and innovation. An updated study on a sample of 2,138 U.S. listed companies confirm a positive relationship between institutional ownership and innovation (Chang et al., 2019).

Some studies go further, identifying the nature of the institutional owner and focusing on the presence of a venture capitalist in the ownership structure and on its effect on R&D expenditures. Venture capital funds represent an external form of financing that assists firms in different stages of their life cycle, from the early to the later phases. They provide firms not only with equity capital but also with active monitoring and advice (Hellmann, 1998; Marx, 1994). The literature highlights their crucial role in funding privately held, high-growth companies (Gompers & Lerner, 2001) and in facilitating firms' ownership change, making it possible for incumbent or external managers to buy into a company (Bruining & Wright, 2002).¹ Gompers and Lerner (2001) emphasize some strategies used by venture capitalists for monitoring and gathering information: allocation of funds in subsequent stages over time, the involvement of other venture capital firms in their investments, participation in the venture-backed firm's board of directors, and compensation agreements.

Empirical findings have pointed out that venture capital funding has a positive and significant impact on innovation (Hellmann & Puri, 2000; Kortum & Lerner, 2001). In order to pursue financial returns, venture capital investors press backed firms' management to invest in R&D because of the positive relationship between R&D and earnings (Bushee, 1998). Kortum and Lerner (2000) regress both patents and the ratio of patents on R&D investments of venture capital firms and find that venture capital funding has a positive and significant impact on innovation. Patents show firm's potential to be able to generate innovation over the years (Farre-Mensa, Hegde, & Ljungqvist, 2017) and positively affect firm evaluation by venture capitalists (Hsu & Ziedonis, 2013). Furthermore, the advice and support provided by VCs facilitate the undertaking of R&D investment of venture-backed firms (Hellmann & Puri, 2000).

Another stream of the literature focuses on the role of the bank as owner and its effect on firms' R&D strategies.

Not all institutions play an active role in managerial decisions. Banks, like insurance companies, are a kind of institution labelled as pressure-sensitive (Brickley et al., 1988). Having existing or potential business relationships with the companies in which they have stocks, such as loans and credits, banks avoid opposing management with regard to some decisions so as to avoid the risk of the company withdrawing its business from the bank. Therefore, banks tend to favor firm-backed management choices about the level of R&D investment. The presence of banks in the ownership structure stimulates firms to take on capital through debt financing (Petersen & Rajan, 1994; Tribo et al., 2007). This dual role of a bank, as shareholder and lender, generates a conflict of interest. Indeed, shareholders show a higher risk propensity than lenders because if the risky investment succeeds, the former obtain most of income, while if it generates bad payoffs, the latter take most of the losses (Jensen & Meckling, 1976). Because of this conflict, banks could pressure firms to undertake investments that maximize the likelihood of loan repayment rather than maximize shareholder value (Kroszner & Strahan, 2001), reducing, therefore, investments in innovative projects with long-term value.

The dual role of shareholder and lender can also lead banks to become reluctant to finance R&D investments for other reasons. The higher the level of debt, the more serious the distortions on a firm's investment decisions (Tribo et al., 2007). An example of this distortion is represented by the short-term

investment bias (Grinblatt & Titman, 1998). In order to reduce the burden of their debt, firms tend to invest in short-term projects, reducing long-term R&D investments. In addition, R&D investments are firm-specific assets, and hard to redeploy. Besides, the higher the percentage of tangible assets of a firm, the less risky is its debt, because tangible assets represent collateral (Titman & Wessels, 1988). Therefore, in the event of bankruptcy and liquidation, R&D investments do not provide the lenders with enough protection (Long & Ravenscraft, 1993). Acharya and Subramanian (2009) find that that creditor-friendly bankruptcy codes hinder innovation. Tribo et al. (2007), in a study on 3,638 Spanish firms, point out that the presence of a bank in the firm's ownership structure negatively affects R&D investments.

BOARD OF DIRECTORS AND R&D INVESTMENTS

Theoretical Background

Studies on the effect of the board on R&D investment have been conducted using mainly three theoretical frameworks that will be illustrated in the next pages.

Agency Theory

This theoretical perspective has its roots in financial economics studies and represents one of the main pillars in the corporate governance literature. The work of Jensen and Meckling (1976) constitutes a seminal work of agency theory and analyzes the interest conflicts generated by the separation of ownership and control in large companies. The agency relationship can be considered as a contract where one part (the principal) delegates work to another part (the agent). In order to implement this relationship, the principal has to cede to the agent a certain degree of decisional autonomy. Jensen and Meckling (1976) use this kind of relationship to analyze the dynamics featuring the relationship between shareholders and managers in public companies, that represent respectively the principal and the agent in the agency relationship. Agency scholars highlight that managers have incentive to consume non-pecuniary personal benefits (perquisites), because they will benefit entirely from the relative advantages while they will share with shareholders the relative costs. More specifically, agency costs are represented by monitoring costs, such as those linked to the use of the board of directors and auditors; bonding costs, e.g., contractual limitations to managerial decision-making and golden parachutes; and residual loss.

There are some relevant assumptions underlying agency theory. The first one is the relative bounded rationality of the individuals. Therefore, they are not able to foresee every potential contingency and account for these contingencies in contracts. Consequently, managers face some unpredictable events, not regulated by the contracts. The second assumption is relative to self-interested individuals. Managers are likely to act in their own interest rather than in the interest of the principal. The third assumption is related to the information asymmetry between principal and agent, which can generate problems of moral hazard that arise when the action undertaken by the agent is unobservable and has a different value to the agent as compared to the principal (Darrough & Stoughton, 1986). Taking these assumptions into account entails that shareholders have no guarantee that managers can achieve their task without any agency costs emerging.

Agency scholars attribute several tasks to the board of directors. More specifically, the board decision process may be articulated in four steps:

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- 1) initiation, that is, the generation of proposals for resource allocation;
- 2) ratification, that is, the selection of the decision proposed by management;
- 3) implementation, that is, the execution of chosen decisions;
- 4) monitoring, that is, the valuation of the performance and the identification of rewards.

Acknowledging opportunistic behaviors and hidden actions, scholars suggest that decision management and decision control should be allocated to different actors. More specifically, managers should be in charge of decision formulation and implementation, while directors should achieve decision ratification and monitoring (Fama & Jensen, 1983).

Agency scholars therefore emphasize a control function of the board of directors. In fact, however, numerous studies over the years have highlighted that the board appears as a legal fiction and have questioned its effective activities of monitoring. Empirical studies describe a board dominated by corporate management, without the essential independence to formulate an objective judgment on management performance (Lorsch & McIver, 1989). In these studies, the CEO is described as an actor with a great power to choose the directors. Therefore, boards appear as the creatures of the chief executive (Mace, 1971), are dominated by corporate management, and are generally passive. From the conclusions of these studies, directors may not be able to identify any real distinction between the work of directors and the work of senior managers.

Stewardship Theory

Stewardship theory represents an alternative to agency theory. It considers a “model of man” different from that depicted by agency theory and, consequently, the board tasks do not include control over the CEO activities. More specifically, while the assumptions underlying agency theory are represented by individualistic, opportunistic, and self-serving managers, highlighting a divergence between the shareholders’ and managers’ interests, stewardship theorists view the manager as an individual motivated by a need to achieve to gain intrinsic satisfaction through excellent performance at work (Donaldson & Davis, 1991). The manager is inclined to take on responsibility and exercise authority (McClelland, 1961). Therefore, stewardship theory considers nonfinancial motivators. “The executive manager, under this theory, far from being an opportunistic shirker, essentially wants to do a good job, to be a good steward of the corporate assets (Donaldson & Davis, 1991, p. 3).

The model of man depicted by stewardship theory adopts a behavior that is pro-organizational and collectivistic. Whether the manager can choose between self-serving behavior and pro-organizational behavior, he or she will not give up the interest of the organization (Davis et al. 1997). The manager always will prefer cooperation over defection. He or she will place higher value on the organization’s objectives, such as sales growth or profitability, because through the achievement of those, shareholders’ wealth is maximized and, in turn, the steward’s utility function is maximized.

Under this perspective, the main board task is not the exercise of control over CEO activities, because the managers are trustworthy and collectivistic, but it is to support and mentor the CEO. Therefore, the board of a company can help to favor the decision-making process by providing knowledge, advice, and support, particularly to the CEO (Calabrò et al., 2013). Consequently, the main role of the board will be an advisory function, with a focus on collaborating and involvement with strategy (Machold, Huse, Minichilli, & Nordqvist, 2011; Pugliese et al., 2009).

In this theory, the concentration of the CEO and chairman is considered a positive feature of the board because it “gives greater unity of direction and strong command and control” (Huse, 2007, p. 55).

Resource-Dependence Theory

Resource-dependence theory considers a firm as an open system whose survival depends on the acquisition of critical inputs, such as employees, technology, and financial resources, from the external environment (Pfeffer & Salancik, 1978). “Criticality measures the ability of the organization to continue functioning in the absence of the resource or in the absence of the market for the output” (Pfeffer & Salancik, 1978, p. 46).

Because of the scarcity of resources, the uncertainty of the acquisition threatens the survival of the organization, which needs to establish relationships with external stakeholders that control critical inputs. M&As and joint ventures represent means through which an organization attempts to manage interdependencies. Yet a board of directors may have a relevant role to establish relationships with the external environment. Under this theoretical framework, the main board tasks are connection and legitimacy. The board may link the focal organization with external stakeholders through co-optation strategies of outside directors. In fact, through the appointment in the boardroom of well-connected individuals, the focal organization links itself with external organizations (Hillman & Dalziel, 2003). More specifically, putting on the board individuals with contacts or connections with other organizations, on one hand, the organization is favored in obtaining external resources, and on the other hand, it may be able to transfer information to its environment. Besides, the appointment to the board of members who are part of the political or business community promotes a legitimization of the company’s behavior and mobilizes external support and resources for it (Huse, 2007). “Board size and composition are not random or independent factors, but are, rather, rational organizational responses to the conditions of the external environment” (Pfeffer, 1972b, p. 226). Resource-dependence theory has offered an important framework to analyze organizational decline and bankruptcy (Daily, 1996). Daily (1995) finds that firms with a higher fraction of outside directors are more likely to successfully re-emerge from bankruptcy.

Board Structure

In what follows, three attributes of the board capable of affecting R&D investments will be illustrated. Board tasks derive from the three theoretical frameworks discussed above.

Outside Directors

Even if the debate on the effect of outside directors on a firm’s performance is still open (Dalton, Daily, Ellstrand, & Johnson, 1998; Rhoades, Rechner, & Sundaramurthy, 2000), scholars have highlighted that outside directors significantly influence a firm’s decision-making process and performance, such as investment decisions and Tobin’s Q (e.g., Gillette, Noe, & Rebello, 2008; Hillman & Dalziel, 2003; Hillman, Nicholson, & Shropshire, 2008).

Policy makers and practitioners emphasize the importance of appointing an appropriate number of outside directors. Using the agency perspective (Fama & Jensen, 1983; Jensen & Meckling, 1976), the board should mitigate the agency problem relative to underinvestment in R&D activities mentioned above (Kor, 2006; Wu, 2008). Directors exert their monitoring role in order to discipline top managers’ oppor-

tunistic behaviors (Fama & Jensen, 1983). The control over management decisions implies that directors remind top managers that undertaking R&D projects strengthens the enduring competitive advantage, even though these projects may damage short-term performance. As shareholders take advantage of promising R&D initiatives, the board may stimulate the alignment of the interests of shareholders and top managers through the advising and monitoring of decisions on R&D expenditures (Lee, 2005). A strong monitoring mechanism corrects the inappropriate behavior of managers and improves the capability of an organization to regulate its investment strategy relative to the changes in its business environment (Allen, 1993; Yoo & Sung, 2015).

Although the literature highlights that the effect of outside directors on R&D activities is controversial, a relevant stream of literature points out a positive effect of outside directors on R&D investments.

In fact, because of the features of R&D investments, advising and monitoring a firm in terms of innovation requires extraordinary skills and knowledge, and the appointment of external managers can be very beneficial because they confer precious competences, experience, and knowledge, which are very difficult to pick up elsewhere. When firms face complicated operations, external knowledge and expertise become essential factors (Faleye et al., 2011). Scholars point out that monitoring and advising activities of external directors depend on their own peculiar professional experience (Kor & Mysangyi, 2008). In particular, competences and expertise of outside directors in similar technological areas (Carpenter & Westphal, 2001) may have a beneficial effect on the company because they may favor the identification of new market niches and products (Shane, 2000), forecast technology and market development (Helfat & Lieberman, 2002), identify potentially successful and unsuccessful innovative projects (Weterings & Koster, 2007), and adopt incentive plans to stimulate innovation efforts.

Outside directors with sufficient firm-specific knowledge can better exert their monitoring role because they may detect with more awareness a firm's operations (Kor & Sundaramurthy, 2009). Consequently, firm-specific human capital favors outside independent directors to support top managers in identifying opportunities and problems during R&D processes (Chen & Hsu, 2009) and in evaluating myopic reduction of R&D investments (Osma, 2008).

Some empirical findings show a positive effect of outside directors on R&D expenditures. Chen and Hsu (2009) find that independent directors significantly and positively affect the relationship between family ownership and R&D investment, supporting the hypothesis that independent outsiders may effectively supervise managers, provide independent suggestions, and favor access to resources.

Balsmeier et al. (2014) show that external executives with an appropriate competence in managing innovative programs at their home firm can provide valuable specific knowledge and expertise to the board of the appointing firm, increasing their innovation performance. In transcending a firm's boundaries by appointing outside directors, the firm's learning capabilities for innovation activity will be improved (Fried, Bruton, & Hisrich, 1998). The positive effect of independent directors on innovation performance is confirmed by Balsmeier et al. (2017) that show a positive relationship between independent boards and number of patents and future citations of patents.

Using a resource-dependence perspective (Pfeffer & Salancick, 1978), outside directors may use their network with external stakeholders to acquire financial resources from outside the firm and to reduce R&D risks resulting from financial constraints (Clarysse et al., 2007; Stearns & Mizruchi, 1993). Therefore, independent directors may constitute access to both human and financial resources that permit the firm to become more competitive and, therefore, more inclined to initiate complex and expensive R&D projects. In addition, the firm's relational capital in terms of networks with scientists and engineers may

be very precious and may expedite knowledge transfer (Westphal, Seidel, & Stewart, 2001) with regard to their relevant capabilities to organize innovative activities.

Through interlocking directorate ties, outside directors may establish valuable connections with stakeholders in the external environment (Kroll et al., 2008), from which firms may acquire competent and skilled professionals to support R&D by signaling the needs, opportunities, and difficulties in the industry and by sharing specific technologies (Chen & Huang, 2006). Chen (2014) finds empirical results that show that interlocking directorate ties positively and significantly influence R&D intensity. Focusing on interlocking directorates, Kang et al. (2018) support evidence that connections between outside directors and CEO positively influence firm's innovation performance.

Yet some studies do not support the conclusion of a positive relationship between outside directors and R&D investments.

Some empirical results highlight that there is a positive relationship between the percentage of inside directors on the board and R&D expenditures per employee (Baysinger et al., 1991), and that firms operating in R&D-intensive sectors show a higher fraction of inside directors with firm-specific competences and know-how on the board, which in turn positively influences firm value (Coles et al., 2008; Shaikh et al., 2018). In fact, taking into account the information asymmetry and asset specificity connected to R&D investment, non-management members of the board may have a lack of information and may not have adequate knowledge to evaluate the potential underlying a firm-specific asset, such as innovation investment (Baysinger et al., 1991), which requires specialized knowledge and expertise and whose potential returns is very difficult to evaluate. Therefore, in specific contexts, such as where conflicts between majority and minority owners can occur, the main role of outside directors will be to discipline R&D activities rather than to stimulate them (Yoo & Sung, 2015). More specifically, non-manager members of the board often serve to discipline the strategic decision of the controlling owner, such as avoiding the wealth transfer from minority to controlling shareholders, stopping the pressures from government officials, and regulating audacious investments of the founding family (Yoo & Song, 2015).

Finally, emerging empirical studies highlight that the relationship between board monitoring and R&D intensity is more complex than it would seem, and that it is characterized by a curvilinear relationship. Guldiken & Darendeli (2016) show that as board monitoring strengthens, R&D expenditures first rise and then decrease. In fact, a more vigilant control activity of the board disincentives top managers to share information with outside directors and, in turn, hinders the advice and counsel role for the board (Adams & Ferreira, 2007). Put differently, too intense control activity limits the resource provision role of the board (Clark, 2005; Pfeffer & Salancik, 1978). More specifically, when a board exerts too much control, top managers may refuse to undertake risky long-term investments—such as those in R&D—because they do not feel the support of directors, in terms of strategic advice (Adams & Ferreira, 2007; Faleye et al., 2011; Finkelstein, Hambrick, & Cannella, 2009). In addition, as board monitoring increases, directors assign more relevance to their monitoring duty, limiting their potential to provide useful information and resources to top managers on relevant firm issues (Pfeffer & Salancik, 1978). Accordingly, as directors exert their monitoring role too intensively, top managers tend not to share useful information with the board and, in turn, directors' resource provision role will be jeopardized. Generally speaking, directors rarely exert the roles of monitoring and resource provision simultaneously (Adams & Ferreira, 2007; Baldenius et al. 2014). Extended tenure of outside directorship influences firm's innovation potential as well. Jia (2017) finds that firms with outside directors enjoying lengthy tenure generate fewer patents and have lower research and development (R&D) productivity and exploration intensity. In fact, extended tenure might lead directors to befriend managers, reducing their monitoring activities. Recently,

Cummings & Knott (2018) find weaker innovation in companies run by outside CEO, probably because they may lack technological domain expertise adequate to effectively manage innovation.

CEO Duality

CEO duality refers to the situation of the CEO who simultaneously wears the hat of the chairperson of the board of directors. “CEO duality represents a fundamental element in the structural arrangement of a board” (Tuggle et al., 2010, p. 947).

There are two competing views about the effect of CEO duality on R&D investment. In fact, from an agency perspective, powerful CEOs may hinder or inhibit board involvement in strategic advice by hiding information and by administering the strategic agenda of board meetings (Kor, 2006). CEO duality may weaken the board’s role of monitoring and may entail conflicts of interest (Daily & Dalton, 1994; Goyal & Park, 2002). More specifically, the chairperson supervises the board activities and may control the quality and quantity of information flows to the board (Rutherford & Buchholtz, 2007), in order to create a strong dependence of outside directors on inside ones, and to limit board participation and contribution during the decision-making process regarding R&D investments (Lim, 2015; Ruigrok, Peck, & Keller, 2006). This condition may reduce the independence of the board and lead to a serious problem of firm’s performance (Duru et al., 2016; Aktas et al., 2018) and of underinvestment in R&D projects.

CEO duality may stimulate majority shareholders who control corporate resources and decisions to adopt opportunistic behaviors, expropriating minority shareholders, because the board cannot effectively exert its monitoring role. CEO duality may favor controlling owners’ objectives that may differ from those of the other shareholders, reducing the firm’s long-term competitiveness (Baliga, Moyer, & Rao, 1996).

CEO duality may amplify the risk of shareholders’ expropriation, implying reduced R&D expenditures. Therefore, splitting the chairperson and CEO roles would make the board’s monitoring activity more efficient and reduce managerial opportunism. Accordingly, a more independent board could more critically detect the CEO’s policies and practices (Dalton et al., 2008) and stimulate shareholder-focused strategic investment (Krause & Semadeni, 2013), such as greater R&D expenditures. A study by Chen and Hsu (2009) on a sample of 369 firms listed on the TSE and OTC between 2002 and 2007 highlights that the negative family ownership–R&D investment relationship becomes stronger when a firm’s CEO is the chairman, supporting the view that CEO duality encourages behaviors that harm minority shareholders and benefits the controlling owner.

Zona (2016) points out that a negative effect of CEO duality on R&D investment occurs at a later stage of CEO tenure, while at early stages CEO duality is associated with higher levels of R&D investments. In fact, early in CEO tenure, nonduality and CEO limited competence may imply conflict between the new CEO and a powerful incumbent chair. These conflicts limit a new CEO’s ability to succeed, and by raising perceived employment risk (Wiseman & Gomez-Mejia, 1998), they lead to reduced R&D expenditures.

The second view emphasizes the advantage of a CEO duality, such as unity of command within firms (Finkelstein & D’Aveni, 1994) and quicker strategic reaction times (Combs, Ketchen, Perryman, & Donahue, 2007). Supporting this view, Chen (2014) highlights that CEO power (comprising CEO duality, CEO ownership, director ownership, and the number of independent directors) positively and significantly influences the relationship between board capital and the level of R&D investment.

In fact, a powerful CEO may be able to appoint friends and very close individuals with whom a collaborative relationship may be more easily established. Those close relationships in turn stimulate a

CEO to question directors' strategic advice on relevant issues (Westphal, 1999). In addition, prestige, visibility, and perquisites deriving from board appointment make directors feel a social obligation toward the CEO (Daily & Johnson, 1997), who in turn encourages them to provide resources (Westphal, 1999). Recently, Kang et al. (2018) point out a positive relationship between CEO duality and firm's innovation performance. Confirming the influence of board of directors' attributes on firm's innovation performance, Abebe e Myint (2018) find a positive effect of CEO duality on the likelihood of business model innovation adoption, supporting the role of resource provision that boards play in stimulating organisational innovation.

Board Size

The number of board members (Lipton & Lorsch, 1992; Yermack, 1996) may have different impacts on innovation performance. On one hand, a greater number of directors should guarantee a wider set of competences, expertise, and information needed to fully evaluate R&D strategies (Haynes & Hillman, 2010; Zahra & Pearce, 1989). In order to effectively manage R&D programs, firms require knowledge, resources, and experience from experts and teams in diverse functions. Larger boards with a greater endowment of know-how and valuable resources (Goodstein et al., 1994) support organizations to effectively deal with high information-processing demands and develop more complete alternative solutions (Ruigrok et al., 2006), therefore increasing the quality of R&D strategies (Kang et al., 2018).

Yet a high number of directors could lead to some disadvantages, such as factionalization (Hackman, 2002), higher levels of cognitive conflicts, and difficulty in concealing divergent perspectives (Ruigrok et al., 2006). The conflicts hinder the reaching of a consensus on strategic decisions and may paralyze board activities and therefore the CEO decision-making relative to innovation projects. This is detrimental for R&D projects because such projects require timely initiation and speedy development. According to Jensen (1993), a larger board may lead to the free-rider syndrome, social loafing, and high costs of coordination.

Zona et al. (2009) and Chen (2012) point out that board size negatively affects R&D investments, supporting the hypothesis of the generation of conflicts and difficulty in reaching consensus as board size increases.

SOLUTIONS AND RECOMMENDATIONS

By examining the literature on ownership structure and R&D investment, some suggestions emerge. First, ownership concentration does not ensure the improvement of innovation strategies. In fact, while in a fragmented ownership structure the free-riding problem does not furnish adequate incentives to investors to strictly monitor the innovation strategies of top management, the presence of a large shareholder tends to solve problems connected to the lack of control activity, because of the relevant share of ownership held by the large block holder. Yet not every large shareholder promotes R&D strategies. While scholars emphasize that private equity and venture capital are beneficial to stimulate innovation strategies, the empirical literature points out that controlling family shareholders hinder R&D investment. Family members' risk aversion, agency conflicts between majority owner and minority shareholders, and asymmetric altruism between parents and children are factors that can negatively affect the innovation investments of family firms.

In order to stimulate family firms' R&D investment, and in turn, their long-term competitiveness, it is essential that they acknowledge the relevant role of technological innovation. Because R&D investments are complex and require managerial skills, it is important that when particular conditions permit defending their affective wealth (De Massis et al., 2012b), family members recruit nonfamily managers who can bring into the firm intangible assets, such as competences, knowledge, experience, and networking that is essential to evaluate the potential of innovation investments and to consciously undertake investment in R&D. Best practices are recommended to facilitate communication between family and nonfamily members.

Focusing on the effect of governing body on R&D expenditures, one of the main results emerging from the studies is related to the role of outside directors. On one hand, they are very useful because they bring to the board skills and resources essential to stimulate R&D investments; on the other hand, they provide monitoring activity that allows control for the R&D underinvestment problem. Yet while studies point out that monitoring activities on top managers should not be decreased, because an underinvestment problem may accordingly occur, it is worthwhile noting that firms should reduce the emphasis on excessive levels of board monitoring. So it is very important not only to focus on the independence standards of directors but also to take into account their firm-specific human capital (Guldiken & Darendeli, 2006).

Regarding the effect of CEO duality on R&D investments, the empirical literature shows divergent results. The lack of consensus in regard to the effect on innovation input of this attribute makes the debate still open. But it is important to note that the positive effect of CEO duality on R&D requires a high level of board capital, such as a high degree of directors' educational level, industry-specific experience, and social ties.

Finally, empirical findings display a negative relationship between R&D investment and the number of directors. Scholars point out disadvantages connected to a large board, such as factionalization, a high likelihood of cognitive conflicts, and the free-riding syndrome. On the other hand, boards with a low number of directors may suffer from a lack of competences, knowledge, and expertise essential to evaluate very complex projects, such as R&D investments.

LIMITATION AND FUTURE RESEARCH DIRECTIONS

The literature focusing on the relationship between corporate governance mechanisms and R&D investments shows some limits that induce reflection for future research. "Ownership represents a source of power that can be used to either support or oppose management depending on how it is concentrated and used" (Salancik & Pfeffer, 1978, p. 655). Because ownership structures may differ according to the institutional and legal context of the firm, studies shedding light on a certain country may not be generalized to the other context. Consequently, future studies should focus on samples that permit a comparison of the behaviors of firms operating in different institutional and legal settings, in order to take into account whether legal and institutional variables have an influence on R&D strategies.

In some cases, studies focus on a sample of firms operating in knowledge-intensive sectors. Scholars should clarify whether the relationship between R&D investments and some corporate governance variable is relevant only in certain sectors or may be expanded to other industries. Future empirical studies should highlight this issue.

Another relevant issue that deserves deeper study is represented by ownership structures with multiple large shareholders that theoretically may have different attitudes toward risk (e.g., family firms and

venture capitalists). In this situation, conflicts between different categories of shareholders may have a detrimental effect on R&D strategies.

CONCLUSIONS

In recent years the increasing integration of different geographical markets has led firms to invest in R&D in order to achieve an enduring competitive advantage. In fact, R&D investment is an essential input for firms aiming to generate intangible capital, constantly offer new products/services, or to adopt new processes, and therefore aiming to differentiate themselves from competitors. While scholars have widely investigated this issue using a managerial perspective, in the last two decades a strand of the literature has focused on the firm's propensity to undertake innovative investment, taking into account the divergences of preferences between shareholders and managers.

In fact, studies point out that managers may choose a suboptimal level of R&D in order to preserve their unemployment risk. The corporate governance literature emphasizes that large shareholders and boards of directors represent two mechanisms able to align the interests of management and shareholders. Within studies investigating the relationship between ownership structures and R&D investments, empirical studies show a positive effect for innovation inputs of venture capitalists and a negative relationship between R&D investment and family and bank ownership.

The effects of board attributes on innovation inputs are less clear. In fact, while board size negatively influences R&D investment, the relationship between the number of independent directors and R&D investment is characterized by an inverted U shape. Finally, the effect of CEO duality on R&D investment is still not clear, and, therefore, further research on this topic is required in order to shed light on the empirical results obtained.

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APPENDIX

Table 1. Relationships between board of directors' attributes and R&D investment

| Main findings | Theoretical framework | Examples |
|--|---|--|
| The relationship between outside directors and R&D investment is positive | Agency theory | Kor (2006); Balsmeier et al. (2014); Yoo & Sung (2015) |
| The relationship between outside directors and R&D investment is curvilinear (inverted U shaped) | Agency theory Resource dependence theory | Guldiken and Darendeli (2016) |
| The relationship between inside directors and R&D investment is positive | Not specified | Baysinger et al. (1991) |
| Ceo duality negatively influences R&D investment at a later stage of Ceo tenure and positively at early stages | Agency theory | Zona (2016) |
| Board size negatively affects R&D investments | Agency theory | Zona et al. (2009); Chen (2012) |

¹In the US literature, the term “venture capital” is restricted to the funding of small, young, and high-growth companies. With regard to the remaining stages of firms’ life cycle, authors use the term “private equity.” In Europe, venture capital refers to all private equity (Gompers & Lerner, 2001).

Chapter 9

Independent Directors' Tenure, Expropriation, Related Party Transactions, and Firm Value: The Role of Ownership Concentration in Malaysian Publicly Listed Corporations

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ABSTRACT

This chapter analyses the relationship between related party transactions (RPT) and firm value and whether independent directors' tenure (IDT) strengthens or weakens this relationship. Further, it examines ownership concentration's role on this moderating effect of IDT in Malaysian family and non-family corporations. It is found that that IDT weakens the relationship between RPT and firm value. However, ownership concentration strengthens this moderating effect of IDT. Interestingly, family corporations are more likely to show a stronger impact of ownership concentration which we allude to concerns of maintaining reputation. The research results remain after controlling for technology corporations. The findings' have important implications for policy makers, practitioners and regulators, especially in emerging economies globally. Keywords: Agency Conflict, Corporate Financial Valuation, Independent Directors' Term in the Office, Corporate Governance, Family Corporations, Emerging Markets

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INTRODUCTION

We build on prior corporate governance (CG) research to assess the role of ownership concentration on the moderating effect of independent directors' tenure (IDT) on the relationship between related party transactions (RPT) and firm value in an emerging market. The Malaysian institutional context provides an interesting case. Its equity market exhibits predominantly high ownership concentration (Claessens et.al., 2000). Generally, corporate Malaysia exhibits unique characteristics of ownership, namely, family, government-linked or state-owned, institutional and retail (widely held) (Ishak and Napier, 2006).

Extant CG literature generally focuses on the typical manager-shareholder agency problem known as Agency Problem Type I. This strand of research assumes that greater insider ownership enhances corporate governance (Morck and Yeung, 2003) because managers with high ownership in their corporations may be less inclined to take actions that reduce their equity value (Jensen and Meckling, 1976). Whilst this proposition is certainly relevant in most developed economies with diffused ownership (Morck and Yeung, 2003), its application in emerging markets with highly ownership concentration and mostly family-controlled (Morck and Yeung, 2003) has been questioned (Al-Bassam et.al., 2018). Such ownership structure in emerging markets with lack of effective external CG mechanisms culminate in conflict between controlling shareholders and minority shareholders or Agency Problem Type II (Morck et.al., 2005; Villalonga and Amit, 2006). These conflicts are evidenced by the occurrence of expropriation inflicted by the controlling shareholders (La Porta et.al., 2000; Faccio et.al., 2001; Mitton, 2002; Lemmon and Lins, 2003; Krishnamurti et.al., 2005). However, these studies do not explain empirically how expropriation occurs. We examine expropriation evidenced by RPT.

Increasingly, the issue of corporate directors' independence has received attention in the Malaysian CG reforms (SC, 2017). IDT may influence directors' independence and oversight role. Therefore, IDT is expected to influence corporate decision-making such as the decision to undertake RPT and hence, its relationship with firm value (Nor and Ismail, 2015). Whilst previous studies analysed the role of other internal CG mechanisms as moderating variables on the relationship between RPT and firm value, evidence on the role of independent directors' tenure is limited (Ahrens, Filatochev and Thomsen, 2011). The question remains as to whether the tenure of independent directors impacts expropriation (Jiang et.al 2010)¹.

This chapter contributes to the family business and CG literature in two ways: Firstly, it extends a relatively unexplored issue of expropriation via RPT and evidences whether the independent director's tenure plays a role in the relationship between RPT and firm value. Secondly, it highlights the relevance of the understanding of the institutional context to examine the role of ownership concentration.

The balance of this chapter is structured as such. Part two sets out the Malaysian institutional context. Part three discusses the extant literature, identifies the research gaps and develops the related hypotheses. Part four elaborates on the data, research method, the descriptive statistics, and issues with respect to endogeneity. Part five provides the results. The implications of the research findings are discussed in part six and finally part seven concludes.

Institutional Context of Malaysia: Legal Framework and Corporate Governance Development

The Malaysian Code of Corporate Governance (MCCG) established in 2000 was a response to the 1997 Asian financial crisis. Since then this code has undergone revisions in 2007, 2012 and 2016 (SC, 2007; SC,

2012; SC, 2016) to match with the Corporate Governance Blueprint 2011 (SC, 2011), aimed at enhancing the rights of equity holders, responsibility of institutional shareholders, proper board disclosure and its transparency, responsibility of significant stakeholders and the enforcement quality (ACGA, 2012). The MCCG 2012, outlined the procedures for the board of directors to practice good CG (SC, 2012). The MCCG 2016 introduced extra measures for board best practice, namely, extra process of approval for independent directors with tenure more than 9 years and the requirement for large corporations to have a minimum of 30% women as part of their board of directors (Foo, 2017).

Despite all these efforts, these codes failed to enhance CG practices as these codes are only optional to be adopted and implemented. Public-listed corporations are required to either adhere or to provide explanations on their non-compliance with the codes in their annual reports (SC, 2007, 2012; Wahab et.al., 2007). Given the voluntary nature of the codes, controlling shareholders possess the incentives to expropriate minority shareholders by not complying with the codes.

The World Bank assessed the codes of CG compliance in Malaysia since 2001 (World Bank, 2001, 2005 and 2012) and noted that Malaysia's institutional context poses challenges for CG reforms. High government-ownership, high ownership concentration of family groups, low accountability of directors, poor minority shareholders' protection, weak institutional investors' and weak shareholder activism have raised concerns (World Bank, 2005; World Bank, 2012). Arguably, this provides opportunities for expropriation in the corporate sector and one of the ways expropriation could occur is via RPT.

Furthermore, traditional family groups are still predominant in Malaysia. Approximately ten to twelve family groups control a range of corporations via a mix of direct and indirect ownership as well as shareholder agreements and approximately seventy percent of public-listed corporations in Malaysia are owned by families (Claessens, Djankov and Lang (2000). Historically, family corporations played a significant role in the Malaysian economy by contributing more than fifty percent of Malaysia's economic growth (Nguai, 2002). In these firms, no proper and major approval is needed for RPT, hence, investor protection is low (World Bank, 2012, p.3).

Incidentally, most Malaysian family corporations grew from small corporations to large conglomerates (Grant Thornton, 2002). Basically, family corporations performed better compared to non-family corporations (Ibrahim, 2009). Unfortunately, a corporate scandal i.e. the Transmile case² in 2007, involving the Kuok family group which held 18% ownership in Transmile, increased family corporations' visibility (The Star, 2010; The Edge, 2010). Given, the publicity attracted by this case and subsequent 2007 CG reforms, there is an opportunity to examine evidence of reputational effects in the context of the Malaysian political economy.

Hence, the following part discusses the previous literature on expropriation and hypotheses development.

REVIEW OF LITERATURE AND HYPOTHESES DEVELOPMENT

Expropriation, Related Party Transactions (RPT) and Firm Value

Expropriation and Firm Value

Expropriation and principal-principal agency conflicts are interrelated (Bjuggren et.al., 2011; Cascino et.al., 2010; Jiang et.al., 2010). The expropriation hypothesis by Shleifer and Vishny (1997) maintained that "as ownership exceeds a certain point, the large controlling shareholders gain approximately full

control and prefer to extract private benefits of control from their corporations which are not shared by minority shareholders” (p.759). A common proxy for expropriation is the difference between monetary rights and voting rights (via the use of dual-class shares, pyramiding, and crossholdings)(Claessens et.al., 2002; Lemmon and Lins, 2003; Utama and Utama, 2019). Such differences are linked to lower firm value, especially for family-control corporations as well as during periods of economic recessions (Lemmon and Lins, 2003; Aldamen et.al., 2019). However, it is likely that the degree to which ownership concentration is associated with expropriation depends on country-specific scenarios, such as banking quality, legal and judicial protection of individual shareholders, and the level of financial disclosure needed (Claessens et.al., 2002). Hence, more evidence on the institutional context and expropriation is required.

Other proxies for expropriation include: the level of dividends rewarded to shareholders (Faccio et.al., 2001; La Porta et.al., 2000); and the value of shares paid to acquire corporations; or from variations in corporate market valuations surrounding specific events³ (Jiang et.al., 2010). Ecchia et.al. (2012) extended the measurement of expropriation costs to the private benefits of control derived from exploitation of minority shareholders. However, in these studies, expropriation is only implied to exist and measured by proxies. Unfortunately, they provide scant evidence on how expropriation occurs.

Related Party Transactions

Increasingly, expropriation is proxied by incidence of related party transactions (RPT). RPT are varied and complicated business deals between a corporation and the employees (Gordon et.al., 2004). RPT which likely result in expropriation cover purchases of assets, sales of assets, sales of equity, business relationships and cash transactions to connected parties (Cheung et.al., 2006). Although the advantages of RPT encompass increased transaction efficiency (Pizzo, 2013), they can be detrimental to the corporation because it is perceived that controlling shareholders use them to extract benefits from their corporations through the tunneling process (Atanasov et.al., 2010; Johnson et.al., 2000; Lei and Song, 2011). In Malaysia, RPT commonly occur in public-listed corporations where ownership is highly concentrated (Nor and Ismail, 2015).

Generally, there is still much to be understood with respect to the monitoring role of CG mechanisms in resolving the agency conflict that can result in expropriation (Ntim et. al., 2019; Oehmichen, 2018).

Expropriation and CG Mechanisms

The CG mechanisms' role in mitigating expropriation has been investigated (Shan, 2013; Selcuk and Sener, 2018). Shan (2013) examined the direct- transfer (Type I tunneling) where the controlling shareholders transfer resources from the corporation for their own benefit. State ownership and the number of board of directors' meetings were found to be positively correlated with Type I tunneling, whereas the number of independent directors revealed a negative association. Utama and Utama (2019) examined the association between expropriation and board size and found that better oversight, represented by a larger board, is needed to reduce the risk of expropriation. Selcuk and Sener (2018) observed a significant positive relationship between tunneling and government ownership and a significant negative relationship between tunneling and foreign ownership. In addition, there is also a non-linear relationship between family ownership and tunneling. Like Utama and Utama (2019), they found that board size to be negatively associated with tunneling. Selcuk and Sener (2018) evidenced that independent directors do not stop the siphoning of corporate resources. However, older corporations with family chairman and

larger growth opportunities have higher likelihood to be involved in tunneling activities. On the contrary, firm size, cash balance, leverage and financial distress have no relationship with tunneling. Conversely, Grosman et al. (2019) evidenced that in Russia, the presence of independent directors is related to a lower expropriation by blockholders, and this is more pronounced in government-owned entities rather than private corporations.

Overall, there is still a huge avenue to examine the role of IDT in curbing expropriation in family corporations.

Independent Director's Tenure, Related Party Transactions and Firm Value

There are many aspects of director's tenure which have been investigated. Niu and Berberich (2015) found that companies with longer serving boards tend to encounter more problems in corporate governance. Dou et.al (2015) found that boards with directors' tenure exceeding 15 years possess better advisory and monitoring outcomes which is evidenced by the firms' lower CEO pay, higher CEO turnover-performance sensitivity and higher quality takeovers. Kim et.al (2014) found that tenure of independent directors has a positive relationship with the performance of board advisory (on the companies mergers and acquisition policies) and performance monitoring (on CEO pay). Huang and Hilary (2018) found an inverted U-shaped relationship between the tenure of independent directors and firm value as measured by Tobin's Q in which Tobin's Q is maximum when the tenure of the independent directors is 10 years. Although recent empirical evidences suggest that the advantages of longer tenure of independent directors exceed their disadvantages, we disagree with this conclusion. Negative consequences can arise if independent directors possess longer tenure. Patro et.al (2018) argued that in the short run, the longer the tenure of the independent directors, the higher their performance due to their attainment of specific knowledge and skills from the firm. However, in the long run, their performance decreases due to their loss of independence, consistent with the finding by Vafeas (2003) that longer serving independent directors' tend to possess closer relationship with the management and as a result, their independence is compromised.

In the context of the Malaysian corporate ownership structure where ownership is highly concentrated; longer serving independent directors on the board may result in the latter being entrenched. As independent directors serve longer on the board, their independence and their ability to monitor their firms are reduced (Hillman et.al., 2011). When independent directors serve longer, their relationship with the management become closer and as a result, their task functions which is to monitor the firm are compromised (Vafeas, 2003). As a result, the controlling shareholders may take this opportunity to influence the independent directors when the latter serve longer on the board (SC, 2011). If controlling shareholders can influence the IDT as the latter's tenure increases, the former may expropriate resources from the corporation without significant check and balances from the independent directors; hence, expropriating the minority shareholders (Vafeas, 2003). This can result in reduction of firm value.

Furthermore, in countries with high ownership corporate structure; controlling shareholders are significant decision-makers in the retention of their boards. Independent directors who are close to the controlling shareholder and the management tend to get re-elected (Bebchuk and Hamdani, 2017). As a result, independent directors possess the incentives to be close to the controlling shareholder and the management in order to get re-elected and consequently, they may fail in providing proper check and balances to the management (Bebchuk and Hamdani, 2017).

Overall, it is argued that the entrenchment effects due to independent directors serving long on the board are prevalent in emerging markets with high ownership concentration within the corporate struc-

tures such as Malaysia. It is also argued that these entrenchment effects is stronger in Malaysian family corporations compared to non-family corporations because family owners possess the incentives to exert higher influence on the independent directors as a result of their interest in extracting private benefits from their corporations which is detrimental to the interests of minority shareholders (Anderson and Reeb, 2003).

The negative effects of long tenure of independent directors could be reflected via higher expropriation through RPT by controlling shareholders. The political economy of Malaysia that is prone to rent seeking, provide large resources for controlling shareholders to expropriate via RPT (Searle, 1999); and the legal loopholes that encourage expropriation via these channels (Thillainathan, 1999) reflect the Malaysian institutional factors which provide incentives for expropriation via RPT by controlling shareholders. The detrimental effects of RPT are arguably more serious in family corporations which possess family members in management in comparison to non-family corporations. Plausibly family owners have the incentives to increase their family members' interests via related trading and loans as well as loan guarantees (Yeh et.al., 2012).

Evidence is scant with respect to the role of IDT on the relationship between expropriation and firm value. This is an avenue for research to increase the understanding of CG implications of high ownership particularly with respect to the impact of ownership concentration (Claessens, et.al., 2002; Al-Bassam et.al., 2018).

Based on the extant IDT and RPT literature as well as the institutional context in which corporations are operating, with poorer investor protection and lack of enforcement, it is likely that the longer the tenure of independent directors, the higher the incentives for expropriation via RPT by controlling shareholders in Malaysian family corporations.

Thus, the study's first two hypotheses are:

Hypothesis 1 (H_1): *There is a moderating effect of independent director's tenure on the relationship between related party transactions and firm value among Malaysian public-listed corporations.*

Hypothesis 2 (H_2): *The moderating effect of independent directors' tenure on the relationship between related party transactions and firm value among Malaysian public-listed corporations will be stronger in family corporations compared to non-family corporations.*

Ownership Concentration, Independent Directors' Tenure, Related Party Transactions and Firm Value

Ownership concentration has been linked to expropriation especially, in emerging markets (Bae et.al., 2012; Liu and Tian, 2012). Particularly, in Asia, there is a positive relationship between ownership concentration and firm value (Heugens et.al., 2009)(hence, it can be considered that ownership concentration can positively moderate the influence of IDT on the relationship between RPT and firm value. Given the emerging markets' institutional context, investors are compelled to exercise their monitoring role, which they can implement effectively only by possessing high ownership. High ownership incentivise them to be more involved in the management of their corporations, by exercising their concentrated voting rights to influence managerial decision-making (David et.al., 2007). As a result, controlling shareholders can align the company's interest to their own interests (Heugens et.al., 2009). High ownership results in high corporate control, thus, lowering Agency Problem Type I (the conflict between controlling shareholders and managers). This generates a positive relationship between ownership concentration and firm value.

As such, it is possible that the ownership concentration can positively moderate the influence of IDT on the relationship between RPT and firm value.

In the Malaysian institutional and CG environment, especially, after the 2007 Transmile corporate scandal, reputational concerns could potentially be a positive force in the moderating effects of family controlling shareholders' ownership on expropriation. These reputational influences exist especially in large family ownership (Feldman et. al., 2016). These family controlling shareholders would like to improve their reputational impact because low corporate reputation can have a negative impact on their family (Santiago et.al., 2019).

Reputational effects work as follows: As family ownership increases in their corporations, there is greater incentives to be mindful of their reputation in order to attract investors to trade their stocks (Dyer and Whetten, 2006), hence a reduction in minority shareholder expropriation. Thus, increased ownership aligns the family owners' interests to those of minority shareholders evidencing the reputational effects (Isakof and Weisskopf, 2015; Ma et.al., 2016; Santiago et.al., 2019). Consequently, increase in the controlling shareholders' ownership can reduce the negative effects of the impact of RPT on firm value.

Based on the above arguments, the following hypotheses are developed:

Hypothesis 3 (H_3): *There is a moderating effect of controlling shareholder's ownership on the moderating effect of independent directors' tenure on the relationship between related party transactions and firm value, among Malaysian public-listed corporations.*

Hypothesis 4 (H_4): *The moderating effect of controlling shareholder's ownership on the moderating effect of independent directors' tenure on the relationship between related party transactions and firm value among Malaysian public-listed corporations is stronger in family corporations compared to non-family corporations.*

DATA AND RESEARCH METHOD

Data: Sample Selection, Sources and Description

Data with respect to the types of controlling shareholders, finance and corporate directors for the period 2007-2009 is utilised. This is a period of global economic recession (Mishkin, 2013) and is selected because CG has the most significance during periods of economic crises (Johnson et.al., 2000). Addition-

Table 1. Sampling for Family Corporations: A Summary

| Description of Data | Quantity of Corporations |
|---|---------------------------------|
| Quantity of family corporations in the Malaysian stock exchange as of 31 st December, 2007 | 498 |
| Subtract: Family corporations in the financial industry | 48 |
| Subtract: Family corporations with incomplete or omitted data | 3 |
| Subtract: Family corporations with minimum twenty percent family ownership but management has no family ties. | 30 |
| Subtract: Family corporations with lower than twenty percent family ownership | 38 |
| Available no. of observations for family corporations | 379 |

Independent Directors' Tenure, Expropriation, Related Party Transactions, and Firm Value

ally, this period coincides with the after-effects of the Transmile case. The data is taken from corporate annual reports and the Bloomberg database.

We define family corporations as corporations which are individual or family-controlled with a minimum twenty percent voting rights (Chakrabarty, 2009)⁴ which include family members in corporate management. For family involvement, we consider minimum one member of the family holding a management position (Cascino et.al., 2010). Table one summarises the family corporations data set.

Table two display the derivation of the final figures for non-family corporations.

Table 2. Sampling for Non-Family Corporations: A Summary

| Description of Data | Quantity of Corporations |
|---|--------------------------|
| Quantity of non-family corporations in the Malaysian stock exchange as of 31 st December, 2007 | 223 |
| Subtract: Non-family corporations which provide financial services | 24 |
| Subtract: Non-family corporations with incomplete or omitted data | 6 |
| Subtract: Non-family corporations with lower than twenty percent controlling ownership by the largest owner | 42 |
| Available no. of observations for non-family corporations | 151 |

Variables Definition and Measurement

Table 3 summarises the definitions and measurement of variables.

RESEARCH MODEL

To test the hypotheses, Ordinary Least Square (OLS) and the Fixed Effects Method (FEM) panel data are utilized. The Fixed Effects Method (FEM) is used instead of the Random Effects Method (REM) because the random effects are correlated with one or more regressors (Gujarati et.al., 2017).

Instrumental variables are used for the regression in this research to control for reverse causality problems (Gujarati et.al., 2017). The panel data regression used in this research cover family corporations, non-family corporations and both family and non-family corporations. The following is the research model used:

Family Firm, Non-Family Firm as well as Combined Family and Non-Family Firm Research Model

$$Y_{it} = \beta_0 + \beta_1(RPT)_{it} + \beta_2(Tenure)_{it} + \beta_3(OC)_{it} + \beta_4(Tenure)_{it}(RPT)_{it} + \beta_5(OC)_{it}(Tenure)_{it}(RPT)_{it} + \sum_{i=2007}^{2009} \beta_i(Control\ Variables)_t + \Delta\eta_{it} + \Delta\mu_{it}$$

Independent Directors' Tenure, Expropriation, Related Party Transactions, and Firm Value

Table 3. Definitions and Measurement of Variables: A Summary

| No. | Regressand | Measurement |
|-----|---|---|
| 1 | Firm value First Proxy (Tobin's Q) | Tobin's Q is measured as such: (Total Market Value of Company + Liabilities) / (Total Asset + Liabilities)(Singh et.al., 2017). |
| 2 | Firm value Second Proxy (Market-to-Book Value)(MBV) | MBV is equity market value divided by equity book value (Detthamrong et.al., 2017). |
| 3 | Firm value Third Proxy (Return On Equity)(ROE) | ROE is measured by: Profit / Equity Value (Ibhagui and Olokoyo, 2018). |
| 4 | Firm value Fourth Proxy (Return On Asset)(ROA) | ROA is derived as such: Profit / Total Assets (Ibhagui and Olokoyo, 2018). |
| | Regressor | Description |
| 1 | Related party transactions (RPT) that are likely to result in expropriation | The amount of <i>RPT which are likely to result in expropriation</i> is used to measure RPT (Cheung et.al., 2006). This figure is divided by the total RPT value to obtain the ratio to be used. |
| 4 | Mean Independent Directors' Tenure (TENURE) | The tenure of independent directors is calculated by summing the tenure of each independent director of the corporation and divide it by the quantity of independent directors in order to obtain the mean figure (Huang and Hilary, 2018). |
| 5 | Ownership concentration (OC) | The data is obtained from the shareholding section in the annual report. It is calculated by total shareholding (%) of the controlling shareholder (Yasser and Mamun, 2017). |
| | Control Variables | Consistent with previous literature, twelve variables, are controlled, namely: (1) Firm Size (SIZE), (2) Firm risk (RISK) (3) Leverage (LEV) (4) Proportion of Independent Directors (IDR): IDR_{it} (5) Firm Age (AGE) (6) Non-affiliated Blockholders (NAB) (7) Sales Growth (SG) (8) Research expenditure-to-Sales (RS) (9) Capital Expenditure-to-Sales (CS) (10) Marketing Expenditure-to-Sales (MS) (11) Gross Domestic Product (GDP): GDP at year t (12) Firm Type (FT): Firm type dummy variable at year t, 1 for family corporations, 0 for non-family corporations. |

Y_{it} : Tobin's Q at year t, Market-to-Book Value (MBV) Ratio at year t, Return on Equity (ROE) at year t, Return on Asset (ROA) at year t.

RPT_{it} : The amount of *related party transactions (RPT) that are likely to result in expropriation* divided by Total RPT at year t

$TENURE_{it}$: Tenure of independent directors at year t

OC_{it} : Ownership concentration in the corporation at year t (%)

$(TENURE)_{it}(RPT)_{it}$: Tenure of independent directors at year t multiplied by the *amount of related party transactions (RPT) that are likely to result in expropriation* divided by total RPT at year t

$(TENURE)_{it}(RPT)_{it}(OC)_{it}$: Tenure of independent directors at year t multiplied by the amount of *RPT that are likely to result in expropriation* divided by total RPT at year t multiplied by ownership concentration in the corporation at year t (%)

Control Variables

SIZE_{it}: Natural Logarithm of Total Assets at year t

RISK_{it}: Firm Risk (Standard Deviation of monthly stock returns from 2007-2009) at year t

LEV_{it}: Leverage (Total Long-term Liabilities/Total Assets) at year t

IDR_{it}: Independent Directors Ratio (No. of independent directors/Board size) at year t

AGE_{it}: Firm age at year t

NAB_{it}: Non-affiliated blockholder's ownership at year t

SG_{it}: Sales Growth at year t

RS_{it}: Research expenditure-to-sales at year t

CAPEX_{it}: Capital expenditure-to-sales at year t

MS_{it}: Marketing expenditure-to-sales at year t

GDP_{it}: Gross Domestic Product at year t

FT_{it}: Firm type dummy variable at year t, 1 for family corporations, 0 for non-family corporations.

Error Terms

η_{it} : Unobserved heterogeneity (fixed effects) at year t

μ_{it} : Stochastic error term at year t

DESCRIPTIVE STATISTICS, ISSUES OF ENDOGENEITY AND RESEARCH RESULTS

Descriptive Statistics

Table 4 provides a summary of the variables for analyses.

Endogeneity Issues

Scientific studies with respect to the prediction of ownership concentration on firm value is highly likely to encounter endogeneity problems due to controlling shareholders' strong access to information. This benefit could possibly be obtained via their involvement in their corporations' management activities (Andres, 2008). Consequently, controlling shareholders can predict their corporations' future potential, which enables them to retain their shares when firm value is high and sell when it is low. Therefore, ownership concentration can be predicted by firm value (Andres, 2008). Thus, test for endogeneity using the Hausman Specification Test (Hausman, 1978) is performed. The results show that there is endogeneity between ownership concentration with Return on Equity (ROE) and Return on Asset (ROA) in family corporations as well as in all corporations. Furthermore, there is endogeneity between ownership concentration and Tobin's Q in non-family corporations.

To reduce this endogeneity problem drastically, we used an instrumental variable (IV) together with the Fixed Effect Method (FEM)(Chi, 2005; Evans et.al., 1993). Since, ownership concentration is determined by firm size and firm risk (Demsetz and Lehn, 1985), predicted value of ownership concentration

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Table 4. Descriptive Statistics For Family Corporations (F) and Non-Family Corporations (NF)

| | Mean | | Median | | Standard Deviation | | Maximum | | Minimum | |
|---|---------|------------|--------|------------|--------------------|------------|-----------|------------|----------|------------|
| | Family | Non-Family | Family | Non-Family | Family | Non-Family | Family | Non-Family | Family | Non-Family |
| Tobin's Q | 0.88 | 1.16 | 0.78 | 0.88 | 0.52 | 1.08 | 7.03 | 11.33 | 0.063 | 0.25 |
| ROE | 0.04 | 0.06 | 0.07 | 0.09 | 0.30 | 1.05 | 3.00 | 2.53 | -5.35 | -20.76 |
| ROA | 0.03 | 0.07 | 0.04 | 0.06 | 0.08 | 0.55 | 0.41 | 11.06 | -0.64 | -1.88 |
| Market-to-Book Value (MBV) | 0.80 | 1.33 | 0.58 | 0.75 | 1.07 | 2.80 | 16.30 | 34.88 | -0.40 | -2.40 |
| Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.33 | 0.15 | 0.18 | 0.00 | 0.35 | 0.29 | 1.00 | 0.99 | 0.00 | 0.00 |
| Mean Independent Directors' Tenure | 6.03 | 5.53 | 5.33 | 4.79 | 3.86 | 4.47 | 31.00 | 17.25 | 0.00 | 0.12 |
| Ownership Concentration | 42.14 | 46.07 | 41.18 | 48.41 | 13.31 | 15.95 | 99.16 | 89.62 | 20.18 | 2.10 |
| Predicted Ownership Concentration | 42.06 | 43.33 | 42.53 | 43.98 | 1.57 | 16.56 | 44.06 | 49.53 | 34.41 | 26.47 |
| Firm size | 19.64 | 20.15 | 19.50 | 19.89 | 1.20 | 1.41 | 24.50 | 24.99 | 16.95 | 16.31 |
| Ln(Firm Risk) | -2.28 | 0.29 | -2.33 | 0.16 | 0.97 | 0.36 | 1.26 | 2.75 | -5.34 | 0.01 |
| Leverage | 0.13 | 0.13 | 0.09 | 0.07 | 0.18 | 0.14 | 2.80 | 0.70 | 0.00 | 0.00 |
| Independent Directors Ratio | 0.42 | 0.43 | 0.40 | 0.40 | 0.11 | 0.12 | 0.83 | 0.83 | 0.18 | 0.14 |
| Non-affiliated Blockholders | 27.25 | 55.28 | 14.80 | 24.56 | 38.96 | 82.96 | 339.26 | 517.63 | 0.00 | 0.00 |
| Ln(Age) | 2.96 | 24.58 | 3.09 | 21.00 | 0.73 | 16.48 | 4.63 | 118.00 | 0.00 | 1.00 |
| Sales Growth | 14.4226 | 7.1040 | 6.4538 | 4.8082 | 93.2761 | 43.7810 | 2254.7070 | 418.1182 | -96.8719 | -87.1248 |
| Research Expenditure-to-Sales | 0.1445 | 0.0804 | 0.0000 | 0.0000 | 1.8187 | 0.4510 | 35.6826 | 5.9684 | 0.0000 | 0.0000 |
| Capital Expenditure-to-Sales | 9.2843 | 7.7666 | 3.6383 | 3.4241 | 27.2080 | 15.1208 | 561.4003 | 207.9674 | -37.0511 | 0.0000 |
| Marketing Expenditure-to-Sales | 2.3014 | 3.3794 | 0.4010 | 0.0000 | 4.0991 | 7.1290 | 62.0660 | 59.1911 | 0.0000 | 0.0000 |
| Gross Domestic Product | 3.2172 | 3.2172 | 4.8075 | 4.8075 | 3.5006 | 3.5006 | 6.4802 | 6.4802 | -1.6360 | -1.6360 |

is used as an instrumental variable. This is obtained by conducting a regression between the original ownership concentration values (dependent variables) against firm size, the square of firm size and firm risk (independent variables)(Himmelberg et. al., 1999). The Fixed Effect Method (FEM) is also able to reduce other types of endogeneity problems which may be present within the research model but not accounted for in this research (Chi, 2005).

RESEARCH RESULTS AND DISCUSSION

The regression results of the OLS and Fixed Effects regression for family corporations are shown in Tables 5 and 6 and for non-family corporations (Tables 7 and 8). For family corporations, it can be observed that mean IDT significantly increases firm value (ROE and ROA) at one percent significance level. However, when IDT moderates the relationship between RPT and firm value, the firm value (Tobin's Q and MBV) effects turns negative. This is significant at five percent and ten percent significance level respectively. In addition, when controlling shareholders' ownership moderates the moderating effect of IDT on the relationship between RPT and firm value, firm value (Tobin's Q and MBV) effects become positive. This is significant at five percent significance level.

For non-family corporations (Tables 7 and 8), it can be observed that mean independent directors' tenure significantly increases firm value (ROA) at five percent significance level. However, there is no

significant moderating effect of independent directors' tenure on the relationship between RPT and firm value. In addition, there is no significant moderating effect of controlling shareholders' ownership on the moderating effect of independent directors' tenure on the relationship between RPT and firm value.

In the combined regression (family and non-family corporations) results in Table 9 and Table 10, it can be observed that mean independent directors' tenure significantly increases firm value (ROE and ROA) at one percent significance level. However, when independent directors' tenure moderates the relationship between RPT and firm value, the firm value (Tobin's Q and MBV) effects turns negative. This is significant at one percent, five percent and ten percent significance level respectively. In addition, when controlling shareholders' ownership moderates the moderating effect of independent directors' tenure on the relationship between RPT and firm value, firm value (Tobin's Q and MBV) effects become positive. This is significant at five percent significance level. Furthermore, in these tables, family corporations have a lower firm value (Tobin's Q and MBV) compared to non-family corporations and this is significant at one percent significance level.

Robustness Check

To test the robustness of the research results, technology corporations are controlled in this research by excluding them. A corporation is defined as a technology corporation if one of its main assets is the technology used to develop new products or processes (Cordes et.al., 1999). Robustness test based upon the same regression techniques are performed using the same samples but excluding technology corporations. Technology corporations were excluded because they possess different characteristics as compared with other type of corporations in terms of faster rates of corporate growth, higher research expenditure and higher propensity to take risk (Grinstein and Goldman, 2006). Hence, their firm value may be different from other type of corporations. In addition, technology corporations with high ownership concentration are associated with higher firm value (Grosfeld, 2009); hence, their firm value is different from other type of corporations. Therefore, it is important to exclude technology corporations for robustness testing on both family and non-family corporations.

It is found that the effect of mean independent directors' tenure on firm value (ROE and ROA) and the moderating effect of independent directors' tenure on the relationship between RPT and firm value (Tobin's Q and MBV) are robust for the exclusion of technology corporations for family corporations and the combined (family and non-family corporations) regression. Additionally, the moderating effect of controlling shareholders' ownership on the moderating effect of independent directors' tenure on the relationship between RPT and firm value (Tobin's Q and MBV) are also robust after excluding technology corporations for family corporations and for the combined (family and non-family corporations) regression.

IMPLICATIONS AND DISCUSSION

Overall, we find that for the sampled Malaysian public-listed corporations; long tenure of independent directors enhances firm value. However, when independent directors' tenure increases, controlling shareholders of family corporations expropriate resources from the firm via RPT. This reduces firm value (Tobin's Q and MBV). Thus, hypothesis 1 is supported based upon market-based performance measures. This finding is relatively consistent with the findings by Bonini (2017) whereby longer tenure

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Table 5. Ordinary Least Squared Regression Results (Family Corporations)

| Predicted Directions | Regressors And Intercept (C) | Regressand | | Predicted Directions | Regressors And Intercept (C) | Regressand | |
|----------------------|---|-----------------------------|-----------------------------|----------------------|---|-----------------------------|-----------------------------|
| | | Tobin's Q | MBV | | | ROE | ROA |
| | | Coeff. (T-Statistics) | Coeff. (T-Statistics) | | | Coeff. (T-Statistics) | Coeff. (T-Statistics) |
| +/- | C | 2.356740*** (6.654477) | 1.733468*** (2.609692) | +/- | C | -1.167044*** (-3.734278) | -0.363105*** (-3.771543) |
| - | Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.108361 (1.549444) | 0.033401 (0.263129) | - | Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.066728 (1.611678) | 0.005412 (0.418007) |
| - | Mean Independent Directors' Tenure (TENURE) | -0.001064 (-0.182267) | -0.005492 (-0.513090) | - | Mean Independent Directors' Tenure (TENURE) | 0.014224*** (4.179997) | 0.003637*** (3.497784) |
| + | Ownership Concentration (OC) | -0.001239 (-0.786688) | -0.0000361 (-0.012065) | + | Predicted Ownership concentration (OCF) | 0.020519** (2.441371) | 0.006932*** (2.741820) |
| +/- | Firm Size (SIZE) | -0.061983*** (-3.509150) | -0.018563 (-0.555886) | +/- | Firm Size (SIZE) | 0.019981* (1.740751) | 0.007284** (2.132088) |
| + | Ln (Firm Risk) | 0.133048*** (9.191716) | 0.155029*** (6.141165) | + | Ln (Firm Risk) | 0.027364*** (2.746170) | 0.008491*** (2.880277) |
| +/- | Leverage (LEV) | 0.893030*** (13.61217) | 0.050956 (0.431866) | +/- | Leverage (LEV) | -0.058036 (-1.399729) | -0.050607*** (-3.894040) |
| +/- | Independent Directors Ratio (IDR) | -0.205126 (-1.534343) | -0.467109* (-1.916656) | +/- | Independent Directors Ratio (IDR) | -0.064675 (-0.829312) | -0.039628** (-1.657483) |
| + | Non-affiliated Blockholders (NAB) | -0.000931** (-2.124333) | -0.002879*** (-3.440588) | + | Non-affiliated Blockholders (NAB) | 0.0000253 (0.107870) | 0.0000721 (1.012987) |
| + | Ln (Age) | 0.015336 (0.495168) | -0.013135 (-0.195271) | + | Ln (Age) | -0.017090 (-1.276810) | -0.006804 (-1.508075) |
| + | Sales Growth (SG) | 0.000059 (0.557959) | 0.000266 (1.366435) | + | Sales Growth (SG) | 0.0000753 (0.962388) | 0.0000327* (1.771711) |
| + | Research Expenditure-to-Sales (RS) | 0.004848 (0.514097) | -0.005331 (-0.286978) | + | Research Expenditure-to-Sales (RS) | 0.000446 (0.092307) | 0.000696 (0.461773) |
| + | Capital Expenditure-to-Sales (CS) | 0.000256 (0.694777) | 0.000699 (1.126003) | + | Capital Expenditure-to-Sales (CS) | -0.000202 (-0.603209) | -0.000119 (-1.474662) |
| +/- | Marketing Expenditure-to-Sales (MS) | 0.002094 (0.701459) | 0.007303 (1.461418) | +/- | Marketing Expenditure-to-Sales (MS) | 0.000334 (0.155508) | -0.000650 (-1.039970) |
| +/- | Gross Domestic Product (GDP) | -0.002853 (-1.385421) | -0.004777 (-1.291038) | +/- | Gross Domestic Product (GDP) | 0.006294*** (3.105457) | 0.001304** (2.203831) |
| - | TENURE x RPT | -0.044899** (-2.093974) | -0.067736* (-1.762265) | - | TENURE x RPT | 0.089849 (0.874409) | 0.006247 (0.201354) |
| + | OC x TENURE x RPT | 0.000790** (2.033172) | 0.001576** (2.242064) | + | OC x TENURE x RPT | -0.002475 (-1.025964) | -0.000197 (-0.270582) |
| | N | 379 | 379 | | N | 379 | 379 |
| | R-Squared Adjusted Values (%) | 19.7398 | 0.044630 | | R-Squared Adjusted Values (%) | 5.4374 | 7.2849 |
| | F-Statistic | 18.46233 | 4.316726 | | F-Statistic | 5.082532 | 6.578707 |

* ten percent sig. level ** five percent sig. level *** one percent sig. level

Independent Directors' Tenure, Expropriation, Related Party Transactions, and Firm Value

Table 6. Fixed Effects Regression Results (Family Corporations)

| Predicted Directions | Regressors And Intercept (C) | Regressand | | Predicted Directions | Regressors And Intercept (C) | Regressand | |
|----------------------|---|-----------------------------|-----------------------------|----------------------|---|-----------------------------|-----------------------------|
| | | Tobin's Q | MBV | | | Tobin's Q | MBV |
| | | Coeff. (T-Statistics) | Coeff. (T-Statistics) | | | Coeff. (T-Statistics) | Coeff. (T-Statistics) |
| +/- | C | 2.356255*** (6.699908) | 1.635185** (2.479772) | +/- | C | -1.142150*** (-3.660726) | -0.359715*** (-3.739225) |
| - | Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.107943 (1.562808) | 0.030445 (0.244024) | - | Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.066371 (1.602599) | 0.005514 (0.425687) |
| - | Mean Independent Directors' Tenure (TENURE) | 0.000470 (0.080911) | -0.002615 (-0.246240) | - | Mean Independent Directors' Tenure (TENURE) | 0.014148*** (4.155833) | 0.003654*** (3.511200) |
| + | Ownership Concentration (OC) | -0.000929 (-0.593729) | 0.000497 (0.167480) | + | Predicted Ownership Concentration (OCF) | 0.020468** (2.434471) | 0.006944*** (2.745227) |
| +/- | Firm Size (SIZE) | -0.064113*** (-3.642234) | -0.016608 (-0.499395) | +/- | Firm Size (SIZE) | 0.020013* (1.743036) | 0.007282** (2.130886) |
| + | Ln (Firm Risk) | 0.130822*** (9.151609) | 0.152573*** (6.142452) | + | Ln (Firm Risk) | 0.027190*** (2.727855) | 0.008521** (2.888546) |
| +/- | Leverage (LEV) | 0.891477*** (13.79086) | 0.031006 (0.267988) | +/- | Leverage (LEV) | -0.057447 (-1.385125) | -0.050754*** (-3.903205) |
| +/- | Independent Directors Ratio (IDR) | -0.159651 (-1.202700) | -0.369136 (-1.530058) | +/- | Independent Directors Ratio (IDR) | -0.067376 (-0.863213) | -0.038974 (-1.627011) |
| + | Non-affiliated Blockholders (NAB) | -0.000859** (-1.978056) | -0.002741*** (-3.315263) | + | Non-affiliated Blockholders (NAB) | 0.0000205 (0.087190) | 0.0000731 (1.027173) |
| + | Ln (Age) | 0.021427 (0.691717) | 0.007987 (0.118707) | + | Ln (Age) | -0.017364 (-1.296653) | -0.006722 (-1.488411) |
| + | Sales Growth (SG) | 0.0000667 (0.649572) | 0.000250 (1.334147) | + | Sales Growth (SG) | 0.0000738 (0.943420) | 0.0000329* (1.779663) |
| + | Research Expenditure-to-Sales (RS) | 0.004114 (0.441071) | -0.007329 (-0.400449) | + | Research Expenditure-to-Sales (RS) | 0.000496 (0.102531) | 0.000688 (0.456331) |
| + | Capital Expenditure-to-Sales (CS) | 0.000263 (0.723150) | 0.000643 (1.051324) | + | Capital Expenditure-to-Sales (CS) | -0.000204 (-0.607791) | -0.000119 (-1.469688) |
| +/- | Marketing Expenditure-to-Sales (MS) | 0.002019 (0.681168) | 0.007338 (1.482007) | +/- | Marketing Expenditure-to-Sales (MS) | 0.000338 (0.157686) | -0.000651 (-1.040817) |
| - | TENURE x RPT | -0.043871** (-2.073690) | -0.069876* (-1.850897) | - | TENURE x RPT | 0.088738 (0.863343) | 0.006484 (0.208886) |
| | OC x TENURE x RPT | 0.000763** (1.988113) | 0.001598** (2.312875) | | OC x TENURE x RPT | -0.002447 (-1.014048) | -0.000203 (-0.278712) |
| | N | 379 | 379 | | N | 379 | 379 |
| | R-Squared Adjusted Values (%) | 22.1719 | 8.7394 | | R-Squared Adjusted Values (%) | 5.4439 | 7.2221 |
| | F-Statistic | 20.03697 | 7.399195 | | F-Statistic | 4.847258 | 6.201715 |

* ten percent sig. level ** five percent sig. level *** one percent sig. level

Independent Directors' Tenure, Expropriation, Related Party Transactions, and Firm Value

Table 7. Ordinary Least Squared Regression Results (Non-Family Corporations)

| Predicted Directions | Regressors And Intercept (C) | Regressand | | Predicted Directions | Regressors And Intercept (C) | Regressand | | |
|----------------------|---|----------------------------|----------------------|---|------------------------------|----------------------------|---------------------------|-----------------------|
| | | Tobin's Q | Predicted Directions | | | MBV | ROE | ROA |
| | | Coeff. (T-Statistics) | | | | Coeff. (T-Statistics) | Coeff. (T-Statistics) | Coeff. (T-Statistics) |
| +/- | C | 3.451611*** (4.299491) | +/- | C | 0.761595 (0.281967) | 0.146326 (0.366168) | -0.104923 (-0.585271) | |
| - | Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.326980 (1.262422) | - | Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.143940 (0.333444) | 0.018642 (0.141156) | 0.043567 (0.756835) | |
| - | Mean Independent Directors' Tenure (TENURE) | 0.021176 (1.570544) | - | Mean Independent Directors' Tenure (TENURE) | 0.040015 (1.642069) | 0.008791 (1.284742) | 0.005752** (2.005871) | |
| + | Predicted Ownership Concentration (OCF) | -0.039495** (-2.473128) | + | Ownership Concentration (OC) | 0.006674 (1.128221) | 0.001529 (1.110910) | 0.001577** (2.482511) | |
| + | Ln (Firm Risk) | 0.241587*** (5.362630) | +/- | Firm Size (SIZE) | 0.006953 (0.052464) | -0.000179 (-0.010046) | 0.006056 (0.741064) | |
| +/- | Leverage (LEV) | 0.350034 (0.981728) | + | Ln (Firm Risk) | 0.234018*** (3.757727) | 0.048203* (1.891526) | 0.018062* (1.697465) | |
| +/- | Independent Directors Ratio (IDR) | -0.698398** (-2.194295) | +/- | Leverage (LEV) | 1.515707*** (2.960755) | 0.121356 (0.708448) | -0.004265 (-0.058602) | |
| + | Non-affiliated Blockholders (NAB) | -0.000943* (-1.698326) | +/- | Independent Directors Ratio (IDR) | -0.499128 (-0.985377) | -0.107676 (-0.604666) | -0.098933 (-1.314408) | |
| + | Ln (Age) | 0.037712 (0.407584) | + | Non-affiliated Blockholders (NAB) | -0.001173 (-1.064908) | -0.000252 (-1.027668) | 0.0000251 (0.222860) | |
| + | Sales Growth (SG) | -0.000505 (-0.895102) | + | Ln (Age) | 0.159078 (0.564475) | -0.005532 (-0.172296) | -0.008598 (-0.604261) | |
| + | Research Expenditure-to-Sales (RS) | -0.070683 (-0.953836) | + | Sales Growth (SG) | -0.001011 (-1.434605) | 0.000310 (0.619708) | 0.000560*** (3.468092) | |
| + | Capital Expenditure-to-Sales (CS) | -0.000785 (-0.313816) | + | Research Expenditure-to-Sales (RS) | -0.010487 (-0.100281) | -0.008835 (-0.205539) | 0.024006 (1.598380) | |
| +/- | Marketing Expenditure-to-Sales (MS) | 0.007380 (0.890426) | + | Capital Expenditure-to-Sales (CS) | -0.001110 (-0.434580) | -0.001789 (-1.227546) | -0.000350 (-0.570299) | |
| +/- | Gross Domestic Product (GDP) | -0.004142 (-0.475453) | +/- | Marketing Expenditure-to-Sales (MS) | -0.008533 (-0.443696) | 0.003402 (1.135515) | 0.000915 (0.696327) | |
| - | RPT x TENURE | -0.138018 (-0.611622) | +/- | Gross Domestic Product (GDP) | 0.001955 (0.199478) | -0.017330** (-2.276729) | 0.000876 (0.365325) | |
| + | OCF x RPT x TENURE | 0.001667 (0.344147) | - | RPT x TENURE | -0.037406 (-0.358730) | -0.011786 (-0.419956) | -0.000501 (-0.038330) | |
| | | | + | OCF x RPT x TENURE | -0.000367 (-0.186849) | 0.0000476 (0.092756) | -0.0000988 (-0.426274) | |
| | N | 151 | | N | 151 | 151 | 151 | |
| | R-Squared Adjusted Values (%) | 5.5153 | | R-Squared Adjusted Values (%) | 3.0445 | 1.0797 | 4.7364 | |
| | F-Statistic | 2.75897 | | F-Statistic | 1.887071 | 1.308359 | 2.404559 | |

* ten percent sig. level ** five percent sig. level *** one percent sig. level

Independent Directors' Tenure, Expropriation, Related Party Transactions, and Firm Value

Table 8. Fixed Effects Regression Results (Non-Family Corporations)

| Predicted Directions | Regressors And Intercept (C) | Regressand | | Predicted Directions | Regressors And Intercept (C) | Regressand | | |
|----------------------|---|----------------------------|-----------------------|----------------------|---|---------------------------|--------------------------|---------------------------|
| | | Tobin's Q | Coeff. (T-Statistics) | | | MBV | ROE | ROA |
| | | Coeff. (T-Statistics) | | | | Coeff. (T-Statistics) | Coeff. (T-Statistics) | |
| +/- | C | 3.256181*** (4.148371) | | +/- | C | 0.230635 (0.085872) | 0.092455 (0.232457) | -0.079733 (-0.455058) |
| - | Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.280090 (1.125807) | | - | Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.108043 (0.256986) | 0.018586 (0.140566) | 0.044313 (0.783061) |
| - | Mean Independent Directors' Tenure (TENURE) | 0.018589 (1.442990) | | - | Mean Independent Directors' Tenure (TENURE) | 0.037610 (1.597651) | 0.008791 (1.283295) | 0.005831** (2.070048) |
| + | Predicted Ownership Concentration (OCF) | -0.036704** (-2.328761) | | + | Ownership Concentration (OC) | 0.007664 (1.325013) | 0.001530 (1.109885) | 0.001539** (2.461515) |
| + | Ln (Firm Risk) | 0.233253*** (5.472854) | | +/- | Firm Size (SIZE) | 0.015457 (0.117346) | -0.000178 (-0.009964) | 0.006628 (0.824334) |
| +/- | Leverage (LEV) | 0.361615 (1.049690) | | + | Ln (Firm Risk) | 0.235384*** (3.928215) | 0.048221* (1.890043) | 0.017464* (1.670825) |
| +/- | Independent Directors Ratio (IDR) | -0.723164** (-2.408124) | | +/- | Leverage (LEV) | 1.529960*** (3.066696) | 0.121338 (0.707522) | -0.011365 (-0.158842) |
| + | Non-affiliated Blockholders (NAB) | -0.000842 (-1.600296) | | +/- | Independent Directors Ratio (IDR) | -0.498236 (-1.024356) | -0.107654 (-0.603854) | -0.093090 (-1.258245) |
| + | Ln (Age) | 0.072139 (0.778874) | | + | Non-affiliated Blockholders (NAB) | -0.000994 (-0.937394) | -0.000252 (-1.025978) | 0.0000231 (0.208201) |
| + | Sales Growth (SG) | -0.000557 (-1.060449) | | + | Ln (Age) | 0.270250 (0.946746) | -0.005513 (-0.171490) | -0.009438 (-0.674894) |
| + | Research Expenditure-to-Sales (RS) | -0.047032 (-0.685624) | | + | Sales Growth (SG) | -0.000984 (-1.458476) | 0.000311 (0.619963) | 0.000569*** (3.579467) |
| + | Capital Expenditure-to-Sales (CS) | -0.001231 (-0.505167) | | + | Research Expenditure-to-Sales (RS) | 0.020278 (0.205556) | -0.008772 (-0.203824) | 0.026288* (1.778835) |
| +/- | Marketing Expenditure-to-Sales (MS) | 0.005816 (0.712983) | | + | Capital Expenditure-to-Sales (CS) | -0.001565 (-0.624687) | -0.001789 (-1.226357) | -0.000367 (-0.608790) |
| - | RPT x TENURE | -0.183984 (-0.837036) | | +/- | Marketing Expenditure-to-Sales (MS) | -0.011348 (-0.600044) | 0.003401 (1.133785) | 0.001012 (0.782509) |
| + | OCF x RPT x TENURE | 0.002726 (0.578229) | | - | RPT x TENURE | -0.051685 (-0.509557) | -0.011785 (-0.419436) | -0.000901 (-0.069897) |
| | N | 151 | | + | OCF x RPT x TENURE | -0.000067 (-0.035337) | 0.0000477 (0.092720) | -0.000086 (-0.376908) |
| | | | | | N | 151 | 151 | 151 |
| | R-Squared Adjusted Values (%) | 9.6642 | | | R-Squared Adjusted Values (%) | 6.2188 | 0.8538 | 5.5703 |
| | F-Statistic | 4.022216 | | | F-Statistic | 2.763117 | 1.228974 | 2.56842 |

* ten percent sig. level ** five percent sig. level *** one percent sig. level

Independent Directors' Tenure, Expropriation, Related Party Transactions, and Firm Value

Table 9. Ordinary Least Squared Regression Results (Family Corporations And Non-Family Corporations)

| Predicted Directions | Regressors And Intercept (C) | Regressand | | Predicted Directions | Regressors And Intercept (C) | Regressand | |
|----------------------|---|-----------------------------|-----------------------------|----------------------|---|----------------------------|-----------------------------|
| | | Tobin's Q | MBV | | | ROE | ROA |
| | | Coeff. (T-Statistics) | Coeff. (T-Statistics) | | | Coeff. (T-Statistics) | Coeff. (T-Statistics) |
| +/- | C | 3.206232*** (7.273038) | 1.788712** (2.002228) | +/- | C | -0.542929** (-1.895881) | -0.317241*** (-3.541479) |
| - | Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.187567** (2.203758) | 0.102417 (0.753604) | - | Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.035153 (0.574838) | 0.007795 (0.437673) |
| - | Mean Independent Directors' Tenure (TENURE) | 0.005091 (0.770331) | 0.002421 (0.213684) | - | Mean Independent Directors' Tenure (TENURE) | 0.015121*** (3.825619) | 0.004194*** (3.487641) |
| + | Ownership Concentration (OC) | -0.000695 (-0.421249) | 0.005132* (1.762548) | + | Predicted Ownership Concentration (OCF) | 0.021979** (2.325805) | 0.011219*** (3.716995) |
| +/- | Firm Size (SIZE) | -0.088949*** (-4.187642) | -0.013857 (-0.319138) | +/- | Firm Size (SIZE) | -0.011412 (-0.653423) | -0.004321 (-0.785035) |
| + | Ln (Firm Risk) | 0.146140*** (8.445923) | 0.159301*** (6.205446) | + | Ln (Firm Risk) | 0.045257*** (3.447117) | 0.010900*** (2.844987) |
| +/- | Leverage (LEV) | 0.834408*** (9.899284) | 0.207519 (1.610574) | +/- | Leverage (LEV) | -0.085841 (-1.237963) | -0.076414 (-4.013921) |
| +/- | Independent Directors Ratio (IDR) | -0.400619*** (-2.640364) | -0.402270 (-1.628892) | +/- | Independent Directors Ratio (IDR) | -0.167772* (-1.769891) | -0.059595** (-2.065346) |
| + | Non-affiliated Blockholders (NAB) | -0.000963*** (-2.753519) | -0.002088*** (-3.137225) | + | Non-affiliated Blockholders (NAB) | -0.000152 (-0.786533) | 0.0000134 (0.224029) |
| + | Ln (Age) | 0.024659 (0.679566) | 0.012036 (0.122635) | + | Ln (Age) | -0.011601 (-0.689376) | -0.008564 (-1.643812) |
| + | Sales Growth (SG) | 0.000026 (0.213292) | 0.0000985 (0.491367) | + | Sales Growth (SG) | 0.000132 (1.068241) | 0.000066** (2.235851) |
| + | Research Expenditure-to-Sales (RS) | -0.000483 (-0.039509) | -0.013240 (-0.534525) | + | Research Expenditure-to-Sales (RS) | 0.000872 (0.124095) | 0.002610 (1.203180) |
| + | Capital Expenditure-to-Sales (CS) | -0.000108 (-0.203435) | 0.000175 (0.249600) | + | Capital Expenditure-to-Sales (CS) | -0.000363 (-0.922860) | -0.0000338 (-0.276169) |
| +/- | Marketing Expenditure-to-Sales (MS) | 0.001983 (0.540152) | 0.001909 (0.338902) | +/- | Marketing Expenditure-to-Sales (MS) | 0.001633 (0.776393) | 0.000341 (0.514939) |
| +/- | Gross Domestic Product (GDP) | -0.002824 (-0.956453) | -0.003749 (-0.997447) | +/- | Gross Domestic Product (GDP) | 0.000474 (0.159912) | 0.001267 (1.529436) |
| - | RPT x TENURE | -0.074134*** (-3.050870) | -0.073483* (-1.911201) | - | RPT x TENURE | 0.066182 (0.755052) | 0.004917 (0.183790) |
| + | OC x RPT x TENURE | 0.001052** (2.422266) | 0.001426** (2.001900) | + | OC x RPT x TENURE | -0.001812 (-0.932314) | -0.000155 (-0.261758) |
| | Firm Type (FT) | -0.267249*** (-4.448257) | -0.525426*** (-3.598974) | | Firm Type (FT) | 0.006643 (0.247435) | 0.007084 (0.837098) |
| | N | 530 | 530 | | N | 530 | 530 |
| | R-Squared Adjusted Values (%) | 10.9716 | 4.0034 | | R-Squared Adjusted Values (%) | 3.5128 | 5.6432 |
| | F-Statistic | 12.51904 | 4.898061 | | F-Statistic | 4.402995 | 6.590157 |

* ten percent sig. level ** five percent sig. level *** one percent sig. level

Independent Directors' Tenure, Expropriation, Related Party Transactions, and Firm Value

Table 10. Fixed Effects Regression Results (Family Corporations And Non-Family Corporations)

| Predicted Directions | Regressors And Intercept (C) | Regressand | | Predicted Directions | Regressors And Intercept (C) | Regressand | |
|----------------------|---|-----------------------------|-----------------------------|----------------------|---|---------------------------|-----------------------------|
| | | Tobin's Q | MBV | | | ROE | ROA |
| | | Coeff. (T-Statistics) | Coeff. (T-Statistics) | | | Coeff. (T-Statistics) | Coeff. (T-Statistics) |
| +/- | C | 3.116730*** (7.171087) | 1.414022 (1.598545) | +/- | C | -0.544204* (-1.906127) | -0.307659*** (-3.451228) |
| - | Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.178374** (2.147154) | 0.099469 (0.752131) | - | Related Party Transactions That Are Likely To Result In Expropriation (RPT) | 0.035161 (0.574781) | 0.008095 (0.455089) |
| - | Mean Independent Directors' Tenure (TENURE) | 0.006001 (0.924835) | 0.004912 (0.442703) | - | Mean Independent Directors' Tenure (TENURE) | 0.015116*** (3.822901) | 0.004213*** (3.507636) |
| + | Ownership Concentration (OC) | -0.000141 (-0.086532) | 0.005918** (2.068823) | + | Predicted Ownership Concentration (OCF) | 0.021973** (2.324380) | 0.011293*** (3.746395) |
| +/- | Firm Size (SIZE) | -0.088341*** (-4.200377) | -0.007333 (-0.170350) | +/- | Firm Size (SIZE) | -0.011410 (-0.653065) | -0.004305 (-0.783297) |
| + | Ln (Firm Risk) | 0.143124*** (8.493934) | 0.158557*** (6.346899) | + | Ln (Firm Risk) | 0.045193*** (3.440866) | 0.010769*** (2.813898) |
| +/- | Leverage (LEV) | 0.825325*** (10.05541) | 0.180606 (1.441207) | +/- | Leverage (LEV) | -0.085698 (-1.235476) | -0.077526*** (-4.077121) |
| +/- | Independent Directors Ratio (IDR) | -0.358530** (-2.416670) | -0.305797 (-1.268568) | +/- | Independent Directors Ratio (IDR) | -0.168267* (-1.774340) | -0.058419** (-2.026966) |
| + | Non-affiliated Blockholders (NAB) | -0.000877** (-2.565388) | -0.001893*** (-2.919892) | + | Non-affiliated Blockholders (NAB) | -0.000153 (-0.788870) | 0.0000136 (0.227291) |
| + | Ln (Age) | 0.040782 (1.124941) | 0.089753 (0.910849) | + | Ln (Age) | -0.011677 (-0.693552) | -0.008626* (-1.657869) |
| + | Sales Growth (SG) | 0.0000338 (0.289053) | 0.0000976 (0.507708) | + | Sales Growth (SG) | 0.000131 (1.064355) | 0.0000659** (2.236745) |
| + | Research Expenditure-to-Sales (RS) | -0.001262 (-0.105624) | -0.015092 (-0.627382) | + | Research Expenditure-to-Sales (RS) | 0.000877 (0.124721) | 0.002648 (1.222420) |
| + | Capital Expenditure-to-Sales (CS) | -0.000097 (-0.187580) | 0.000106 (0.155424) | + | Capital Expenditure-to-Sales (CS) | -0.000363 (-0.922790) | -0.0000319 (-0.261400) |
| +/- | Marketing Expenditure-to-Sales (MS) | 0.001440 (0.397913) | 0.001426 (0.257569) | +/- | Marketing Expenditure-to-Sales (MS) | 0.001636 (0.777590) | 0.000352 (0.532579) |
| - | RPT x TENURE | -0.072895*** (-3.078359) | -0.079158** (-2.114499) | - | RPT x TENURE | 0.066023 (0.752986) | 0.004896 (0.183212) |
| + | OC x RPT x TENURE | 0.001026** (2.426230) | 0.001514** (2.185323) | + | OCF x RPT x TENURE | -0.001808 (-0.930027) | -0.000154 (-0.260706) |
| | Firm Type (FT) | -0.261004 (-4.360850) | -0.514402 (-3.526740) | | Firm Type (FT) | 0.006596 (0.245573) | 0.007096 (0.839683) |
| | N | 530 | 530 | | N | 530 | 530 |
| | R-Squared Adjusted Values (%) | 14.2441 | 8.4174 | | R-Squared Adjusted Values (%) | 3.4577 | 5.8077 |
| | F-Statistic | 15.66304 | 9.113703 | | F-Statistic | 4.161739 | 6.443001 |

* ten percent sig. level ** five percent sig. level *** one percent sig. level

of independent directors reduces firm value. In addition, the findings also show that expropriation via RPT due to long tenure of independent directors is stronger in Malaysian family corporations compared to non-family corporations. This means that the likelihood of family corporations in Malaysia to expropriate via RPT due to long tenure of independent directors is higher compared to non-family corporations. Hence, hypothesis 2 is supported but only for market-based performance measures. Furthermore, we find a significant positive moderating effect of controlling shareholders' ownership on the moderating effect of independent directors' tenure on the relationship between RPT and firm value within family corporations. However, these results are restricted to market-based performance measures only (i.e. Tobin's Q and MBV). Therefore, hypothesis 3 is supported but only for market-based performance measures of firm value. Furthermore, the results also show that the significant positive moderating effect of controlling shareholders' ownership on the moderating effect of independent directors' tenure on the relationship between RPT and firm value is stronger in family corporations compared to non-family corporations. Hence, hypothesis 4 is supported based upon market-based performance measures of firm value (Tobin's Q and MBV).

Interestingly, reputational concerns could have reduced expropriation via RPT in the presence of long tenured independent directors. This repudiates Peng and Jiang (2010)'s argument that reputational effects cannot overcome institutional deficiencies such as low protection of minority shareholder rights especially in developing countries. Our findings for the post Transmile and the global financial crisis period showed otherwise.

In addition, there are policy implications of the research findings. Notably, when the tenure of independent directors increases, family owners expropriate resources from the firm via RPT. Hence, long tenure of independent directors is not beneficial to Malaysian public-listed family firms. These findings support the recommendation in the MCCG 20125 which restricts the independent directors' tenure to a nine-year limit⁶. Additionally, we suggest the relevant authorities such as the SC monitor RPT disclosures particularly, by family controlling shareholders to deter expropriation of corporate resources.

CONCLUSION

Generally, this study evidences that expropriation via RPT is exacerbated by the duration of independent directors' tenure within Malaysian family corporations. This suggests that expropriation via RPT in the presence of long-tenured independent directors is higher in Malaysian family corporations compared to non-family corporations.

Conversely, the significant positive moderating effect of high family ownership on the moderating effect of independent directors' tenure on the relationship between RPT and firm value in Malaysian family corporations suggests that family corporate reputational effects lowers minority shareholder expropriation within these corporations. This expand our understanding of agency conflict and its solutions by showing that corporate reputational effect may lower minority shareholder expropriation in family corporations during periods of financial crisis (consistent with Feldman et.al., 2018 who found family corporations pursue multiple objectives beyond profit maximisation). This significant positive moderating effect also disputes the argument by Peng and Jiang (2010) that reputational effects cannot overcome institutional deficiencies in emerging markets to improve corporate governance. Overall, the study broadly supports findings from South Africa by Ntim et.al. (2019) who found pay for performance sensitivity is higher in corporations with more founding CEOs as well as CEOs with higher ownership

and reputation. Hence, these findings show that higher ownership and reputation results in less expropriation among South African firms.

There are some limitations of this research. This study only analysed public-listed corporations for which data was available. Additionally, the analysis could compare the different categories of non-family corporations.

Lastly, future research could consider analysing the influence of new regulations and the quality of their enforcement on minority shareholder expropriation especially in emerging markets.

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ENDNOTES

- ¹ Evidence on expropriation as a result of long independent directors' tenure are difficult to obtain due to the possible difficulties in obtaining these data.
- ² In the Transmile case (2007), there was falsification of financial statement's revenue (SC, 2011). This negatively affected the corporate reputation of family corporations in this country as Transmile was part of the Kuok family group during that time and they are one of the largest family conglomerates in Malaysia.
- ³ Also known as event studies.
- ⁴ The twenty percent criteria are used as the majority (seventy six percent) of family corporations' controlling shareholders in the Malaysian stock market own a minimum twenty percent ownership⁵ Part 3, Para.3.3.
- ⁶ Malaysian Code of Corporate Governance (MCCG) 2017 extends this to 12 years.

Chapter 10

Corporate Governance and Firm Performance in an Emerging Market: The Case of Malaysian Firms

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ABSTRACT

This study examines the corporate governance mechanisms and how they affect firm performance in Malaysia. After the financial crisis in 1997/98, the CG issues have been the most debated, discussed, and researched in the attempt to improve the CG structure accommodating every economy regardless of the economic landscapes. Using a rich and huge data on Malaysian firms for 16 observation years, this study found that the MCCG has been of a closely referred blueprint by firms in Malaysia to improve firms' performance. Certain CG mechanisms do have significant impact on firm performance. Firms seem to operate in a large board size indicating a positive relationship with performance and board independence. CEO duality is negatively related, in support of separation of roles, complementing the result of board independence and ownership structure as positively related to performance. Agency theory seems to be the dominant theory influencing the CG structure of firms in Malaysia.

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INTRODUCTION

Literature has been documenting evidences that effective corporate governance (CG) structure has eminent influence in improving firm performance in both developed as well as emerging economies (CG Watch Report, 2018; Zhou et al., 2018; Al-ahdal et al., 2020). Nevertheless, the liaison between CG and firm performance has never been conclusive for different nature of relationship between the two has been evidenced, due to different CG structure being practiced depending on the institutional differences of each country being examined (Rouf et al., 2010; AlQadasi and Abidin, 2018; Nomran and Haron, 2019). Different social, economic, market behaviour and regulatory conditions of each country do at some point result in differing CG structures being practiced, thus it is imperative to study and understand the relationship between CG and performance to ensure maximum performance of firm as different firm operating in a different setting may need different CG structure (Black et al., 2014; Hussain et al., 2018).

The inconclusive empirical evidences on the relationship between CG structure and firms' performance imply that there is no one fit all CG structure, thus creates gaps in the literature (Zhou et al., 2018; Uribe-Bohorquez et al., 2018). Although enormous studies have been done on the relationship between CG structure and firm performance in Malaysia, majority of the studies used a shorter study period of maximum five years with quite a limited number of observations. Hence, this study sets forth with the objectives to examine the relationship between CG structure and firm performance, using a rich, huge and recent data of 742 firms in Malaysia within a wide study period of 16 years (2000 to 2015) and characterize certain CG mechanism in this relationship without neglecting the endogeneity issues that may arise en-route the analyses and deal with the issue by employing the General Method of Moments (GMM) in the methodology. To ensure the robustness of the findings, this study employs various performance measurements to measure firm performance (ROA, ROE and Tobin's Q) and to meet its objective, four CG mechanisms are incorporated in this study, which are board-independence, board size, CEO duality and ownership concentration besides controlling for some firm level determinants like firm size, growth, age of firm and leverage. These CG mechanisms are common variables used by researchers in the studies of CG and are generally accepted in the literature. Ownership concentration in particular, is interestingly unique to emerging market such as Malaysia where highly concentrated ownership is evidently prominent (see, for examples; Ting et al., 2017, AlQadasi and Abidin, 2018; Haron, 2018) and ownership structure is the imperative determinant of CG in Southeast Asia (Lukviarman and Johan, 2018). The average ownership concentration for Malaysian listed firms in fact stood at 61.67%, much higher compared to the average of 54.19% for other 38 countries (including Malaysia) for the period 2006-2009 (Moshirian et al., 2014). Hence, such investigation is crucially important in addressing the issue of inconclusiveness reported in the body of knowledge and will enrich the existing literature especially on emerging market (Liu et al., 2015; Zhou et al., 2018) for research on the influence of corporate governance practices and firm performance in emerging market is still lacking (Zhou et al., 2018).

When discussing the relationships between CG mechanisms and firm performance, Sanda et al. (2005) propose four theories that primarily govern these relationships which are the agency theory, the stewardship theory, the stakeholder theory and the resource dependency theory. These four theories basically emphasize on the role of board of directors in improving firm performance. Agency theory which mainly concerns with agency issues regards board as necessary, economical yet effective monitoring tool over opportunist managers (Fama and Jensen, 1983; Jensen and Meckling, 1976). Contrasting to that, the stewardship theory sees managers as a dependable and reliable agent thus according to Donaldson and Davis (1991) will not need the board to monitor or supervise. The stakeholder theory as

argued by Freeman (1984) on the other hand, acknowledges the board as stakeholders' representative who will deal with their interests in the firm while the resource dependency theory looks at the board as information resources and function as a linkage to outside information for long term plan of the firm (Zhou et al., 2018).

Malaysia, an emerging economy in the Southeast Asia (SEA) region, is one of the most open economies in the world, with a trade to GDP ratio averaging over 130 percent since 2010. Openness to trade and investment have been instrumental in employment creation and income growth, with about 40 percent of jobs in Malaysia linked to export activities. After the Asian financial crisis of 1997-1998, Malaysia's economy has been on an upward trajectory, averaging growth of 5.4 percent since 2010, and is expected to achieve its transition from an upper middle-income economy to a high-income economy by 2024 (World Bank, 2019). Malaysian stock exchange (Bursa Malaysia) is the biggest in SEA region in term of number of companies listing with almost 1000 companies listed. Equity Initial Public Offerings (IPOs) has shown increasing trend over the years reflecting increasing capital raising exercise from equities by firms through the local equity market (OECD, 2018). Acknowledging this experience, Malaysian capital market regulator (Securities Commission – SC) has put more efforts in enhancing the CG framework and facilitating stakeholders including boards, management, shareholders and the investment community in driving CG excellence (SC, 2019).

With the continuous efforts undertaken by the SC to enhance the local CG framework, since the last revision of the Malaysian Code of Corporate Governance (MCCG) in April 2017, there has been noticeable progress in this area in the country. In 2018, Malaysia rose to fourth place in the CG Watch Report, a report from the Asia Corporate Governance Association, up from seventh place (CG Watch Report, 2018). Despite this improvement, Malaysia is currently facing a trust deficit that is cutting across both public and private sectors, as remarked by Zarinah Anwar, Chairman of the Institute of Corporate Directors Malaysia (ICDM) (The Edge, 2019). This trust deficit according to her is due to the abuse of trust and has to be rectified through good CG, particularly at the boardroom level. Built on a foundation of transparency, accountability and trust, good CG practices are fundamental to a company's success, enabling access to capital, mitigation of risks and safeguarding against mismanagement. Therefore, she argued that good CG must start at the boardroom, as it is the nerve centre of any company or entity. The board has the responsibility to ensure that there is no disconnection between governance and strategy on the long-term sustainability of the business. While the law provides board regulations on what not do, she proposed more measures need to be done to nurture an encouraging culture in order to prosper further. ICDM, through its conferences such as the International Directors Summit 2019 (IDS) is aiming to instigate more changes in corporate Malaysia. It begins with discussions and brainstorming sessions on potential practices that can set a better foundation for firms to reduce their trust deficit and reach equilibrium, particularly in an environment that is volatile, uncertain, untrusting, unfair, complicated and ambiguous (The Edge, 2019). Therefore, Malaysia, having experienced the opposite direction of CG practice i.e. considerable progress in CG due to strong capital market regulator (CG Watch Report, 2018) while at the same time, facing trust deficit that is cutting across both public and private sectors (The Edge, 2019), is a unique country among the emerging market thus offers a perfect setting to study CG practice and its effect on firm performance. This unique setting of Malaysia compared to other countries in the emerging market coupled by the conflicting results documented in the literature plus the lack of research on the association between corporate governance practices and firm performance in emerging market are the main motivators to embark into this study. The findings are expected to contribute new

insights on the CG practice of firms in emerging market and its implication to corporate finance and business practices.

For the purpose of this study, the structure will proceed as follows. The next section briefly describes the CG practice in Malaysia, reviews related literature and then proceeds to hypotheses development. The data and methodology employed are presented and explained in section three and follows by results and discussions in section four. Section five concludes the study with some limitations of the study and recommendation for future research are put forth.

LITERATURE REVIEW

Corporate Governance in Malaysia

Corporate governance is a principle or mechanism that acts as a disciplinary tool to a firm or organization, a framework to control and protect the interest of relevant players in the market like shareholders, managers, executive management and also board of directors (Rouf et al., 2010; Shamsudin et al., 2018; Das, 2019). The world has witnessed the manifestation of poor CG structures and mismanagement during several financial crises especially the 1997/98 financial crisis where the Southeast Asian region was badly hit by the turmoil with thousands of firms collapsed (Shamsudin et al., 2018). CG issues have then become the most debated, discussed and researched about among all players in the field as to what attributes to an effective CG structure and how it can improve firm performance (Black et al., 2014; Das, 2019). Good CG will develop firm's brand name, lead to more competitive markets and firms and improve the confidence of the stakeholder and investors (CG Watch Report, 2018). The investors perceived that firms with good CG appear to have higher performance and better credibility (Nomran and Haron, 2019). Consequently, good CG will protect the shareholders' right, enhancing corporate transparency and ensuring a greater closure of financial and non-financial information (Black et al., 2015). The results from many empirical studies are consistent with the argument that well-governed firm have high performance (Shamsudin et al., 2018; Das, 2019; Al-ahdal et al., 2020).

Acknowledging the importance of CG structure to a firm regardless of where it is operating, all countries globally have devised their own sets of CG guidelines according to their social, economic and political as well as religion needs for that matter to ensure a level battle field for everyone and simultaneously protect the right and interest of all stakeholders (Black et al., 2015; Hussain et al., 2018; Al-ahdal et al., 2020). Malaysia, being an emerging country situated in the SEA region was also a victim to the shock in 1997/98 (Shamsudin et al., 2018; Nomran and Haron, 2019). In 2000, the Securities Commission (SC) of Malaysia took the initiative to set up a Malaysian Code on Corporate Governance (MCCG) to encourage promising overhaul to the overall CG practices in Malaysia post the financial crisis. In 2007, the MCCG was revised where emphasis was given to strengthen the roles and responsibilities of board of directors (BOD), audit committee and the internal audit function following best practices worldwide. Keeping the MCCG parallel with the current practices, the MCCG was again reviewed and revised in 2012, highlighting the issue of board structure and composition with an imposition on compliance with the latest MCCG guidelines.

Very recently in 2017, another revision of MCCG has taken place stressing further the importance of board of directors in ensuring maximum performance of a firm. It is required in the MCCG 2017 that 50% of the total number of board members in the board of directors should consist of outside directors or

independent directors. For large companies, it is required that the majority of the board are independent directors (MCCG, 2017). It is also required that the positions of CEO and chairman be held by different individuals. Separation of roles between chairman and CEO promotes accountability and should be responsible in each tasks and duties. “In this regard, no one individual can influence board’s discussions and decision-making. The responsibilities of the chairman should include leading the board in its collective oversight of management, while the CEO focuses on the business and day-to-day management of the company and this division of role should be clearly defined in the board agreement” (MCCG, 2017 pp. 16). Firms with the BOD are encouraged to adopt best practices and strategies to improve and enhance competency.

According to Abdullah (2004) and Ibrahim et al. (2018), the CG model in Malaysia adopts the Anglo-American approach with the concept closely based on the agency perspective that is the relationship between shareholders and managers. In this CG system, the BOD is the highest governing level in a firm, acting as a monitoring mechanism over the management. This is very much reflected in the recently revised MCCG in 2017 where the functions of BOD are very much emphasized. According to the agency theory, managers are opportunists thus are more inclined to act on their own interest (Jensen and Meckling, 1976). This opportunistic attitude will trigger conflicts between managers and shareholders and may consequently affect firm performance. Shareholders hire managers to run the operation of the firm. This in turn has allowed managers to access to inside information of the firm thus obtain much more information comparative to the owner or shareholders. Due to this, an information asymmetry occurs that could provide opportunity to the managers to expropriate wealth at the expense of the shareholders (Jensen and Meckling, 1976; Nomran and Haron, 2019). Hence, agency theory puts forward that the CG structure can act as a mechanism to monitor managers’ acts and functions as well as to align both the management and the shareholders goals (Hussain et al., 2018; Zhou et al., 2018; Uribe-Bohorquez et al., 2018).

Literature Review on Corporate Governance and Firm Performance

Since the MCCG is primarily based on agency relationship, the importance of BOD as a monitoring tool is very much accentuated. Many studies have been done on Malaysian firms regarding the relationship between the CG structure and firm performance. Nevertheless, mixed and conflicting results are evidenced in the literature, making it even more interesting to investigate further. CEO duality records mixed relationship with firm performance in Malaysia. CEO duality appears to have significant influence on firm performance (Rahman and Haniffa, 2005; Shawtari et al., 2017; Shamsudin et al., 2018). According to Rahman and Haniffa, separation of roles in a board improves firm performance significantly as monitoring activities are carried out efficiently without the existence of CEO duality.

In support of board independence, significant positive relationship is found in Ramdani and Witeloostuijn (2010), Ibrahim and Samad (2011) and Shamsudin et al. (2018). However, Shukeri et al. (2012) and Taghizadeh and Saremi (2013) provide evidences of negative relationship between board independence and firm performance. Board size also records inconsistent results on Malaysian firms when Leng (2004) finds a significant influence of board size on Malaysian firm performance, whereas Ghazali (2010) cannot provide evidence of significant relationship between the two. A study done by Ponnu (2008) after the implementation of MCCG 2000, finds no significant relationship between CG structure and firm performance. However, Che Haat et al. (2008) come out with significant evidence that 142 Malaysian firms understudy have benefited tremendously from the MCCG implementation. This

is supported further by Shamsudin et al. (2018) on their study based on sample of top 100 Malaysian firms for the period from 2012 to 2014.

Corporate Governance Mechanism and Hypotheses Development

To meet the objective of this study, four CG mechanisms are incorporated which are size of the board, board independence, CEO duality and ownership structure. These CG mechanisms are common variables used by researchers in the studies of CG and are generally accepted in the literature. Ownership concentration in particular, is interestingly unique to emerging market such as Malaysia where highly concentrated ownership is evidently prominent (Lukviarman and Johan, 2018). The mean ownership concentration for Malaysian listed firms is found to be much higher at 64.2% compared to the mean of 54.3% for 38 countries (including Malaysia) for the period 2006-2009 (Moshirian et al., 2014). This study incorporates four control firm level determinants that are firm size, leverage, growth and age of firm.

Board Size

It has been argued that the effectiveness of a firm management relies on the size of the board. Several studies document positive relationship between board size and firm performance. Larger board size can elicit more ideas for a more collective and resourceful decision making and can also enhance monitoring activities hence a better firm performance (see for examples; Haniffa and Hudaib 2006; Haron, 2018; Uribe-Bohorquez et al., 2018). Chugh et al. (2011) and Sun et al. (2014) share the same positive relationship with firm performance as well. However, there are arguments against larger board size where there may be miscommunication among bigger member size in the board thus hinders quick and urgent decision making. This may affect the performance of the firm, indicating a negative relationship (Garcia-Ramos and Garcia-Olalla, 2011). Drakos and Bekiris (2010), Turki and Sedrine (2012) and Kao et al. (2019) also record an inversed relationship with firm performance. Therefore, based on the mixed results between board size and firm performance, the hypothesis is:

Hypothesis One: A significant relationship is expected between board size and firm performance.

Board Independence

Bursa Malaysia (the stock exchange) listing requirements states that under Practice Note 13, No. 1.1 defines independent directors as a director who is independent from management and free from any business or other relationship which could interfere with the exercise of independent judgment or the ability to act in the best interest of the firm. Managers according to the stewardship theory are responsible and reliable and will not incline to misconduct, thus do not need independent directors to supervise. Donaldson and Davis (1991) believe that these managers will not act at their own self-interest and are able to improve the performance of the firm to the maximum. This indicates a negative relationship between board independent and firm performance. Judge et al. (2003), Bhagat and Bolton (2008) and Zhou et al. (2018) support this negative relationship. In relation to this, according to Shakir (2008) on his studies on Malaysian property firms, when independent board posed questions on the firm's operation during board meetings, executive board members are expected to provide them with satisfactory explanations. Independent board also plays important role in monitoring the CEO. If independent board is ineffective in their monitoring role and unable to alleviate information asymmetries, this may decrease the CG

structure of the firm, and eventually lead to weak firm performance. However, Jensen and Meckling (1976) on the other hand, state that according to the agency theory, managers are opportunists and this opportunistic behaviour may divert managers' attention to their own self-interest only. Independent board can effectively monitor and supervise managers to align their interests with the shareholders in order to achieve maximum performance. Fama and Jensen (1983), Arslan et al. (2010) and Shamsudin et al. (2018) also believe that the execution of functions among the board will be more effective due to their independency and monitoring thus consequently leads to higher firm performance, a positive relationship. O'Connell and Cramer (2010), Terjesen et al. (2016) and Uribe-Bohorquez et al. (2018) record a positive relationship between independent board and firm performance too. The MCCG too encourages independent board and requires 50% of the board be consisted of independent directors (MCCG, 2017). Based on the mixed results, the hypothesis is, therefore,

Hypothesis Two: A significant relationship is anticipated between board independence and firm performance.

CEO Duality

CEO duality and its impact on firm performance has become one of the most contentious issues in both the academia and business (Duru et al., 2016). From the agency theory perspective, CEO duality may create agency problem as there would be conflict of interest when the same person holds the CEO position and the chairman as well (Fama and Jensen, 1983; Yammeesri and Herath, 2010; Duru et al., 2016; Shawtari et al., 2017). This indicates a negative relationship with firm performance. It is worth to note that the very recently revised MCCG 2017 has stated in its blueprint that the positions of the CEO and the chairman should be held by different persons. In other words, as discussed earlier, the MCCG 2017 highly recommended the separation of roles as to avoid agency conflicts and no one individual can influence board's discussions and decision making (MCCG, 2017). Nevertheless, the stewardship theory and resource dependence theory asserts that duality promotes more focused and flexible leadership which facilitate organizational effectiveness in a potentially dynamic business environment (Duru et al., 2016). CEO duality can eliminate bureaucracy in decision making hence better firm performance, a positive relationship. Evidently, family firms, according to Saidat et al. (2019) will support CEO duality to ensure power concentration within the family and improves the performance. Klein (2002), Sanda et al. (2005), Ramdani and Witteloostuijn (2010), Ibrahim and Samad (2011) and Saidat et al. (2019) report a positive relationship between CEO duality and performance of a firm as well. Therefore,

Hypothesis Three: A significant relationship is expected between CEO duality and firm performance.

Ownership Concentration

As argued by Mishra and Kapil (2017), ownership concentration can mitigate agency problem since the controlling shareholders are the best monitoring mechanism against opportunistic managers, thus can lead to better firm performance, a positive relationship. It is commonly believed that concentrated ownership offers the highest protection to shareholders when legal protection is relatively weak, as evidenced in most Asian jurisdictions (Heugens et al., 2009; Haron, 2018). Literature documents positive relationship between ownership concentration and firm performance (see for examples, Ehikioya, 2009; Reddy et al., 2010; Desoky and Mousa, 2013; Saidat et al., 2019) with the argument that highly concentrated ownership like family firms for instance are very motivated to achieve maximum firm performance.

Table 1. Structure of panel data

| Year Since Listing | Firm Observations | Year Since Listing | Firm Observations |
|--------------------|-------------------|--------------------|-------------------|
| 2000 | 442 | 2008 | 666 |
| 2001 | 476 | 2009 | 678 |
| 2002 | 505 | 2010 | 704 |
| 2003 | 547 | 2011 | 722 |
| 2004 | 587 | 2012 | 734 |
| 2005 | 617 | 2013 | 742 |
| 2006 | 635 | 2014 | 742 |
| 2007 | 648 | 2015 | 742 |

Contrastingly however, Fan et al. (2007) argue that when the degree of concentration is too high, there is a possibility for the controlling shareholders to entrench themselves and not opting to hiring quality outsider. Adding to that, controlling ownership by family in particular provides them with the ability and incentive as controlling shareholders to deprive the rights and expropriate wealth at the expense of the minority shareholders (Lukviarman and Johan, 2018), could be done by transferring assets and profits out of the firms for their benefits (Heugens et al., 2009). This situation may affect the function of board as disciplinary tool thus may lead to lower firm performance, a negative relationship. Liu et al. (2015) and Haron (2018) record a negative relationship between ownership concentration and firm's performance in their study. Therefore, based on the mixed results recorded in the literature,

Hypothesis Four: A significant relationship is expected between ownership concentration and firm performance.

DATA AND METHODOLOGY

Data and Sample Firms

This study utilizes an unbalanced panel data that included 742 Malaysian non-financial listed firms covering the 16 years period of 2000-2015. The firms' data on CG are manually collected from the annual reports of the firms since it is not available on on-line database. The annual reports are downloaded from Bursa Malaysia (the stock exchange) website while data on control variables are extracted from the Datastream database. Only firms with three minimum observations from 2015 and backward (firms that have been listed at least from 2013) are included in the study sample (see, for example; Manoel et al., 2018). The structure of panel data in this study is shown in Table 1 below.

Methodology

This study performs a panel regression to examine the influence of CG variables on firm performance after controlling for firm size, leverage, growth and age of firms. The panel regression is estimated based on the Generalized Method of Moment (GMM-First Difference-2step), a dynamic estimator that is widely used to control for endogeneity in the study of CG and firm performance, as well to cater for

the dynamic nature of the study i.e. firm performance for the current year is influenced by the previous year performance (see for examples; Liu et al., 2015; Duru et al., 2016; Haron, 2018; Manoel et al., 2018; Nomran and Haron, 2019; Al-ahdal et al., 2020). Moreover, in situations where panel data set consists of small T and large N (as in this study), independent variables that are not strictly exogenous, fixed individual effects, heteroscedasticity and serial correlation, GMM estimator is most suitable (Al-ahdal et al., 2020).

The panel regression model is explained as following:

$$Perf_{it} = \beta_0 Perf_{it(-1)} + \beta_2 Dir_{it} + \beta_3 IndBrd_{it} + \beta_4 CEO_{it} + \beta_6 ConOwn_{it} + \sum Control_{it} + \varepsilon_{it}$$

where, $Perf_{it}$ (Firm Performance) is represented by three common measurements as found in the literature i.e. Return on Equities (ROE), Return on Total Asset (ROA) and Tobins' Q (Q). ROE, ROA and Q are measured based on the ratio of net profit over total shareholders equities (Duru et al., 2016; Al-ahdal et al., 2020), net profit over total asset (Duru et al., 2016; Zhou et al., 2018; Al-ahdal et al., 2020), and total of equity market capitalization plus the book value of total liabilities, and divided by the book value of total asset (Liu et al., 2015; Al-ahdal et al., 2020). These three different measurements of firm performance serve as robustness tests to check for consistency in the regression results derived from the model.

CG variables: Dir_{it} (Number of Directors on Board) in log10, $IndBrd_{it}$ (Independent Board Member) the ratio of independent board member over total board member, CEO_{it} (CEO Duality) represented by 1 if CEO is also the chairman of the Board, 0 otherwise, and $ConOwn_{it}$ (Ownership Concentration) is measured based on the shareholdings of 5 percent and above. $Control_{it}$ (Control variables) are Firm Size (total asset in log10), Leverage (ratio of total debt over total asset), Growth (ratio of market value of equities over book value of equities) and Firm Age (years since incorporated in log10), while ε_{it} is the error term.

To ensure the efficiency of the GMM estimator, this study performs standard diagnostic tests (see, for examples, Nomran and Haron, 2019; Al-ahdal et al., 2020). which are the Wald test, to assess the joint significance of the determinants of firm performance (null: all coefficients on the determinants are jointly equal zero); the second order serial correlation test AR(2) (null: no second order serial correlation in the residuals) and the J-test, a test for the validity of the instrumental variables representing $Perf_{it(-1)}$ (null: instrumental variables are valid). Estimates derived from the GMM are only consistent if there is no second order autocorrelation in the residuals and instrumental variables are valid (Al-ahdal et al., 2020). Variance Inflation Factor (VIF) is performed to check whether there is multicollinearity problem between variables in the model. The VIF should be less than 10 to confirm that there is no multicollinearity problem in the dataset (Salmeron et al., 2018).

RESULTS AND DISCUSSIONS

Descriptive Statistics

Table 2. Descriptive statistics on variables

| Variable | Mean | Median | Maximum | Minimum | Std. Dev. |
|-------------------------|--------|--------|---------|---------|-----------|
| ROE | 0.0043 | 0.0069 | 0.2682 | -0.7024 | 0.0275 |
| ROA | 0.0326 | 0.0343 | 0.5475 | -0.5020 | 0.0856 |
| Tobin's Q | 0.9817 | 0.8789 | 2.9793 | 0.0535 | 0.4350 |
| Board of Directors | 0.8656 | 0.8451 | 1.3424 | 0.6021 | 0.1111 |
| Independent Board | 0.4279 | 0.4000 | 0.9000 | 0.0909 | 0.1298 |
| CEO Duality | 0.2239 | 0.0000 | 1.0000 | 0.0000 | 0.4168 |
| Ownership Concentration | 0.4774 | 0.4986 | 0.7993 | 0.0000 | 0.1928 |
| Size | 5.5492 | 5.4618 | 8.0686 | 0.0000 | 0.6200 |
| Leverage | 0.2072 | 0.1822 | 0.8838 | 0.0000 | 0.1748 |
| Growth | 1.1179 | 0.8164 | 9.8943 | 0.0661 | 1.0168 |
| Age | 1.3207 | 1.3617 | 2.0414 | 0.0000 | 0.3287 |

Table 2 presents the descriptive statistics of the variables used in this study. Based on the sample of 742 firms, the minimum and maximum firm performance (ROE, ROA, Q) are volatile during the period. Nonetheless, on average firms record positive ROE and ROA with average Q of close to 1. As for board independence, the mean indicates that 42.79 percent of the board composition consists of independent directors which are in line with the recommendation in the revised MCCG 2007 (one-third; 33.3 percent), however lower than 50 percent as suggested by MCCG 2017. Since the data is from 2000 to 2015, referring to the minimum of 9.09 percent, there are some firms that are not in compliance with the requirement of one-third (33.3 percent) independent board out of board members as in MCCG 2007. The results are similar to the study done by Abdifatah and Sanni (2015) and Shamsudin (2018). With regards to the board size, the minimum number of the board member is 4 ($\log_{10}=0.6021$) while the maximum is 22 ($\log_{10}=1.3424$) with the mean about 8 ($\log_{10}=0.8656$). The mean of eight suggests that public firms in Malaysia have larger board size (Chen et al., 2015; Shamsudin, 2018). Chen and Shamsudin found the average board size is 9 for Malaysian firms. As for CEO duality, the average is 0.2239 which indicates that only 22.3 percent of the firms are served by the same person as both chairman and CEO. The MCCG 2017 also required that the positions of CEO and the chairman be held by different persons. For ownership concentration, the mean is 47.7 percent with maximum and minimum percentage of almost 80 percent and zero percent, respectively. Paramanatham et al. (2018) found the mean ownership concentration of 54.5 percent with maximum and minimum percentage of 87.7 percent and zero percent, respectively in their studies on top 100 listed firms in Malaysia for the period of 2011-2015.

Regression Results

Table 3. Regression results (performance and CG variables)

| Variable | ROA | ROE | Q | VIF |
|---|--------------------------|-------------------------|---------------------------|------|
| Firm Performance (-1) | 0.2677** [19.2242] | 0.0045 [1.0884] | 0.1292*** [6.0475] | |
| Board of Directors | 0.5810** [4.1802] | 0.0371** [2.2109] | 0.1794** [2.2840] | 1.27 |
| Independent Board | 0.2078** [1.8562] | 0.0520*** [4.4761] | 0.2864** [1.9546] | 1.15 |
| CEO Duality | -0.1057 [-1.5670] | -0.0255*** [-4.4738] | -0.1339* [-1.7732] | 1.01 |
| Ownership Concentration | 0.1257 [1.6140] | 0.0122 [1.3344] | 0.4429** [2.3282] | 1.06 |
| Control Variable | | | | |
| Size | -0.5160*** [-13.7004] | -0.0212*** [-2.8569] | -0.1781* [-1.6884] | 1.29 |
| Leverage | 0.0324 [1.2415] | 0.0617*** [12.3427] | 0.1193 [0.7703] | 1.10 |
| Growth | -0.0020 [-0.9362] | -0.0004 [-1.0220] | -0.3862*** [-18.0466] | 1.03 |
| Age | -0.2244*** [-4.3918] | -0.0821*** [-5.1859] | -0.3538** [-2.4734] | 1.10 |
| Mean VIF Wald test (<i>F</i> -statistic) AR(1) <i>m</i> -statistic | 93.8896*** -9.2969*** | 33.9509*** -2.3242** | 109.4771*** -2.73991** | 1.13 |
| AR(2) <i>m</i> -statistic | -0.0370 | 1.4409 | -1.4050 | |
| <i>J</i> -statistic | 114.4833 | 101.3145 | 110.5808 | |
| No. of Observations | 8155 | 8179 | 7921 | |

Notes: ROA (Return on Total Asset), ROE (Return on Shareholders Equities), Q (Tobin's Q); ***, **, * represents *p* at 1%, 5% and 10%, respectively. The *t*-statistics in parenthesis are the robust *t*-values with standard errors corrected for heteroscedasticity. Wald test is to assess the joint significance of the determinants of firm performance (null: all coefficients on the determinants are jointly equal zero); The *m*-statistic for AR(2) refers to the null of no second order correlation in the residuals; the *J*-statistic for the null that the over identifying restrictions (instrumental variables) are valid. The VIF test of less than 10 confirms that there is no multicollinearity problem in the dataset.

Despite enormous studies have been done on the relationship between CG structure and firm performance in Malaysia, the results and findings yielded in this study still are very interesting. Majority of the CG mechanisms incorporated in this study appear to be significant factors of a good firm performance in Malaysia during the period under study. Board size reveals a significant relationship (positive) with firm performance, H_1 is thus supported, consistently across all performance measurements (ROA, ROE, Q). Firms in Malaysia seem to agree that larger board size can elicit more ideas for a more collective and resourceful decision making and can also enhance monitoring activities hence a better firm performance (Haniffa and Hudaib 2006; Haron, 2018; Uribe-Bohorquez et al., 2018). Chugh et al. (2011) and Sun et al. (2014) share the same positive relationship with firm performance as well.

Independent board also yields significant relationship (positive) with firm performance, supporting H_2 , consistently across all performance measurements (ROA, ROE, Q). There is an influence of agency theory here where managers are seen as opportunists and outside directors are very much needed to monitor and align the managers' interest with that of the shareholders for value maximization. In a dynamic environment, the monitoring effectiveness associated with board independence is likely to intensify the firm performance (Duru et al., 2016). Independent board in Malaysian firms seems to have effective monitoring role and able to alleviate information asymmetries to increase firm value, confirming the finding of Shakir (2008) on Malaysian property firms. The positive relationship found in this study may perhaps due to the emphasis and requirement made by the MCCG (2017) that at least 50% of the directors in the board are outside directors. The tenure of an independent director must not exceed a cumulative term limit of nine years as this is to ensure that an independent director can act independently of management. This result supports O'Connell and Cramer (2010), Terjesen et al. (2016) and Uribe-Bohorquez et al. (2018). Board independence therefore acts as a strong mechanism for monitoring the performance of managers and preventing opportunistic actions as a result of the greater motivation of executive directors and their interest in supervising managerial actions and thus upholding the company's reputation (Uribe-Bohorquez et al., 2018).

Apparently, the significant result for CEO duality (ROE, Q) seem to enhance what has been depicted in the relationship between independence board and firm performance earlier in this study. The clear implication is that the independence of a vigilant board and separation of role between chairman and CEO enhances firm performance (Duru et al., 2016). H_3 is therefore supported as CEO duality has significant influence (negative) on performance, in line with Rahman and Haniffa (2005), Yammesri and Herath (2010), Duru et al. (2016) and Shawtari et al. (2017). Again, the influence of agency theory is found here where from the agency theory perspective, there would be conflict of interest when the same person holds the CEO position and the chairman as well. Firms in Malaysia seem to agree with the separation of roles to achieve maximum firm performance. Descriptive statistic in this study shows on average, only 22.3 percent of the firms are served by the same person as both chairman and CEO. Referring to the MCCG 2017, there is an imposition that the position of CEO and the chairman must be held by different individuals. This imposition placed in the MCCG 2017 blueprint has somehow gained the trust and confidence from firms' management in Malaysia in order to achieve good firm performance, thus adhere to it.

Ownership concentration and firm performance shows a significant relationship (positive) in this study, supporting H_4 , however only on (Q). Agency theory is once again detected here. From the agency points of view, high concentration of ownership structure can mitigate agency problem and consequently increase firm performance. Highly concentrated ownership like in Malaysia which is in majority family firms are normally highly driven to achieve maximum performance. The positive relationship reinforces the argument made by Heugens et al. (2009) and Haron (2018) that concentrated ownership offers the highest protection to shareholders when legal protection is relatively weak, as evidenced in most Asian jurisdictions. Concentrated shareholders can also use their vast resources and prior knowledge to enhance managerial and organizational capabilities (Heugens et al., 2009). This positive relationship supports what have been documented by Ehikioya, (2009), Reddy et al. (2010), Desoky and Mousa (2013) and Saidat et al. (2019).

Following what has been documented in the literature, the control firm level determinants also show significant influence on firm performance in this study. Firm size and age relate negatively with firm performance (ROA, ROE, Q) and the same is recorded on growth (Q), whilst leverage has a positive relationship with firm performance (ROE).

CONCLUSION

The objective of this study is to examine the relationship between CG mechanisms and firm performance in Malaysia. To meet its objective, this study uses the GMM to analyse 742 publicly listed firms in Malaysia over the period of 16 years from 2000 to 2015, to characterize the relationship between board size, board independence, CEO duality and ownership concentration on firm performance. This study also acknowledges the stylized facts on the impact of certain firm level determinants on firm performance by controlling the determinants like leverage, firm size, growth and firm age. This study also observes and addresses the issue of endogeneity en-route the analyses by employing the GMM. The GMM is known to have the ability to deal with endogeneity, following the literature. To check the robustness of the results generated from GMM, firm performance is measured according to the different measurements, ROA, ROE as well as Tobin's Q. The results on board size and board independence are robust to all different measurements.

Interestingly, agency theory seems to be the governing theory in characterizing the influence of CG mechanisms incorporated in this study on firm performance. The impact of board size on firm performance is significant where larger size is preferred comparative to smaller board size. Firms in Malaysia believe that larger board size can elicit more ideas for a more collective and resourceful decision making and can also enhance monitoring activities hence a better firm performance. This may also because firms want to accommodate and maximise the 50% outside director requirement by the MCCG 2017. The MCCG encourages board independence for a much better and effective monitoring mechanism to the firm as explained by the agency theory. For CEO duality, firms in Malaysia seem to follow the requirement stated in the MCCG 2017 that the position of CEO and chairman be held by two different individuals. The board of directors are apparently agreeing to that separation of roles in striving for maximum firm performance as if different person holds the duty of a CEO and a chairman conflict of interest is reduced or even avoided.

Looking at the ownership structure, literature documents the ownership structure in the emerging market like Malaysia is highly concentrated with family firm being the most dominant ownership identity. This study witnesses how ownership concentration has quite a substantial influence on firm performance in Malaysia. Firms seem to adhere to the MCCG requirement regarding outside directors in support of board independence as explained by the agency theory. The large board size practice depicted in this study may be due to the awareness and allowance of having outside directors as monitoring mechanism for the benefit of the firm, particularly at the time where corporate Malaysia is currently facing trust deficit due to the abuse of trust which has to be rectified through good CG, particularly at the boardroom level. The board has the responsibility to ensure that there is connection between governance and strategy on the long-term sustainability of the firm. All these findings depicted from this study confirm and justify what has been recorded in the literature pertaining to the relationship between CG structures and firm performance in Malaysia during the period understudy. Generally, firms with highly concentrated ownership structure in Malaysia operate within a larger board size, have independent board to monitor

the management with different people holding the position of CEO and chairman to avoid self-conflicts in their effort to maximise firm performance. Agency theory seems to be the dominant theory governing the corporate decisions en-route value maximization. The theory seems to be able to explain the current phenomena of trust deficit that is cutting across both public and private sectors in Malaysia (as reported in The Edge, 2019) and the need for strong monitoring mechanism by the board to address the issue of trust for better firm performance.

POLICY IMPLICATION

This study apparently comes with some policy implications. Although the implementation of MCCG does have significant impact on the CG structure in Malaysia, policy maker should continuously re-evaluate and review and revise the doctrines and guidelines in the MCCG to ensure best practice and that the code of conduct remains relevant in the global context. Responsible players should take into account the impact of these CG mechanisms on firm performance that is the role of board, independent board, ownership and the separation of role between chairman and CEO. Built on a foundation of transparency, accountability and trust, good CG practices are fundamental to a success of Malaysian firms. This study uses a wide span of study period and a substantial numbers of observations with various measurements of firm performance in its investigation thus is relatively fit for generalization purposes and can be extended to other emerging markets as well.

FUTURE RESEARCH

However, this study does have some limitations. This study only examines four CG characteristics where in fact there are more that should be examined like the characteristic of the board members, gender diversity, types of concentrated ownership and so forth which are equally important CG mechanisms. Future research could also analyse and examine the impact of each three revision done on the MCCG (2007, 2012, 2017) on firm performance for a much better evaluation and improvement based on empirical assessments on the performance of the firms after the revision. Perhaps future research could look into this matter and enhance the literature even further.

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Chapter 11

Zero–Leverage in European Firms: The Role of Corporate Governance Mechanisms on the Phenomenon

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ABSTRACT

This study analyzes the zero-leverage phenomenon in a sample of European listed firms for the period 2001-2016, with a focus on the role played by the corporate governance mechanisms on the explanation of the phenomenon. Considering a set of internal and external corporate governance variables, it is rejected that firms with poor internal mechanisms of corporate governance have a greater propensity to adopt zero-leverage policies. Nonetheless, a great ownership concentration—measure for external corporate governance mechanisms—decreases the firm's propensity to be debt-free, indicating that the presence of large shareholders reduces managers' opportunistic actions. Results that partially validate that zero-leverage policies are driven by entrenched managers avoiding the disciplinary power of debt, especially in the presence of small shareholders without incentives and power to control managers' actions. Additionally, zero-leverage firms seem to substitute debt by internal sources of liquidity. Results are robust to different zero-leverage classifications and econometric methods.

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INTRODUCTION

The beginning of this century is marked by the recognition that a considerable number of firms have extremely conservative debt levels, reaching in some cases ratios close to zero (Graham, 2000). The “zero-leverage puzzle” or the “zero-leverage phenomenon” refers to the growing trend of firms that have a mysterious zero leverage in their capital structure, becoming known after the contemporary study of Strebulaev and Yang (2013). The existence of debt-free firms contradicts the arguments of the dominant capital structure theories that claim the benefits of debt (Frank & Goyal, 2008). According to Frank and Goyal (2008) firms should use debt to obtain debt-tax shields (Modigliani & Miller, 1963) as well as to reduce agency conflicts between shareholders and managers (Jensen & Meckling, 1976; Jensen, 1986). The zero-leverage phenomenon is even more enigmatic considering that the decision of debt-free to lever up would enable firms to increase substantially their market value (Korteweg, 2010; Strebulaev & Yang, 2013). The existence of firms without debt has aroused the interest of the scientific community, being a fertile area for new researches (Takami, 2016).

Empirical studies about zero leverage were developed mainly in samples of US firms (Byoun & Xu 2013; D’Mello & Gruskin, 2014; Ferrão et al., 2016), with Strebulaev and Yang (2013) showing that, on average, around 10% of large US listed firms do not have any kind of short- or long-term debt in their balance sheets. Beyond the considerable number of debt-free firms, Devos et al. (2012) found that this is a persistent capital structure policy. Bessler et al. (2013) add the international and growing nature of the phenomenon, being more usual in common law than in civil law systems, highlighting the determinant role of country on the phenomenon. Also Dang (2013) and Takami (2016) are examples of the country effect on the phenomenon, the former showing that approximately 12% of UK listed firms correspond to debt-free firms, while Takami (2016) found a proportion of zero-leverage observations that even not reach 6% on Japanese listed firms. More recently, studies have been developed on emerging economies, such India (Ghose & Kabra, 2016) and China (Huang et al., 2017). Despite recognizing that zero leverage is a global phenomenon, Ghoul et al. (2018) show that it is more pronounced in developed and high-income countries.

Previous studies resort to the following arguments to explain firms’ motivation to present zero leverage: i) financial constraints or credit constraints (i.e., zero leverage results from market impositions that implies rejection of credit to the firm); ii) financial flexibility (i.e., zero leverage is a result of a financial decision taken by the firm that opts to remain without debt to preserve financial flexibility); iii) equity financing (i.e., firms resort to equity issuances in an attempt to take advantage of the overvaluation of the firm in capital markets and thereby reduce debt); iv) macroeconomic and specific-country effects and v) managerial entrenchment and corporate governance structures (i.e., poor corporate governance mechanisms gives more power and control to the manager, increasing their propensity to reduce firm’s leverage to protect their own private benefits). However, there is little consensus on the literature about the motives that explain zero-leverage policies.

To the best of the authors’ knowledge, the effect of managerial entrenchment and the structures of corporate governance on zero leverage were analysed only in US samples by Byoun and Xu (2013), Devos et al. (2012) and Strebulaev and Yang (2013) and despite using similar samples of firms the studies end up, in part, by providing conflicting results. In an attempt to fill the previous gap this study focuses on the following research questions: *Does the zero-leverage phenomenon in Europe result from the firm’s internal/external mechanisms of corporate governance?* and *Which are the alternative sources of finance that substitute debt in debt-free firms?* To answer this questions and provide empirical evidence

about the zero-leverage phenomenon in Europe, firm-specific data were obtained from the DataStream database for listed firms from France, Germany, the UK and the PIIGS (Portugal, Ireland, Italy, Greece and Spain), between 2001 and 2016, representing a final sample of 5,762 firms. Selected countries and the period of analysis allow to investigate the role of corporate governance on zero leverage. In addition, it is the intention of the authors to show the alternative sources of finance to debt in debt-free firms.

The analysis of the impact of corporate governance mechanisms on zero leverage is made through the consideration of internal and external mechanisms. Internal mechanisms are considered board structure elements (Ferreira et al., 2011; Weir et al., 2002), given that among corporate governance mechanisms, the board of directors is considered the central axis, contributing to preserve investor confidence and acting as a key element to reduce agency costs given its ability to monitor management actions and decisions (Fama & Jensen, 1983; Liu et al., 2015; Uribe-Bohorquez et al., 2018). As external mechanism, following Devos et al. (2012), the authors consider the ownership concentration as a proxy for the presence of large shareholders that own a large block of shares, decreasing incentives for managerial entrenchment.

This study contributes directly to the discussion around the specific effect of corporate governance on zero-leverage policy, being the first to present evidences at this level outside the US reality. In particular, this study contribute to previous literature by showing that external mechanisms of corporate governance significantly impact zero-leverage policies, while internal mechanisms do not. Another particularity from this study is the European sample that allows to differentiate it from the others by two main reasons: First, selected countries allow to analyse the zero-leverage phenomenon in different economies with different potential and growth, which can have impact on the distribution of the phenomenon across European countries¹; Second, considering the predominance of countries with civil legal systems and bank-based financial systems (Demirgüç-Kunt & Levine, 2004; Djankov et al., 2007), the study is even more challenging given the high dependency of non-financial firms on bank loans (European Investment Bank, 2015; Langfield & Pagano, 2016) hindering the appearance of firms without debt.

The remainder of the chapter is organised as follows. Section 2 briefly reviews previous empirical evidences and theoretical explanations of the zero-leverage phenomenon and formulates some empirical hypotheses. Section 3 describes the data and the methodology used in the empirical analysis. Section 4 presents and discusses the results obtained by both univariate and multivariate data analyses. Finally, section 5 contains some final considerations.

LITERATURE REVIEW

Related Literature and Empirical Evidence

The literature on zero leverage has known its main developments in the present decade. However, it remains unclear the reasons that lead to the adoption of zero-leverage policies, since, despite of using similar samples in some cases, the empirical evidence is somewhat conflicting (Byoun & Xu, 2013; Devos et al., 2012; Strebulaev & Yang, 2013). Specifically, resorting to their sample of US listed firms, Strebulaev and Yang (2013) found a determinant role of corporate governance characteristics on zero leverage, where weak corporate governance mechanisms that facilitate the managerial entrenchment, such as the small board size or the smaller presence of independent directors on the board, increase the propensity for zero leverage. However, using a similar sample of US firms, Devos et al. (2012) did not find evidences that zero leverage is driven by entrenched managers attempting to avoid the disciplin-

ary pressures of debt, showing that debt-free firms do not have weaker internal or external governance mechanisms. The conflicting findings from these studies can be explained by the different criteria used to classify a firm as debt-free. Strebulaev and Yang (2013) classify a firm as debt-free if in a given year it does not have any amount of debt in its balance sheet. On the other side, Devos et al. (2012) classify a firm as debt-free if the firm does not have any amount of debt for three consecutive years, the option by this criteria being more oriented towards the long term ensures that such debt policy is not temporary. Therefore, their results may indicate that corporate governance mechanisms do not explain zero-leverage policies when they are persistent over time. However, also Byoun and Xu (2013) analyse the role of corporate governance structures on zero leverage, this time resorting to US listed industrial firms. Adopting the same criteria of Strebulaev and Yang (2013) to classify a zero-leverage firm, the authors found evidences that do not support the hypothesis that extreme debt conservatism results from managerial entrenchment. Therefore, the evidences surrounding the role of corporate governance mechanisms and managerial entrenchment on zero leverage remains unclear.

A considerable number of studies shows that debt-free firms prefer not to resort to debt simply because they do not need or because they want to preserve their debt capacity for future unforeseen events and thus they can maintain their financial flexibility and substituting debt by internal sources of financing (Dang, 2013; Huang et al., 2017). Previous studies show that firms with higher levels of profitability and internal liquidity are more likely to adopt zero leverage due to financial flexibility reasons (Bessler et al., 2013; Bigelli et al., 2014; Dang, 2013).

Other studies show that the zero-leverage phenomenon can be explained by the substitution of debt for equity financing. Bessler et al. (2013) show that zero leverage was driven by the latest IPO waves, while Byoun and Xu (2013) present evidences that funding obtained via capital markets has a determinant role on zero leverage, showing that firms can take advantage of the favourable market valuation to issue shares and reduce debt, which is in accordance with the implications of the Market Timing approach (Baker & Wurgle 2002).

Theoretical Approaches Explaining Zero Leverage

Corporate Governance Structures and Managerial Entrenchment

A plausible explanation for firms to present zero leverage can be the existence of entrenchment managers that act according with their own personal preferences (Jensen & Meckling, 1976). According to agency theory (Jensen and Meckling, 1976), if managers prefer to increase their private control benefits rather than maximizing shareholder wealth, they are expected to take decisions that increase their power and control over the firm. One way to increase power over the firm's decisions is to avoid the disciplinary pressures associated with leverage (Jensen, 1986). The absence of a debt service plan means a higher level of free cash flows that increase the discretionary power of the manager. The existence of entrenched managers is not always easily detected by investors due to the presence of market frictions such as moral hazard.

To prevent those opportunistic managers to seize shareholders' wealth, firms' corporate governance structures act as mechanisms defining the rights and duties of managers and shareholders in a firm. The objective is to monitor the manager's performance in order to ensure that there are no conflicts of interest between shareholders and managers. Corporate governance mechanisms are generally split into two categories, internal (board of directors) and external mechanisms (market) (Ferreira et al., 2011; Weir et al., 2002). Internal corporate governance mechanisms are typically assigned to internal orga-

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nizational bodies that allow to supervise manager's behaviour or other business decisions that promote the alignment of interests between shareholders and managers. Agency theorists consider that the board of directors play a pivotal role in monitoring managers being its main function, in order to protect the interests of the shareholders and thus to reduce agency costs associated with the separation between firm ownership and control. Previous studies state that internal mechanisms of corporate governance include board structure variables such as board dimension, independency and composition (Byoun & Xu, 2013; Devos et al., 2012; Weir et al., 2002). External mechanisms of corporate governance are those developed by the market itself, where the investors end up supervising the managers' decisions and the respective results (Weir et al., 2002). It is considered as external mechanism - the existence of large shareholders with incentives to monitoring manager's actions and ensure that their decision are in order to maximize the firm's value (Devos et al., 2012).

It is expected that firms with weaker corporate governance mechanisms favor managerial entrenchment and, consequently, to be more likely to adopt debt conservative policies. To investigate the effect of corporate governance mechanisms on zero-leverage firms, the authors divide the analysis in internal and external mechanisms. Following Devos et al. (2012) and Strebulaev and Yang (2013), are considered variables related with board characteristics to analyse the impact of firm's internal governance structure on zero leverage, namely the board size and the fraction of independent directors on board. Additionally, it is examined whether the CEO assume a dual role, i.e., if they are also board member (Byoun & Xu, 2013), which implies that a manager decides about firm's policies and strategies and simultaneously participates in the supervision of their work.

It is expected that managers adopt zero-leverage policies in the presence of more favourable boards, i.e., with small size (Cheng, 2008); composed by directors who are equally executive (inside or executive directors), which means less independent boards (Boone et al., 2007); and where the manager participates and maintains his influence, since it attenuates the board's potential to monitor effectively the firm management (Duru et al., 2016; Weir et al., 2002). The expected effects are then consistent with agency theory (Jensen & Meckling, 1976), which suggests that larger and more independent boards that are free from the influence of team management are better able to monitor and control management behaviour. Considering theoretical arguments the following hypotheses are formulated:

H1: Weaker internal corporate governance mechanisms increases firm's propensity to zero leverage.

- H1a: Board size has a negative effect on zero leverage;
- H1b: The percentage of independent directors on board has a negative effect on zero leverage;
- H1c: The presence of CEO on board has a positive effect on zero leverage.

Concerning external corporate governance mechanisms, following Devos et al. (2012) that investigated the existence of block ownership on zero leverage, the effect of ownership concentration on zero leverage is analysed. The theory of ownership and control tell us that managers can be subject of monitoring actions to their performance by external shareholders. This holds true particularly in the presence of shareholders who own a large block of shares that would not be subject to the free-rider problem and would have strong incentives to monitor managers to ensure that their wealth is being maximized (Shleifer & Vishny, 1986). Although Devos et al. (2012) have not found a significant effect of block ownership on zero leverage, it is expected that the ownership concentration (presence of large shareholders) reduce managerial entrenchment and consequently decreases the propensity for zero-leverage policies. The following hypothesis will be tested:

H2: Ownership concentration has a negative effect on zero leverage.

Internal Sources of Liquidity

Pecking Order theory argues that in the presence of information asymmetries, firms establish a preference in their sources of financing, choosing in a first stage, internal sources of finance rather than the more expensive external financing, such debt (Myers, 1984; Myers & Majluf, 1984). Hence, if the firm's financing needs do not exceed the internal funds generated and retained, these are enough to finance the firm. Therefore, zero leverage can be explained by the adoption of a Pecking Order style financial policy.

An important stream of literature argues that firms avoid debt financing today and stockpile cash to increase financial slack in an attempt to preserve borrowing capacity and assure financing for future investments (de Jong et al., 2012; Myers, 1984; Rapp et al., 2014). The arguments are coincident with the financial flexibility approach that considers the interdependence over time between firms' financing and investment decisions (Ferrando et al., 2017; Gamba & Triantis, 2008). Financial flexibility mitigates investment distortions (Rapp et al., 2014), such as underinvestment problems which avoids bypass projects with a positive net present value (NPV) (Myers, 1977). In this attempt to preserve debt capacity to fund future investments, firms reduce their investments in the present (Marchica & Mura, 2010) which enables them to create financial slack. In European surveys Bancel and Mittoo (2004) and Brounen et al. (2006) confirm that CFOs consider financial flexibility as having a determinant role in capital structure decisions, leading such managers to voluntarily limit credit lines to preserve their capacity to take on future debt.

Both arguments, used by Pecking Order theory and financial flexibility approach, consider that internal sources of liquidity can explain zero-leverage policies. In fact, firms can substitute debt by internal financing because it is a less expensive source of financing and internal generated cash flows are sufficient to meet their commitments; or it chooses to maintain its financial flexibility to preserve debt capacity. Therefore, firms with higher levels of cash holdings and profitability are expected to have more internal liquidity and consequently to be more prone to present zero leverage.

H3: Internal sources of liquidity increases firm's propensity to zero leverage.

- H3a: Profitability has a positive effect on firm's propensity to zero leverage;
- H3b: Cash holdings have a positive effect on a firm's propensity to zero leverage.

Equity Financing

One possibility for zero-leverage firms to obtain external finance is to resort to equity financing, namely equity issuances. According with the theoretical approach of Market Timing (Baker & Wurgler, 2002), managers perceiving that shares are overvalued in the market, issue shares take advantage of the optimism of the market to finance the firm. Welch (2004) shows that firms with overvalued stocks have lower debt ratios. Therefore, most of equity issues are attempts of the firm to take advantage of the overvaluation and market optimism to issue shares, which may explain the lack of debt financing (Leary & Roberts, 2010).

In addition to firms trying to take advantage of market optimism, equity financing can also be a way to reduce agency costs of debt (Jensen & Meckling, 1976). Equity holders of firms with valuable growth opportunities prefer to finance important investment projects through equity. Thus, they ensure that

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the cash flows generated by the project will be return to them (Myers, 1977). This mechanism allows mitigating underinvestment incentives.

Whether is through an attempt to take advantage of the overvaluation of the firm's securities in the capital market, or through an attempt to avoid incentives to underinvestment, equity financing may emerge as an alternative to debt and contribute to zero leverage. Theoretical arguments and empirical evidences point out that firms with greater equity market valuation and greater growth opportunities are more likely to adopt zero-leverage policies (Bessler et al., 2013; Byoun & Xu, 2013). The market-to-book ratio has been used as a measure of equity market valuation (Byoun & Xu, 2013) and as a measure of growth opportunities (Bessler et al., 2013). Therefore, the following research hypothesis is postulated:

H4: Market-to-book ratio has a positive effect on zero leverage.

METHODOLOGY

Data

Firm-specific data were collected from DataStream database provided by Thomson Reuters, for listed firms domiciled in the UK, Germany, France and the PIIGS, between 2001 and 2016. Selected countries and period of analysis ensure the availability of data to investigate the role of corporate governance on zero leverage. Simultaneously, selected countries have been frequently used in the literature to develop recent studies in capital structure field (Campbell & Rogers, 2018).

After data collection for all listed companies, the following cleaning and filtering process was carried out: first, specific industry sectors that affect the capital structure or firms with missing information about the industry sector were excluded, so utilities and financial firms, as well as firms without an industry code were excluded from the sample; next, firm/year observations with missing information or with obvious errors for total assets, sales or total debt were removed; iii) finally, firm/year observations with invalid information for the variables included in the analysis were excluded from the sample. Following the suggestions of Guariglia (2008), the authors allowed firms' entry and exit from the sample, in an attempt to mitigate potential survivor bias. After applying those cleaning and filtering criteria, the final sample contains 5,762 listed firms corresponding to an unbalanced panel data of 49,271 firm/year observations.

Variables

Following previous studies on capital structure, book leverage ratio is defined as the sum of the short- and long-term debt divided by total assets (Strebulaev & Yang, 2013). Therefore, a firm is considered to adopt a zero-leverage (ZL) policy if both short-term debt and long-term debt are equal to zero in a given year. The zero leverage classification is done through the consideration of financial debt, excluding non-debt liabilities (such as accounts payables) since they reflect the day-to-day of the firms' business and not the financing decisions (active capital structure choices).

As discussed in the "Theoretical approaches explaining zero leverage" section, *Board size*, *Independent directors* and *CEO duality* are explanatory variables representing internal corporate governance mechanisms and *Ownership concentration* represents external corporate governance mechanisms. Explanatory variables representing alternative fund sources are *Profitability* and *Cash holdings* for internal

sources of financing and *Market-to-book ratio* for equity financing. The econometric models will also include control variables that previous studies have shown to have a significant effect on capital structure decisions. Therefore, variables such as *Size*, *Tangibility*, *Dividend payouts*, *Capital expenditures* and *Non-debt tax shields* (Bessler et al., 2013; Ghoul et al., 2018; Huang et al., 2017) are included in the models. Dummy variables for industry, country and year will be introduced in most models to control for non-observed specific effects. Table 1 presents a deeper definition of the variables used in the main econometric models.

Table 1. Definition of the variables

| Variable | Definition |
|-------------------------|--|
| Book leverage | Ratio of long- and short-term debt to total book assets |
| ZL | Dummy that equals 1 if a firm has a zero book leverage in a given year and 0 otherwise |
| Board size | Logarithm of total number of board members at the end of the fiscal year |
| Independent directors | Proportion of independent board members |
| CEO duality | Dummy that equals 1 if CEO holds simultaneously a position on board of directors and 0 otherwise |
| Ownership concentration | Proportion of shares owned by all 5% owners (employees or individual investors) of the firm |
| Profitability | Ratio of earnings before interests, taxes, and depreciation (EBITDA) to book assets |
| Cash holdings | Ratio of cash and short-term investments to book assets |
| Market-to-book ratio | Market-to-book ratio (the market value of equity plus the book value of debt, divided by total assets) |
| Size | Logarithm of total book assets |
| Tangibility | Ratio of fixed assets to book assets |
| Dividend payout | Ratio of common dividends to book assets |
| Capital expenditures | Ratio of capital expenditures to total book assets |
| Non-debt tax shields | Ratio of depreciation and amortizations to book assets |

Logit Model

Considering the binary nature of the dependent variable, i.e. 1 if the firm has zero leverage and 0 otherwise, it is necessary to use econometric methods that accounts for such a response variable. The use of standard estimators such as ordinary least squares (OLS) assuming that the dependent variable can take on any real negative or positive value will be an inappropriate choice that will produce biased results (Wooldridge, 2012). In a binary response model, interest lies primarily in the response probability:

$$P(Y = 1|\mathbf{x}) = P(Y = 1 | x_1, x_2, \dots, x_k), \quad (1)$$

where \mathbf{x} is used to denote the full set of explanatory variables. In particular, as argued by Hosmer et al. (2013), in the presence of binary dependent variables logit regression is a natural option. Logit regression methods has been widely used in several research areas (e.g. Dong et al., 2011), being also a common model used to study binary responses in corporate finance, specifically when the study is related with debt conservatism themes (e.g. Strebulaev & Yang, 2013). Therefore, pooled logit regression models are

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used to estimate the impact of the explanatory variables on the likelihood of a firm having zero leverage. The logit model has the following form:

$$P(ZL = 1|\mathbf{x}) = 1 / \left[1 + e^{-(\alpha + \mathbf{x}\boldsymbol{\beta})} \right], \quad (2)$$

where the dependent variable ZL is a binary variable taking the value of 1 if the firm has zero leverage in a given year and 0 otherwise. \mathbf{x} represents the vector of the explanatory variables defined previously in Table 1, $\boldsymbol{\beta}$ represents the vector of the variable coefficients and α is the constant of the model. Considering this information, the base model applied in the study can be represented in the following form:

$$\begin{aligned} \alpha\beta = & \beta_0 + \beta_1 \text{Profitability} + \beta_2 \text{Cash Holdings} + \beta_3 \text{Market to book ration} + \beta_4 \text{Size} \\ & + \beta_5 \text{Tan gability} + \beta_6 \text{Dividend payout} + \beta_7 \text{Capital Expenditures} \\ & + \beta_8 \text{Non debt tax shields} + \text{Year dummies} + \text{Industry dummies} \\ & + \text{Country dummies} + \varepsilon \end{aligned} \quad (3)$$

To analyse the effect of corporate governance mechanisms on zero leverage, board variables (*Board size*, *Independent directors* and *CEO duality*) are added to the model, when the purpose is to analyse the effects of internal mechanisms, or the *Ownership concentration* variable is added, when the purpose is to analyse the effects of external mechanisms. For more information about the applied models, please refer to the beginning of the “Main findings” section.

EMPIRICAL RESULTS

The following subsections present the results of the data analysis. First, a characterization of the sample with the descriptive statistics related with the variables in the study, and finally results arising from the different econometric fitted model estimates.

Univariate Analysis

Sample

Table 2 presents the sample composition, specifying number of firms and observations by country and the distribution of debt-free firms by countries.

Table 2 shows that almost 80% of the observations are recorded in UK, France and Germany. On average 11.86% of firm-year observations are classified as zero-leverage firms, which corresponds to around 27% of firms being debt-free in at least one year. The zero-leverage phenomenon is also present in European firms i.e., all countries have firms that in a given year have zero leverage, confirming the results presented by Bessler et al. (2013) and Ghouil et al. (2018) that zero leverage is an international phenomenon, but the truth is that there is a great heterogeneity in the distribution of zero leverage between countries. Specifically, if UK present the greatest proportion of zero-leverage observations reaching almost 20% followed by Germany reaching around 14%, countries such as Portugal and Spain do not even reach 2%. Results show that PIIGS countries have a considerable less proportion of zero-leverage firms (4.39% of observations) than other countries (13.86%). Evidences that seem to corroborate the

arguments that country specific-factors such as legal system (Bessler et al., 2013), culture and level of development (Ghoul et al., 2018) and financial system development (Takami, 2016) can influence zero leverage.

Table 2. Sample characterisation by country

| Country | All firms | | | Debt-free firms | |
|--------------|-----------|---------|--------|-----------------|----------|
| | N firms | N. obs. | % obs. | % obs. | % firms* |
| <i>PIIGS</i> | | | | | |
| Greece | 341 | 3,692 | 7.49 | 6.28 | 21.41 |
| Ireland | 102 | 831 | 1.69 | 13.36 | 32.35 |
| Italy | 339 | 3,316 | 6.73 | 2.17 | 08.85 |
| Portugal | 78 | 731 | 1.48 | 1.78 | 3.85 |
| Spain | 194 | 1,846 | 3.75 | 1.57 | 7.73 |
| Sub-total | 1,054 | 10,416 | 21.14 | 4.39 | 14.61 |
| France | 1,114 | 10,186 | 20.67 | 2.84 | 9.25 |
| Germany | 995 | 9,248 | 18.77 | 14.10 | 31.86 |
| UK | 2,599 | 19,421 | 39.42 | 19.53 | 38.75 |
| Sub-total | 4,708 | 38,855 | 78.86 | 13.86 | 30.31 |
| Total | 5,762 | 49,271 | 100.00 | 11.86 | 27.44 |

* Firms that present zero leverage levels in at least one year.

Descriptive Statistics and Correlation Analysis

Table 3 present the descriptive statistics for the variables of the study. Specifically, Panel A shows descriptive statistics for the full sample, while Panel B and C presents descriptive statistics for PIIGS countries and other countries, respectively.

The firms present, on average, book leverage ratios of about 20%, a value close to that reported by Campbell and Rogers (2018) for a very similar sample. Panel B and C shows that leverage ratio is considerable higher on PIIGS countries, reaching on average 29%, instead in other countries the figure not even reach 18%. A possible explanation for this difference is that PIIGS countries have civil law systems (except Ireland) with bank-based financial systems (Demirgüç-Kunt & Levine, 2004; Djankov et al., 2007) which contributes to a greater dependence on bank debt and to the development of closer ties with creditors.

Panel A, also highlights that about 46% of the directors that serve on board are classified as independent and more than 80% of CEO's held a position on board. Finally, on average, more than 19% of the firms' ownership is concentrated on individual investors (block holders).

Table 4 presents the Pearson pairwise correlation coefficients between the variables. The correlations between explanatory variables seems not to be particularly high, except for the correlation between the variable *Size* and *Board size*, all the others present coefficients under 0.5. To alleviate concerns with multicollinearity in the last column of Table 4 the coefficients of the variance inflation factor (VIF) are presented. The VIF are always under 2, which seems to indicate that multicollinearity is not a problem.

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Table 3. Descriptive statistics

| Variable | Panel A: Full sample | | | Panel B: PIIGS | | | Panel C: Other countries | | |
|-------------------------|----------------------|---------|--------|----------------|---------|--------|--------------------------|---------|--------|
| | N | mean | sd | N | mean | sd | N | mean | sd |
| Leverage | 49,271 | 0.2020 | 0.1787 | 10,416 | 0.2900 | 0.1868 | 38,855 | 0.1784 | 0.1688 |
| ZL | 49,271 | 0.1186 | 0.3233 | 10,416 | 0.0439 | 0.2048 | 38,855 | 0.1386 | 0.3455 |
| Board size | 6,215 | 2.3358 | 0.3612 | 1,147 | 2.4743 | 0.3358 | 5,068 | 2.3045 | 0.3594 |
| Independent directors | 5,744 | 0.4657 | 0.2266 | 1,047 | 0.4169 | 0.2104 | 4,697 | 0.4766 | 0.2286 |
| CEO duality | 5,985 | 0.8097 | 0.3926 | 1,074 | 0.9264 | 0.2612 | 4,911 | 0.7842 | 0.4114 |
| Ownership concentration | 40,536 | 0.1927 | 0.2562 | 8,775 | 0.1851 | 0.2677 | 31,761 | 0.1948 | 0.2530 |
| Profitability | 48,113 | 0.0534 | 0.2415 | 10,197 | 0.0797 | 0.1329 | 37,916 | 0.0463 | 0.2628 |
| Cash holdings | 49,218 | 0.1588 | 0.1789 | 10,398 | 0.1099 | 0.1278 | 38,820 | 0.1720 | 0.1881 |
| Market-to-book ratio | 45,106 | 1.3011 | 1.4484 | 9,544 | 1.0534 | 1.0084 | 35,562 | 1.3676 | 1.5386 |
| Size | 49,271 | 11.6745 | 2.2769 | 10,416 | 12.3413 | 1.8921 | 38,855 | 11.4958 | 2.3374 |
| Tangibility | 49,076 | 0.2340 | 0.2255 | 10,406 | 0.3024 | 0.2261 | 38,670 | 0.2156 | 0.2217 |
| Dividend payout | 46,641 | 0.0158 | 0.0385 | 9,719 | 0.0148 | 0.0382 | 36,922 | 0.0161 | 0.0386 |
| Capital expenditures | 46,467 | 0.0475 | 0.0645 | 9,411 | 0.0458 | 0.0657 | 37,056 | 0.0479 | 0.0642 |
| Non-debt tax shields | 48,971 | 0.0485 | 0.0509 | 10,343 | 0.0423 | 0.0350 | 38,628 | 0.0502 | 0.0543 |

Table 4. Pearson correlation matrix and Variance Inflation Factor (VIF)

| Variables | ZL | Board size | Independent directors | CEO duality | Ownership concentration | Profitability | Cash holdings | Market-to-book ratio | Size | Tangibility | Dividend payout | Capital expenditures | Non-debt tax shields | VIF |
|-------------------------|---------|------------|-----------------------|-------------|-------------------------|---------------|---------------|----------------------|---------|-------------|-----------------|----------------------|----------------------|------|
| ZL | 1.00 | | | | | | | | | | | | | |
| Board size | -0.17** | 1.00 | | | | | | | | | | | | 1.76 |
| Independent directors | 0.04** | -0.24** | 1.00 | | | | | | | | | | | 1.32 |
| CEO duality | 0.07** | -0.22** | 0.35** | 1.00 | | | | | | | | | | 1.20 |
| Ownership concentration | -0.00 | 0.02 | -0.16** | -0.04** | 1.00 | | | | | | | | | 1.05 |
| Profitability | -0.12** | -0.09** | -0.00 | 0.04** | 0.02** | 1.00 | | | | | | | | 1.51 |
| Cash holdings | 0.39** | -0.11** | 0.00 | -0.05** | 0.05** | -0.19** | 1.00 | | | | | | | 1.16 |
| Market-to-book ratio | 0.21** | -0.17** | -0.00 | 0.05** | -0.00 | -0.15** | 0.32** | 1.00 | | | | | | 1.72 |
| Size | -0.28** | 0.59** | 0.01 | -0.16** | -0.19** | 0.27** | -0.26** | -0.20** | 1.00 | | | | | 1.89 |
| Tangibility | -0.16** | 0.01 | 0.01 | 0.05** | -0.08** | 0.10** | -0.33** | -0.12** | 0.22** | 1.00 | | | | 1.60 |
| Dividend payout | 0.09** | -0.09** | 0.00 | 0.06** | -0.02** | 0.24** | 0.06** | 0.17** | 0.08** | -0.02** | 1.00 | | | 1.34 |
| Capital expenditures | -0.05** | -0.02 | 0.01 | -0.01 | -0.02** | 0.03* | -0.10** | 0.05** | 0.02** | 0.42** | 0.00 | 1.00 | | 1.69 |
| Non-debt tax shields | -0.04** | -0.00 | -0.04** | -0.02 | -0.00 | -0.07** | -0.08** | -0.00 | -0.09** | 0.10** | -0.03** | 0.20** | 1.00 | 1.22 |

Note: The table shows the Pearson correlation coefficients between the variables of the study, and the coefficients associated with the VIF. ** significance at 1%; * significance at 5%

Characteristics of Zero-Leverage Firms

Table 5 presents univariate comparisons of the characteristics of zero-leverage firms and leveraged ones. Columns 1 and 2 shows, respectively, the average values of the explanatory variables both for zero-

leverage firms and leveraged firms, while column 3 presents a t-statistic for mean differences between the two groups of firms and the associated significance level.

Table 5. Mean characteristics of debt-free and leveraged firms

| Variables | ZL firms | Leveraged firms | T-test for diff. in means |
|-------------------------|----------|-----------------|---------------------------|
| Board size | 2.054 | 2.349 | -13.2967*** |
| Independent directors | 0.505 | 0.464 | 2.8989*** |
| CEO duality | 0.940 | 0.804 | 5.5661*** |
| Ownership concentration | 0.190 | 0.193 | -0.6360 |
| Profitability | -0.029 | 0.064 | -27.3658*** |
| Cash holdings | 0.348 | 0.133 | 93.1256*** |
| Market-to-book ratio | 2.140 | 1.191 | 45.6812*** |
| Size | 9.945 | 11.907 | -64.4073*** |
| Tangibility | 0.135 | 0.247 | -35.8976*** |
| Dividend payout | 0.025 | 0.015 | 18.8231*** |
| Capital expenditures | 0.038 | 0.049 | -11.6518*** |
| Non-debt tax shields | 0.042 | 0.049 | -9.8764*** |
| Observations | 5,842 | 43,429 | |

* significance at 10%, ** significance at 5% and *** significance at the 1% level.

The results show that zero-leverage firms have smaller board size and are more independent, i.e. a greater proportion of independent directors serve on board than leveraged firms. Simultaneously, debt-free firms are those where the CEO has more propensity to hold a position on board. These mixed results are not completely supportive of the entrenchment hypothesis that zero-leverage firms have weaker internal governance mechanisms. Specifically, the small board dimension and the greater CEO duality in zero-leverage firms seem to indicate a more favourable board for managers to pursue their own purposes (Cheng, 2008; Weir et al., 2002), which agrees with the hypothesis of zero leverage arising from managerial entrenchment. However, the greater presence of independent directors on board is against the managerial entrenchment hypothesis (Boone et al., 2007). There is no support for the entrenchment hypothesis from the external governance measure as well, since ownership concentration, although being smaller in zero-leverage firms than in leveraged firms, it is not significantly different. Similar results have been presented by Devos et al. (2012).

Additionally, results show that zero-leverage firms, on average, present lower profitability but higher cash holdings levels than leveraged firms. The higher levels of cash holdings agree with the arguments of internal sources of liquidity as a possible explanation for zero leverage, since according with the Pecking Order theory and with the financial flexibility perspective, firms stockpile cash as an attempt to preserve borrowing capacity and assure financing for future investments or to avoid expensive external finance (de Jong et al., 2012; Myers, 1984; Rapp et al., 2014). On the other side, the evidence that zero-leverage firms are on average less profitable than leveraged firms is a result that does not corroborate the arguments of Pecking Order theory and the financial flexibility perspective that zero leverage can be the result of internal liquidity. Similar evidences have been presented by Dang (2013).

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Debt-free firms have substantially higher market-to-book ratio than leveraged firms, which supports the arguments that debt conservative firms have higher market valuation and growth opportunities (Bessler et al., 2013; Byoun & Xu, 2013; Devos et al., 2012), which may indicate a substitution of debt by equity financing (Baker & Wurgler, 2002; Leary & Roberts, 2010). Finally, zero-leverage firms are smaller and have lower levels of tangible assets than leveraged firms, which suggests that those firms can face credit constraints (Bessler et al., 2013; Benmelech & Bergman, 2009; Hadlock & Pierce, 2010); simultaneously, debt-free firms pay higher dividends and have lower levels of capital expenditures and non-debt tax shields.

Multivariate Analysis

In this section are presented the results from regressions modelling the propensity of firms to have zero-leverage policies and a set of robustness checks.

Main Findings

Table 6 presents the results from the logit regression models. Three different specifications of equation (2) were adopted, corresponding each specification to a different model. For each independent variable are reported the estimated coefficient, the result of a Wald test for its individual significance in brackets and its (average) partial effect. By applying the maximum likelihood method that is based on the distribution of y given x , the heteroscedasticity in $\text{Var}(y|x)$ is automatically accounted for (Wooldridge, 2012). However, to eliminate any possible problem with heteroscedasticity, the Wald test uses robust standard errors that are adjusted for heteroscedasticity and clustered by firm to mitigate concerns about within-firm correlation (Petersen, 2009). The reported partial effects measure the probability of a change in ZL policy due to a one standard deviation change in a continuous explanatory variable or a change from 0 to 1 in a dummy variable (Wooldridge, 2012).

Adding board data reduces substantially the sample, hence similar to the procedure adopted by Strebulaev and Yang (2013), the analysis is started by introducing only standard firm-level variables and in different models are introduced board and ownership data separately. Model (1) incorporates the explanatory variables representing internal sources of liquidity and equity financing as alternatives to debt, a set of control variables and industry dummies (based on the 1-digit FTSE/Dow Jones Industry Classification Benchmark (ICB) code), year dummies and country dummies to mitigate concerns about omitted variables. The set of explanatory variables used in Model (1) can be expressed by the equation (3). Model (2) adds the *Ownership concentration* variable and finally, Model (3) incorporates board variables.

The applied econometric tests and criteria confirm the suitability of the estimated logit regression models. The Wald tests for the individual and joint significance of the explanatory variables confirm their ability to explain ZL. The Pseudo R-squared varies between 32.77% and 40.65%, being these values quite higher than those reported in previous studies analysing the impact of corporate governance mechanisms on zero leverage (Devos et al., 2012; Strebulaev & Yang, 2013). Considering additional measures of goodness-of-fit of all models it is concluded that the different models adopted fits well the data collected. Specifically, the percentage of values of ZL being correctly predicted by the model are always above 90%. Also, Akaike information criterion (AIC) and Bayesian information criterion (BIC) shows that the different models fits well the data.

Table 6. Regression models

| Independent variables | Base model (1) | Ownership concentration (2) | Board variables (3) |
|----------------------------------|-------------------|--------------------------------|------------------------|
| Board size | | | 0.690 |
| | | | (0.95) |
| | | | 0.024 |
| Independent directors | | | 0.872 |
| | | | (1.04) |
| | | | 0.031 |
| CEO duality | | | 0.382 |
| | | | (0.68) |
| | | | 0.013 |
| Ownership concentration | | -0.610*** | |
| | | (-3.34) | |
| | | -0.041 | |
| Profitability | 0.442*** | 0.484*** | 2.625*** |
| | (4.18) | (4.11) | (2.71) |
| | 0.030 | 0.032 | 0.093 |
| Cash holdings | 4.077*** | 4.304*** | 5.377*** |
| | (23.20) | (21.81) | (5.68) |
| | 0.279 | 0.286 | 0.190 |
| Market-to-book ratio | 0.032 | 0.035 | -0.079 |
| | (1.55) | (1.40) | (-0.82) |
| | 0.002 | 0.002 | -0.003 |
| Size | -0.408*** | -0.439*** | -1.072*** |
| | (-17.80) | (-17.13) | (-5.51) |
| | -0.028 | -0.029 | -0.038 |
| Tangibility | -0.751*** | -0.732*** | 0.077 |
| | (-3.03) | (-2.70) | (0.08) |
| | -0.051 | -0.049 | 0.003 |
| Dividend payout | 7.270*** | 7.572*** | 2.773** |
| | (7.74) | (7.36) | (2.09) |
| | 0.497 | 0.504 | 0.098 |
| Capital expenditures | -0.394 | -0.292 | -0.795 |
| | (-0.78) | (-0.48) | (-0.34) |
| | -0.027 | -0.019 | -0.028 |
| Non-debt tax shields | -2.097*** | -2.400*** | 3.532 |
| | (-3.09) | (-3.12) | (0.74) |
| | -0.143 | -0.160 | 0.125 |
| Constant | 2.517*** | 3.063*** | 10.109*** |
| | (8.99) | (9.59) | (4.53) |
| Year Dummies | Yes | Yes | Yes |
| Industry Dummies | Yes | Yes | Yes |
| Country Dummies | Yes | Yes | Yes |
| Observations | 41,526 | 37,387 | 4,611 |
| Wald test for joint significance | 1681.67*** | 1514.80*** | 187.18*** |
| Pseudo R2 | 0.3277 | 0.3392 | 0.4065 |
| Correct classification | 90.31% | 90.56% | 94.77% |
| AIC | 19525.82 | 17136.90 | 1238.36 |
| BIC | 19853.92 | 17469.53 | 1457.19 |

Table 6 presents the main results of the econometric models. The dependent variable takes the value of 1 if the firm has no debt in a given year and 0 otherwise. For each independent variable are reported the regression coefficients, the z-statistics (in brackets) and marginal effects (average partial effects). The fixed effects considered in each model are indicated at the bottom of each column. Robust standard errors are adjusted for heteroscedasticity and clustered by firm. ***, **, * indicates statistical significance at 1%, 5% and 10% respectively.

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Results presented in Model (1) show that variables that serve as a proxy for internal sources of liquidity, i.e. *Profitability* and *Cash holdings*, present a positive and significant effect on firms' propensity to have zero leverage. The increase of one standard deviation on firm's profitability, with the other variables remaining constant, increases the likelihood of zero leverage in around 3 percentage points (pp). More pronounced is the impact of cash holdings on *ZL*, specifically a positive change of one standard deviation on cash holdings levels corresponds to an increase of almost 28pp in the firm's likelihood of having zero leverage. Consequently, the results suggest that more profitable firms with higher cash holdings are more likely to be debt-free, which is in accordance with the arguments that internal sources of liquidity can substitute debt financing. Therefore, firms with higher internal liquidity can choose zero leverage to preserve financial flexibility by keeping their borrowing capacity which assures funds for future valuable investments that may arise (de Jong et al., 2012; Marchica & Mura, 2010; Rapp et al., 2014) or to avoid expensive external finance adopting a Pecking Order style of financing (Myers, 1984). According to these results, hypotheses H3a and H3b are validated, supporting the general hypothesis H3.

The *Market-to-book ratio* has a positive but insignificant effect on zero leverage. This result shows that firms with higher market valuation and thus with more growth opportunities are not more prone to have zero leverage. Therefore, contrary to the results presented by Bessler et al. (2013) and Byoun and Xu (2013), the predictions that firms can replace debt by equity financing as an attempt to take advantage of their higher market valuation (Baker & Wurgler, 2002; Leary & Roberts, 2010) are not confirmed. Thus, hypothesis H4 is rejected.

Regarding the control variables, traditional measures of credit constraints as firm size and tangibility (Hadlock & Pierce, 2010; Benmelech & Bregman, 2009) have a negative effect on *ZL*, indicating that small firms with less asset tangibility have greater propensity to have zero leverage. Furthermore, dividend payments present a positive and statistically significant effect on *ZL*, being the variable with the greatest economic impact on zero leverage. Finally, non-debt tax shields present a negative effect on zero leverage, while capital expenditures does not have a significant effect on zero leverage.

Model (2) that intends to capture the effect of external corporate governance mechanisms on zero leverage shows that initial results (Model 1) are stable with the introduction of this new variable. Moreover, the results confirm the importance of external mechanisms of corporate governance on zero leverage. The *Ownership concentration* variable has a negative and statistically significant coefficient, implying that a firm with a higher concentration of the ownership with the presence of large shareholders is less likely to have zero leverage. Specifically, the increase of one standard deviation in the level of ownership concentration, ceteris paribus, corresponds to a fall of approximately 4pp in the firm's likelihood of having *ZL*. The result confirms the managerial entrenchment argument that the presence of shareholders who own a large block of shares have strong incentives to monitor managers and protect the value of their investment (Shleifer & Vishny, 1986), reducing the propensity of zero-leverage policies adopted by managerial opportunistic reasons. A result distant from the non-significant effect of block ownership on zero leverage found by Devos et al. (2012) and that corroborates hypothesis H2.

Once again, Model (3), intending to capture the effect of internal corporate mechanisms on zero leverage, shows that previous results are stable. Concerning board related variables, *Board size*, *Independent directors* and *CEO duality*, all present a positive but insignificant effect on *ZL*. These results are not supportive of the entrenchment hypothesis that zero-leverage firms have weaker internal governance mechanisms that facilitate managerial entrenchment. Characteristics of a friendly board, of small dimension, where CEO holds a position and with less independency did not influence zero-leverage policies. Therefore, similar to the US study developed by Devos et al. (2012), in this study, zero leverage seems

not to be driven by opportunistic managers taking advantage of weaker internal corporate governance mechanisms to avoid the disciplinary pressures of debt and remain debt-free. This result allows to reject hypotheses H1a, H1b and H1c and the corresponding hypothesis H1.

Robustness Tests

This section considers several departures from models (2) and (3) to evaluate the robustness of the results. First, alternative dependent variables are used. Second, alternative econometric specifications to the pooled logit model are estimated. Finally, additional alternative estimation methods to address potential endogeneity problems related to previous estimates are provided.

Table 7 presents the results from the logit regression models using alternative dependent variables to ZL for debt conservatism. Models (2a) and (3a) replace ZL by the ZL3 variable, while Models (2b) and (3b) replace ZL by AZL. The first alternative dependent variable ZL3 was introduced by Devos et al. (2012), which classifies a firm as having zero leverage if during three consecutive years it has no debt in its capital structure as an attempt to assure that zero leverage is a persistent financial policy. The second variable is a dummy that takes the value of 1 if the book leverage ratio is below 5% (Strebulaev & Yang, 2013), corresponding to an almost zero-leverage policy (AZL) quite used in the literature to study the low-leverage phenomenon.

Overall the results are quite similar to those of the base models (2) and (3), keeping the main conclusions. Model (2a) and (3a) show that the determinants of a persistent zero-leverage policy are quite similar to those when zero leverage is based on only one year. Specifically, Model (2a) presents evidence that contradicts the results of Devos et al. (2012), since the presence of large shareholders, proxied by the ownership concentration, reduced also the propensity for a persistent zero-leverage policy, confirming that external mechanisms of corporate governance can discipline managers which reduces their tendency to present zero leverage by entrenchment reasons. However, on the other hand, in Model (3a) the results confirm those presented by Devos et al. (2012) that weaker internal corporate governance mechanisms facilitating managerial entrenchment do not determine a zero-leverage persistent policy.

Concerning the AZL variable, both models present similar results to those of the original models. Nevertheless, Model (2b) shows that *Market-to-book ratio* has a positive effect on low leverage. Therefore, it seems that firms with higher equity market valuation can take on equity financing to keep low-leverage levels but greater than zero. Finally, Model (3b) shows that a greater *Board size* increases low leverage propensity, once again a result that does not support the managerial entrenchment argument that firms with friendly boards (smaller boards) are more likely to present conservative levels of debt.

Table 8 presents the results from alternative econometric methods. Models (2c) and (3c), (2d) and (3d), (2e) and (3e) are estimated using the Pooled Probit, Random-effects Logit and Random-effects Probit methods, respectively.

Using alternative estimation methods that account for the binary nature of the dependent variable provides in most cases results similar to those initially reported in models 2 and 3, showing their robustness to the estimation method applied.

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Table 7. Robustness tests using alternative dependent variables

| Independent variables | ZL3 | | AZL | |
|----------------------------------|------------------------------|----------------------|------------------------------|----------------------|
| | Ownership concentration (2a) | Board variables (3a) | Ownership concentration (2b) | Board variables (3b) |
| Board size | | 0.509 (0.57) | | 0.826** (2.31) |
| Independent directors | | 0.804 (0.79) | | -0.161 (-0.32) |
| CEO duality | | 0.461 (0.65) | | -0.013 (-0.03) |
| Ownership concentration | -0.573** (-2.54) | | -0.439*** (-3.43) | |
| Profitability | 0.585*** (4.14) | 1.462 (1.45) | 0.488*** (4.85) | 3.301** (2.56) |
| Cash holdings | 3.778*** (17.99) | 5.097*** (4.87) | 5.527*** (26.29) | 6.325*** (8.29) |
| Market-to-book ratio | 0.016 (0.65) | -0.062 (-0.77) | 0.054** (2.14) | 0.091 (0.94) |
| Size | -0.385*** (-12.64) | -0.938*** (-4.36) | -0.322*** (-16.38) | -0.848*** (-6.91) |
| Tangibility | -0.537 (-1.56) | 0.924 (0.80) | -1.327*** (-6.54) | -1.107 (-1.52) |
| Dividend payout | 7.092*** (7.51) | 3.965*** (2.97) | 8.063*** (7.07) | -0.054 (-0.04) |
| Capital expenditures | -0.296 (-0.41) | -1.359 (-0.51) | -0.378 (-0.80) | -1.617 (-0.79) |
| Non-debt tax shields | -2.736** (-2.32) | 5.125 (0.87) | -2.537** (-4.70) | -4.842 (-1.57) |
| Constant | 2.035*** (5.27) | 7.976*** (3.12) | 2.617*** (10.19) | 8.518*** (5.36) |
| Year Dummies | Yes | Yes | Yes | Yes |
| Industry Dummies | Yes | Yes | Yes | Yes |
| Country Dummies | Yes | Yes | Yes | Yes |
| Observations | 37,387 | 3,577 | 37,387 | 5,352 |
| Wald test for joint significance | 1194.70*** | 190.54*** | 1687.86*** | 294.59*** |
| Pseudo R2 | 0.3014 | 0.3458 | 0.2866 | 0.3230 |
| Correct classification | 93.60% | 95.81% | 81.92% | 88.57% |
| AIC | 12663.19 | 902.92 | 30425.53 | 2984.61 |
| BIC | 12995.82 | 1100.75 | 30758.17 | 3241.44 |

Table 7 presents robustness test using alternative dependent variables. ZL3 variable takes the value of 1 if the firm has zero leverage during three consecutive years. AZL variable takes the value of 1 if the book leverage ratio is below 5%. For each independent variable are reported the regression coefficients and the z-statistics (in brackets). The fixed effects considered in each model are indicated at the bottom of each column. Robust standard errors are adjusted for heteroscedasticity and clustered by firm. ***, **, * indicates statistical significance at 1%, 5% and 10% respectively.

Table 8. Robustness tests using alternative econometric methods

| Independent variables | Pooled Probit | | Random Logit | | Random Probit | |
|----------------------------------|------------------------------|----------------------|------------------------------|----------------------|------------------------------|----------------------|
| | Ownership concentration (2c) | Board variables (3c) | Ownership concentration (2d) | Board variables (3d) | Ownership concentration (2e) | Board variables (3e) |
| Board size | | 0.253 (0.69) | | 0.544 (0.55) | | 0.223 (0.43) |
| Independent directors | | 0.361 (0.87) | | 0.755 (0.67) | | 0.435 (0.74) |
| CEO duality | | 0.328 (1.11) | | 1.552 (1.40) | | 0.819 (1.33) |
| Ownership concentration | -0.326*** (-3.49) | | -0.763*** (-3.31) | | -0.422*** (-3.44) | |
| Profitability | 0.248*** (4.08) | 1.405*** (3.06) | 0.405** (2.54) | 3.348** (2.47) | 0.221*** (2.63) | 1.879*** (2.74) |
| Cash holdings | 2.450*** (23.23) | 2.955*** (6.23) | 5.172*** (15.96) | 8.913*** (4.45) | 2.820*** (16.69) | 4.716*** (4.44) |
| Market-to-book ratio | 0.027** (2.09) | -0.032 (-0.74) | 0.049 (1.60) | -0.173 (-1.40) | 0.031* (1.90) | -0.087 (-1.39) |
| Size | -0.238*** (-17.90) | -0.522*** (-5.05) | -0.857*** (-17.58) | -1.742*** (-6.00) | -0.461*** (-17.49) | -0.918*** (-6.09) |
| Tangibility | -0.326** (-2.48) | -0.062 (-0.13) | -1.965*** (-4.84) | 0.284 (0.20) | -1.026*** (-4.83) | 0.215 (0.29) |
| Dividend payout | 3.974*** (8.36) | 1.543** (2.21) | 7.960*** (6.44) | 1.608 (0.59) | 4.249*** (6.89) | 0.913 (0.68) |
| Capital expenditures | -0.203 (-0.65) | -0.401 (-0.35) | -0.947 (-1.17) | -3.828 (-1.01) | -0.562 (-1.32) | -2.456 (-1.22) |
| Non-debt tax shields | -1.286*** (-3.33) | 1.317 (0.75) | -3.388*** (-3.75) | -3.691 (-0.98) | -1.785** (-3.75) | -2.108 (-0.97) |
| Constant | 1.552*** (9.21) | 4.851*** (4.41) | 6.907*** (12.11) | 17.556*** (5.16) | 3.673*** (11.83) | 9.303*** (5.08) |
| Year Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Country Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 37,387 | 4,611 | 37,387 | 4,611 | 37,387 | 4,611 |
| Wald test for joint significance | 1661.68*** | 210.36*** | 1698.98*** | 126.91*** | 1832.23*** | 135.85*** |
| Pseudo R2 | 0.3436 | 0.4113 | | | | |
| Correct classification | 90.53% | 94.77% | | | | |
| AIC | 17022.32 | 1228.92 | | | | |
| BIC | 17354.95 | 1447.75 | | | | |

Table 8 presents robustness test by using alternative econometric methods. For each independent variable are reported the regression coefficients and the z-statistics (in brackets). The fixed effects considered in each model are indicated at the bottom of each column. Robust standard errors are adjusted for heteroscedasticity and clustered by firm. ***, **, * indicates statistical significance at 1%, 5% and 10% respectively.

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Endogeneity problems are ubiquitous in empirical research about capital structure decisions. Recognizing possible endogeneity problems, previous studies on debt conservatism frequently lag all independent variables by one year to alleviate these concerns (namely about jointly determined variables and reverse causality) (e.g. Ghoul et al., 2018). Therefore, Table 9, Models (2f) and (3f), presents the results from alternative models with all firm-level independent variables lagged by one period. Additionally, in Models (2g) and (3g) firm-fixed effects methods are applied to control for unobserved sources of firm heterogeneity.

Once again, the results are very similar to those already discussed in the previous section, not changing main findings, which allows to alleviate some concerns about endogeneity problems.

CONCLUSION

This study analysis the zero-leverage phenomenon in European context. During the period of 2001 and 2016 approximately 11.86% of the observations are classified as debt-free firms. However, the distribution of zero-leverage firms across the countries is not homogeneous, with countries more affected by financial and sovereign debt crises that prevent their normal economic growth, availability of finance and recovery of investment levels being those with smaller levels of debt-free firms. Specifically, on average, around 4% of observations recorded on PIIGS countries correspond to debt-free firms, while almost 14% is recorded in the group of countries with more strong economies (France, Germany and the UK). Findings that complement those of Ghoul et al. (2018) and Bessler et al. (2013) that lower income economies and with civil law systems have less predominance of zero-leverage firms.

Another finding shows that higher ownership concentration decreases firm's propensity to have zero leverage, a result that is valid independent if the zero leverage is a persistent or "temporary" policy, i.e. robust to different zero leverage classifications; and to different econometric methods. Therefore, contrary to Devos et al. (2012), in this study is concluded that the presence of shareholders who own a large block of shares have strong incentives to monitor managers' actions, decreasing the managers' propensity to act according to their own preferences and to avoid the disciplinary pressures associated with leverage. By the other side, if external mechanisms of corporate governance adopted, in this study, affect zero leverage, internal board-related mechanisms do not.

Concerning alternative sources of finance, it is shown that firms with greater internal liquidity are more likely to be debt-free. Evidences consistent with the arguments of both financial flexibility, i.e., a firm avoid debt today and build up their liquidity in an attempt to preserve borrowing capacity and assure financing for future investments; and Pecking Order style of financing, i.e., a firm avoids resort to expensive external financing. Additionally, equity financing seem not to be an alternative source of financing for zero-leverage firms, since the proxy used for market valuation is not significant in most models. It is concluded that debt-free firms rely on internal liquidity to support their policy of financial conservatism.

Table 9. Robustness tests accounting for endogeneity

| Independent variables | Lagged independent variables | | Firm-fixed effects | |
|-------------------------------------|------------------------------|----------------------|------------------------------|----------------------|
| | Ownership concentration (2f) | Board variables (3f) | Ownership concentration (2g) | Board variables (3g) |
| Board size | | 0.104 | | 0.124 |
| | | (0.15) | | (0.14) |
| Independent directors | | 1.062 | | 1.086 |
| | | (1.26) | | (0.96) |
| CEO duality | | 0.447 | | 1.332 |
| | | (0.79) | | (1.48) |
| Ownership concentration | -0.570*** | | -0.606*** | |
| | (-2.98) | | (-2.98) | |
| Profitability | 0.399*** | 2.423** | 0.325** | 1.699 |
| | (2.91) | (2.35) | (2.56) | (1.61) |
| Cash holdings | 4.196*** | 4.824*** | 3.108*** | 6.597*** |
| | (20.10) | (5.13) | (14.27) | (4.65) |
| Market-to-book ratio | -0.003 | -0.081 | 0.017 | -0.043 |
| | (-0.11) | (-0.87) | (0.75) | (-0.42) |
| Size | -0.430*** | -1.046*** | -0.705*** | -0.738*** |
| | (-15.82) | (-4.83) | (-13.11) | (-2.60) |
| Tangibility | -0.659** | -0.003 | -2.694*** | 2.578 |
| | (-2.30) | (-0.00) | (-7.16) | (1.43) |
| Dividend payout | 7.160*** | 3.100** | 7.213*** | 1.775 |
| | (6.95) | (2.01) | (6.68) | (0.78) |
| Capital expenditures | -0.037 | 0.067 | -1.541** | -8.872** |
| | (-0.06) | (0.03) | (-2.14) | (-2.08) |
| Non-debt tax shields | -1.529** | 3.616 | -3.388*** | -7.336 |
| | (-2.03) | (0.67) | (-4.43) | (-0.89) |
| Constant | 3.011*** | 10.429*** | | |
| | (8.94) | (4.29) | | |
| Year Dummies | Yes | Yes | No | No |
| Industry Dummies | Yes | Yes | No | No |
| Country Dummies | Yes | Yes | No | No |
| Observations | 32,512 | 3,948 | 8,248 | 547 |
| Wald/LR test for joint significance | 1363.80*** | 214.97*** | 850.11*** | 64.69*** |
| Pseudo R2 | 0.3247 | 0.3852 | | |
| Correct classification | 90.59% | 94.78% | | |
| AIC | 15009.02 | 1102.89 | | |
| BIC | 15327.81 | 1310.16 | | |

Table 9 presents robustness tests by using alternative econometric methods with lagged independent variables (Models 2f and 3f) and with firm-fixed effects (Models 2g and 3g). For each independent variable are reported the regression coefficients and the z-statistics (in brackets). The fixed effects considered in each model are indicated at the bottom of each column. Robust standard errors are adjusted for heteroscedasticity and clustered by firm. ***, **, * indicates statistical significance at 1%, 5% and 10% respectively.

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This study contributes directly to the growing research on zero leverage, particularly to the specific effect of corporate governance on this policy, in an attempt to test the managerial entrenchment hypothesis. In particular, this is the first study of this nature developed outside the US, contributing to the contrasting evidences presented in that country. Therefore, this study complements those of Devos et al. (2012) and Strebulaev and Yang (2013) by showing that presented results are valid for persistent (Devos et al., 2012) or “temporary” (Strebulaev & Yang, 2013) zero-leverage policies and robust to different econometric methods.

Beyond theoretical contributions, this study can be used also by practitioners namely by firms’ shareholders. To this public it is shown that the existence of block holders, a mechanism that decreases entrenchment managers, also contributes to decrease the propensity for zero-leverage policies. Therefore, the greater the ownership held by the shareholder the greater the tendency for managers to act accordingly with the principal interests, avoiding zero-leverage policies due to opportunistic reasons. For small shareholders, with little ability to build blocks of shares and to develop effective supervising actions to the managers’ actions, it is suggested that the investment in firms with the presence of large shareholders allows a lower propensity for opportunistic zero-leverage policies, guaranteeing greater protection to their investment.

Future research should explore the role of recent crises experienced in the European context on zero-leverage. Moreover, it will be also relevant to highlight the role of the financial system development on zero leverage, and to explore the effects of the crisis on debt-free firms in different financial systems. Finally, evidence on the performance of debt-free firms will be decisive for classifying this policy as beneficial to the company or not.

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KEY TERMS AND DEFINITIONS

Capital Structure: Combination of debt and equity used by a firm to fund its operations and finance its assets.

Corporate Governance Structures: Mechanisms defining the rights and duties of managers and shareholders in a firm, allowing to monitor the manager's performance.

Independent Boards: Boards composed by outside, non-executive, directors.

Managerial Entrenchment: Manager's actions and decisions are taken to increase their own private benefits rather than to maximize shareholder wealth.

PIIGS Countries: Acronym used to refer to the economies of Portugal, Ireland, Italy, Greece and Spain.

Zero-leverage Firms: Firms with zero short- and long-term debt in a given year.

Zero-leverage Phenomenon: The expression used to refer the growing trend of firms to have zero leverage in their capital structure.


ENDNOTE

In particular, PIIGS countries were characterized by high deficits and large debt, being those most affected by the recent financial crisis that has been related to sovereign debt crises that until very recently prevented the normal economic growth, the availability of finance and the recovery of investment levels (European Commission, 2014; European Investment Bank, 2015), which drove some of them (Portugal, Ireland and Greece) to request external financial assistance to avoid default on their sovereign debt.


Chapter 12

Corporate Governance and Properties of Accounting Numbers in Brazil

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ABSTRACT

This chapter analyzes 30 variables of the boards of directors (BDs) and oversight boards (OBs) of 325 Brazilian companies from 2011 to 2015, including examination of 19,487 resumés of their members. With support from factor analysis, the authors performed empirical tests considering the relations between the underlying factors of BDs and the properties of Brazilian accounting numbers, controlling for ownership structure, differences in corporate governance levels, issuance of ADRs, type of auditor, presence of an OB, size, and leverage. Factors like age, board interlocking, and variable compensation arrangements are the main characteristics associated with the variations in the accounting information properties of the firms analyzed. On the other hand, characteristics such as gender diversity, existence of a controlling shareholder chairing the board, board independence, and other characteristics considered relevant in the international literature tended to lose strength when the spectrum of variables analyzed increased.

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INTRODUCTION

Many properties can be attributed to accounting information. Besides being essentially informative, various other characteristics are considered important, such as relevance, conservatism, timeliness and persistence of earnings (Lopes & Walker, 2008). According to Dechow *et al.* (2010), six factors are responsible for determining the quality of accounting numbers: i) firm characteristics; ii) accounting practices; iii) corporate governance mechanisms; iv) auditing; v) capital market incentives; and vi) other external factors.

This study examines the corporate governance mechanisms – mainly operating through two specific bodies, the board of directors (BD) and oversight board (OB)¹ – and their influences on the properties of accounting numbers, especially profits. The authors analyzed the influence of BDs and OBs (when established) of listed Brazilian companies regarding the properties of their accounting numbers.

Studies of governance tend to report inconsistent coefficients due to the limited number of variables to represent its quality (Dechow *et al.*, 2010). To resolve this type of problem, also common in studies related to Corporate Governance, the authors analyzed a broad set of characteristics of the two boards, by factor analysis (FA) and the construction of indexes derived from that technique. The use of FA aims to extract constructs that better reflect, in non-correlated form, most of the variance of the original data, besides permitting discerning a robust relation between the environment of the boards and the quality of the accounting information disclosed, considering the possible effect of reverse causality between the various characteristics analyzed.

The general hypotheses of this chapter is that the board of directors and oversight board, through their monitoring of management, influence the quality of the information disclosed at various levels, depending on the structure in which each board operates and the compensation paid to the members. It is possible that better monitoring of executives will reduce the manipulation of results to benefit managers and increase the earnings persistence.

According to Martinez (2010), the tolerance for earnings management can be explained by the profile of the board of directors. Du, Jian & Lai (2017) identified that the presence of foreigners on the boards of directors tended to mitigate earnings management. In this respect, Gul, Srinidhi & Tsui (2007) identified that firms with female directors tended to manage earnings less and had higher quality of accruals.

In turn, Klein (2002) supplies evidence that the independence of boards is responsible for increasing the levels of monitoring of accounting processes. In this respect, it is possible that other characteristics, such as education, age and specific knowledge of directors, influence the quality of monitoring of managers to the point of preventing, for instance, an undesirable reputation in the market, as well as manipulation of results for purposes unknown to the shareholders.

Aspects like the frequency of meetings and size of boards can increase the monitoring power of directors, and consequently the quality of accounting information. A larger board is seen as being more capable of preserving the interests of shareholders, since it has more resources (Zahra & Pearce, 1989), a greater range of experiences to share (Xie *et al.*, 2003) and greater expertise (Zahra & Pearce, 1989; Rahman & Ali, 2006). On the other hand, larger boards tend to take longer to reach decisions and are more likely to resist innovations (Jensen, 1993).

Another relevant point is whether the presence of an oversight board has an effect on the numbers disclosed by firms. Since this is a body inexistent in most other countries in the world, few studies have examined this theme in Brazil, making it an attractive research target.

In this respect, the authors empirically analyzed the properties of the accounting numbers from the standpoint of corporate governance, through the relations established between the various characteristics of the board of directors and oversight board – such as the proportion of members with advanced degrees (MSs and PhD), levels of independence, influence of the controlling shareholder, frequency of meetings, compensation of members, formal mechanisms to evaluate boards, among others – and the properties of the accounting numbers disclosed.

Studies investigating this type of relationship with broad scope are unusual in the literature, so the importance of this study is the fact it can clarify the understanding of the real role of these two boards in terms of influence on the quality of the financial reports announced in the Brazilian capital market, thus allowing market agents to consider the structures of the boards as an important characteristic in making investment decisions.

This study's results also have implications for regulatory agencies in efforts to minimize the opportunities for managing earnings and improve the quality of the accounting information disclosed by firms. Finally, companies wanting to strengthen their governance regarding aspects related to the quality of financial information can also benefit from studies of this nature.

BACKGROUND

Board of Directors and Oversight Board in Brazil

All publicly traded firms must have board of directors in Brazil. Its composition is specified in Article 140 of Law 6.404/1976 (Law of Corporations), which among other matters sets the size limits (minimum of three members) and the rules on the election of members by minority shareholders through multiple voting (Article 141).

Brazilian law also establishes the figure of the oversight board. It is a body that functions independently of the board of directors and the executive board, with the objective of assuring fair rendering of accounts by managers, to help improve the performance of firms (IBGC, 2007, p. 9). The oversight board has existed in Brazilian legislation since 1940. It has the basic purpose of assuring transparency to the shareholders. For this purpose, the oversight board has the legal power to oversee both the acts of managers and the financial statements released to the market (at least quarterly for listed firms), making this body an interesting target for study.

In other countries the function exercised by the oversight board is usually encompassed by the audit committee. According to Section 301 of the Sarbanes-Oxley Act (SOX), the audit committee is responsible for the engagement and supervision the independent audit firm, as well as for creating procedures to deal with anonymous complaints or accusations from employees regarding accounting matters. In this sense, in the case of Brazil firms that issue American Depositary Receipts (ADRs) must have a permanent audit committee or incorporate the functions of the audit committee in the oversight board, configuring what is known in the market as a “turbocharged oversight board”. On the other hand, the existence of an audit committee does not imply the impossibility of establishing an oversight board (IBGC, 2010), suggesting complementarity between the two bodies (Brugni *et al.*, 2013).

Properties of Accounting Numbers

The literature on the properties of accounting numbers has expanded in recent decades. In this respect, researchers have developed some models aiming to analyze various properties of the main accounting category: profits or earnings (Dichev & Tang, 2007). Therefore, it is necessary to discuss some specific models meant to analyze the quality of earnings, such as earnings persistence, earnings management and timeliness of recognizing losses.

Earnings persistence is a construct commonly used to assess the quality of earnings (Schipper & Vincent, 2003). Dechow & Schrand (2004) stressed that this quality, from the perspective of conveying information to users, is measured by how closely earnings reflect current performance and presage future performance. For Dichev & Tang (2009), many applications of accounting data require good prediction of profits.

In this context, the persistence of earnings can be taken as a quality measure focused on the capacity of current results to supply information to enable forecasting future returns, making it an important tool for investors. In applying empirical tests of the implications formalized by Miller & Rock (1985) that the magnitude of the reaction of returns to changes in earnings depends on their persistence, Kormendi & Lipe (1987) defined earnings persistence in the following form:

$$EAR = \alpha_0 + \beta_1 EAR_{t-1} + \varepsilon_t \quad (1)$$

where *EAR* is earnings in the period, generally scaled by assets or number of shares outstanding. Therefore, the closer β_1 is to 1, the greater will be the persistence of earnings, and consequently the better their quality.

Various authors have used this approach, among which the authors can mention Ali & Zarowin (1992), Lev & Thiagarajan (1993) and Francis *et al.* (2004). Regardless of the results, important questions have to be raised regarding studies of this nature, since earnings persistence can be the result of manipulation of the accounting numbers associated with specific strategies of firms or an inherent feature of the firm's market segment, making this quality metric inconsistent or even inapplicable for users of this information.

Studies associating earnings persistence with parameters of boards of directors are not common, although some studies have sought to associate governance levels with this type of accounting property. In this sense, Hsu & Hu (2016) identified that firms whose directors more actively provide strategic counsel to top managers tend to report more persistent earnings. In turn, Ben-Nasr, Boubakri & Cosset (2015) suggested that the concentration of ownership in recently privatized companies tends to be associated with less persistent earnings. Furthermore, Sivaramakrishnan & Yu (2008) found evidence that firms with strong corporate governance mechanisms (measured by Gomper's index) tend to present more persistent earnings.

Jiang, Lee & Anandarajan (2008) used the Gov-Score to measure the relation between earnings quality and corporate governance. They found that firms with high corporate governance levels disclose significantly better results in terms of quality (such as persistence) when compared to firms with lower governance levels.

Baber *et al.* (1998) found that CEO compensation based on profits is positively related to the persistence of earnings, suggesting that this compensation is influenced by the economic substance of the results disclosed. Starting from this premise, it is possible that directors whose remuneration is based

on results exercise differentiated mechanisms to monitor CEOs – in terms of manipulation of numbers through discretionary accruals to report more persistent earnings, for example.

With regard to the oversight board, there is virtually no evidence, since this body is seen as supplementary in Brazil and has no counterpart in typical benchmark countries like the United States and United Kingdom. For this reason, and also because of the scant research on the characteristics of the oversight board and earnings persistence, it is necessary to discuss the incentives related to that body and the phenomenon of persistence potentially found in the earnings of Brazilian firms.

In turn, the theme of earnings management has been widely studied and various relations with corporate governance characteristics have been found. There is no single earnings management metric in the literature. Among those that stand out are the models of Eckel (1981), Healy (1985), Jones (1991), Dechow, Sloan and Sweeney (1995), Kang (1999) and Leuz, Nanda & Wysocki (2003) and others.

Each of these models has its peculiarities and difficulties in terms of estimations and evaluation. Among the models found in the literature, it is possible to note a basic difference in approach. While the model of Eckel (1981) measures the level of income smoothing by the linear relation between sales revenue and net accounting profit, the other mentioned models measure earnings management by means of accruals, such as Healy (1985), who analyzes total accruals, and the other models, which examine the portion of accruals that can be considered discretionary.

For robustness purpose, the authors test both the Eckel and the modified Jones model for measuring Earnings Management and associate it to Corporate Governance.

According to Dechow, Sloan, and Sweeney (1995), the Modified Jones Model tends to reduce the measurement error of discretionary accruals. For them, the modified Jones model provides more effective results on measuring earnings management compared to other models. Despite other models known for measuring earnings management, the authors assume Dechow, Sloan, and Sweeney (1995) as effective for measuring earnings management in Brazil due to its large presence on Brazilian accounting literature.

In the modified model, Dechow, Sloan, and Sweeney (1995) state that nondiscretionary accruals are estimated during the event period, as:

$$NDA - \alpha_1 \left(\frac{1}{A_{t-1}} \right) + \alpha_2 (\Delta REV_t - \Delta REC_t) + \alpha_3 (PPE_t)$$

(2) where ΔREC_t , = net receivables in year t less net receivables in year t-1 scaled by total assets at t-1.

The estimates of $\alpha_1, \alpha_2, \alpha_3$ and nondiscretionary accruals during the estimation period (in which no systematic earnings management is hypothesized) are those obtained from the original Jones Model. The only adjustment relative to the original Jones Model is that the change in revenues is adjusted for the change in receivables in the event period.

Davidson, Stewart & Kent (2005) identified a significant negative relationship between earnings management and the presence of boards composed mainly of non-executive members, thus suggesting a significant relationship between the profile of directors and the likelihood of earnings management.

Evidence from many countries indicates that the corporate governance structure plays a significant role in reducing earnings management practices. Xie *et al.* (2003) demonstrated this scenario in the United States, while González & Garcia-Meca (2014), Kang, Leung, Morris & Gray (2013), Iqbal & Strong (2010) and Liu & Lu (2007) presented the same findings of a negative association between good

corporate governance structures and the propensity to manage earnings in Latin America, Australia, United Kingdom and China, respectively.

Studies related to the oversight board are rare, as stated mainly because this is a body specific to Brazil. However, two important studies relating the features of this board to earnings management can be mentioned. Trapp (2009) found that the existence of the oversight board in a company is in general associated with lower levels of earnings management, while Prado (2013) identified that the oversight board has little power to deter the practice of earnings management by administrators.

Although conservatism is no longer a desirable characteristic in terms of international accounting, the timely recognition of losses is an important qualitative trait of accounting information, and in this sense conditional conservatism has long been found to have an influence on accounting (Watts, 2003).

There are two types of conservatism: conditional and unconditional. Unconditional conservatism is the process of reporting low book values, independent of signs of probable economic losses (Ball & Shivakumar, 2005). In contrast, conditional conservatism implies recognizing economic facts timely and asymmetrically, by recognizing indications of negative results at the moment they are identified (Coelho, 2007).

Basu (1997) defined a model for timely recognition of losses as follows:

(3) where $EAR_{i,t+1}$ represents the profit of firm i at time $t+1$, $RET_{i,t}$ denotes the return of firm i at time t and $D_{i,t}$ is a dummy that assumes the value 1 for negative returns and 0 for positive returns.

The model assumes that the market efficiently reflects losses through returns (RET) at the moment they are incurred. Therefore, a rise of β_3 implies more timely recognition of lower earnings.

In Brazil, Almeida *et al.* (2012) identified that firms with strong conditional conservatism are more likely to smooth income, indicating that conditional conservatism is related to the quality of accounting information. Their results corroborated those of Kim & Pevzner (2010), who indicated that the market reacts more strongly to good results of conditionally conservative firms and to a lesser degree to bad news. On the other hand, Burgstahler & Dichev (1997) and DeGeorge, Patel & Zeckhauser (1999) reported that firms also manage earnings to avoid recognizing losses and/or to report results near those forecast by analysts. Finally, Ruch & Taylor (2015) indicated that conditional conservatism reduces information asymmetry, but it also reduces the accuracy of analysts' forecasts and the relevance of information, and makes executives' compensation more sensitive to profits.

METHOD AND EMPIRICAL TESTS

The data were gathered from the reference forms (RFs)² of 325 listed Brazilian firms between 2011 and 2015, for a total of 1,618 firm-observations. From these reports, the authors analyzed 30 variables of the two boards, gleaned by reading, interpreting and analyzing 10,893 résumés of directors and 8,594 of oversight board member, an average of 3,897 read and interpreted for each year, besides analysis of other variables not related to the résumés.

After evaluating the possible presence of outliers in the sample by applying the BACON algorithm, the authors applied factor analysis. Then the authors applied two tests of the adequacy of the technique for each year of the sample: Bartlett's sphericity test and the Kaiser-Meyer-Olkin (KMO) test. Both these tests indicated the adequacy of the factor analysis for the BD variance of the characteristics of the members of this body over time.

Besides this, the authors performed three other steps: i) identification of the factor extraction method; ii) choice of the criterion to choose the number of factors to explain the underlying data structure; and iii) construction of the indexes.

The factor extraction method used was common factors because it best fitted the research question. The latent root criterion was used to select the number of factors to be extracted, along with the orthogonal rotation method.

The third step consisted of developing the indexes, based on the underlying factors constructed, to enable analyzing the associations between the characteristics of the board of directors and oversight board and the properties of the accounting numbers in Brazil.

Besides FA, the authors also applied multiple linear and logistic regression models to assess the relations between the corporate governance factors and properties of accounting earnings reported in the Brazilian capital market.

The FA technique used can be generically represented by the following equation:

(4) where X_i represents the standardized variables; α_{ij} the factor loadings, representing the weight of variable i in factor j or the degree of correlation between them; F_j denotes the common factors; and ε_i denotes the factors that explain the largest portion of the specific variances.

Most of the studies reviewed used subjective questions to construct the respective indexes – questions that can generally be answered by consulting published information, with binary responses (yes/no). However, the authors used factor analysis as the tool to support creation of the indexes.

In this context, each factor extracted via the factor analysis was represented by an index, measured according to equations 5. Therefore, the authors multiplied each standardized variable by the factor score coefficients corresponding to each variable of the factor, as follows:

(5) where $FSC_{f,n}$ denotes the factor score coefficient, representing the coefficient of variable n referring to the factor score matrix of factor f ; $x_{f,n}$ represents the original variable n significant for factor f , $\mu_{f,n}$ is the mean of the variable n significant for factor f , and $\sigma_{f,n}$ represents the standard deviation of the variable n significant for factor f .

The models used in this study are based on the premise that the variables that explain the greatest part of the variance of the data related to the makeup of the boards of directors and oversight boards can influence the quality of information disclosed by companies. To evaluate this condition, the authors created indexes in function of each dependent variable designed to capture a certain property of accounting information, tested by form of multiple regressions, controlled for the effects of simultaneity of the predictor variables and the error term. The general model can be determined as follows:

(6) where EQ_{it} is the earnings quality metric of firm i at time t ; β_n are the angular coefficients between the structural indexes of the board and the dependent variables, represented by $f1_{i,t}$, $f2_{i,t}$, $f3_{i,t}$ to $fn_{i,t}$; γ_n are the angular coefficients between the control and dependent variables; $ctrl_{it}$ represent the control variables size and leverage; $\varnothing_1 \dots \varnothing_n$ are the angular coefficients between the quality metrics and the variables that measure the level of adhesion to enhanced governance trading segments (Levels 1 and 2 and New Market), as well as other controls that indicate differentiated governance and ownership structures; $DI1_{it}$, $DI2_{it}$ and Dnm_{it} are dummies that represent the adherence of firm i to one of the enhanced governance segments at time t ; ADR_{it} is a dummy variable that assumes value of 1 for firms issuing American Depositary Receipts (ADRs) and 0 otherwise; $BIG4_{it}$ is a dummy variable

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that assumes value 1 for companies audited by one of the largest four audit firms and 0 otherwise; and

$\sum_1^n \emptyset_n owner_{it}$ is the sum of the dummy variables for ownership structure.

As discussed in the literature review, the authors considered three proxies to operationalize EQ_{it} : i) earnings persistence; ii) earnings management; and iii) timely loss recognition.

The persistence metric is based on the premise that current earnings have important information content to predict future profits (Freeman *et al.*, 1982). Therefore, the model to measure earnings persistence in function of the factors of the boards of directors can be represented as follows:

$$PERSIST_{i,t} = \alpha_i + \sum_1^n \beta_n fn_{i,t} + \sum_1^n \gamma_n ctrl_{i,t} + \emptyset_1 DI1_{i,t} + \emptyset_2 DI2_{i,t} + \emptyset_3 Dnm_{i,t} + \emptyset_4 ADR_{i,t} + \emptyset_5 BIG4_{i,t} + \sum_1^n \emptyset_n owner_{i,t} + \varepsilon_{i,t}$$

(7) Where: $PERSIST_{it}$ is the dependent variable that measures earnings persistence, derived from β_1 of equation 1.

In turn, to model earnings management the authors adopted both the Eckel (1981) and Dechow, Sloan, and Sweeney (1995) model. To identify the relation between earnings management and the factors of the boards of directors, the authors used the following regression:

$$EM_{it} = \alpha_i + \sum_1^n \beta_n fn_{i,t} + \sum_1^n \gamma_n ctrl_{i,t} + \emptyset_1 DI1_{i,t} + \emptyset_2 DI2_{i,t} + \emptyset_3 Dnm_{i,t} + \emptyset_4 ADR_{i,t} + \emptyset_5 BIG4_{i,t} + \sum_1^n \emptyset_n owner_{i,t} + \varepsilon_{i,t} \quad (8)$$

Where: EM_{it} is the Earnings Management measured by index of Eckel (1981) or Dechow, Sloan, and Sweeney (1995) model.

In the case of the measure of asymmetric timing and timely loss recognition, the most frequent setup found in the literature is that of Basu (1997), according to equation (3). Consequently, the model to capture the relation between timeliness of loss recognition and the factors of the boards of directors derives from the general model and is represented by the following equation:

$$TLR_{i,t} = \alpha_i + \sum_1^n \beta_n fn_{i,t} + \sum_1^n \gamma_n ctrl_{i,t} + \emptyset_1 DI1_{i,t} + \emptyset_2 DI2_{i,t} + \emptyset_3 Dnm_{i,t} + \emptyset_4 ADR_{i,t} + \emptyset_5 BIG4_{i,t} + \sum_1^n \emptyset_n owner_{i,t} + \varepsilon_{i,t} \quad (9)$$

Where: $TLR_{i,t}$ is the dependent variable to measure timing of loss recognition, derived from β_3 of equation 3.

In the case of the control variables, the authors used the natural logarithm of total assets as the proxy for firm size, as represented in (10).

$$SIZE_{i,t} = \ln(TA_{i,t}) \quad (10)$$

Where: $TA_{i,t}$ is the total assets of the firm i in period t.

The authors used two proxies to control for the effect of debt level (leverage). The first was tested in the sense of also considering firms' operating liabilities, which in Brazil have relatively high expression in total liabilities, represented by the ratio between debt capital (operating and non-operating liabilities) and total assets:

$$LEV_{i,t} = \frac{DC_{i,t}}{TA_{i,t}}$$

(11)Where: $LEV_{i,t}$ is the leverage of firm i in period t ; $DC_{i,t}$ is the debt capital (current and long-term liabilities) of firm i in period t .

The second proxy considers gross debt as an alternative for leverage. In this respect, the alternative proxy to control for the companies' indebtedness is represented by the following expression:

$$LEV2_{i,t} = \ln(GDEB_{i,t})$$

(12)Where: $LEV2_{i,t}$ denotes the leverage of firm i in period t ; and $\ln(GDEB_{i,t})$ is the natural logarithm of the gross debt of firm i in period t .

Also for the effect of control, the authors considered listing in trading segments of the BM&FBovespa requiring enhanced governance (Level 1, Level 2 or New Market), to make the analyses more consistent.

To control for the effect of the quality of the audit work in relation to the financial statements, the authors identified if the independent auditor of each company was one of the big four in the world (Big 4). In this respect, the assumption is that the auditing work by one of these firms is better than that of other auditors, tending to improve the quality of the accounting numbers.

RESULTS AND DISCUSSION

Boards of Directors According to Factor Analysis

After performing the factor analysis for each period, the authors considered five underlying variables for the RFs from 2011 to 2015, according to the latent root criterion for extraction of factors. Additionally, two factors besides those with eigenvalues greater than 1 were maintained in each year for being considered relevant in the literature on the theme and for representing significant characteristics of the model.

The result extracting the underlying variables according to the latent root criterion suggests that five factors explained nearly 80% of the variance of the data for RF2015. The loadings of the extracted factors as well as the commonalties for RFs from 2011 to 2014 presented similar behavior.

Fewer than half of the variables (40%) of the database analyzed explained the majority of the variance, and compensation of executives and level of dedication of board members were highly important to explain nearly half of this variance (considering the sum of factors 1 and 2). The level of dedication of board members, or the time dedicated to other boards, was the main characteristic in this respect.

The form of compensating the members also proved to be an important variable to explain the largest portion of the variance of the data (17.35%), besides being a relevant characteristic reported in the national and international literature on corporate governance and properties of accounting numbers. The remuneration of board members can have beneficial effects in the collective interest or can lead to opportunistic behavior.

Another important characteristic reported in the literature was significant in the total variance of the data (30.59%). Represented by factors 3 and 4, the age (minimum, maximum and average) of board members explained a good part of the variance, leading to the belief that this factor is also significant from the standpoint of experience of board members with respect to the properties of accounting numbers disclosed in Brazil.

Factor 5 involves the area of professional background, and 12.45% of the variance was explained by the fact of members holding bachelor's degrees in administration, economics and/or accounting and whether or not members had some further postgraduate specialization.

The outputs of factors 6 and 7 were maintained for together presenting relevant factor loadings in the sample and also for representing important characteristics reported in the national and international literature. Although not explaining a large proportion of the variance, and assuming that factor 6 can be identified as "influence of the controller on the independence of the board", it is possible that the supremacy of the controller in appointing board members can undermine the independence of the board, in line with the assertion of Dutra & Saito (2002).

Characteristics of Boards of Directors/Oversight Boards and Earnings Persistence

The authors ran the model only with statistically significant variables, since the inclusion of other variables tends to bias the significant coefficients. Besides this, the dynamic generalized method of moments did not produce consistent results, since the significant factors of the model were not statistically correlated with the random error term for all sample.

Persistence is a desirable property of earnings, since from the perspective of information users, the more consistent that current earnings are, the better will be the ability to predict future performance (Dechow & Schrand, 2004). In this light, the earnings persistence metric (equation 7) was tested to identify a possible association of features of the boards of directors and/or oversight boards with earnings persistence for a window of five years.

According to our empirical results, the factor that measures the participation of board members on the boards of other companies is a relevant underlying characteristic to explain the phenomenon of earnings persistence in the Brazilian market. The results show a significant inverse relation of the proportion of members that sit on other boards and the persistence levels. In other words, the signs suggest that firms whose boards of directors and/or oversight boards are formed by dedicated members tend on average to report more persistent earnings. This is consistent with the findings of Hsu & Hu (2016). The result held with the inclusion of sectorial dummies in the model, in which RFs 2011 and 2013 became significant.

An important reservation must be noted: the fact that an association exists between a pair of variables does not necessarily mean a cause-effect relationship exists between them. However, the results found suggest that the level of occupation of board members on other boards at the same time is a good proxy to measure the impact of board makeup on the persistence of earnings, since the factor in question is isolated from common correlations with other variables in this study. This is in contrast to other studies

in the literature on the matter, which, in considering a limited set of variables, have reported inconsistent associations (e.g., Dechow *et al.*, 2010).

As discussed in the methods section, to calculate the betas of the persistence equation, the authors used as earnings metrics both the natural logarithm and the absolute value, scaled by the number of outstanding shares. In the last case, the results also were consistent, with highlight on the results for RF 2015 and RF 2014, which also showed an association with variable compensation of the members, in line with Bushman, Engel & Smith (2006), Bushman, Engel, Milliron & Smith (2001), and Baber *et al.* (1998), all of whom indicated that variable remuneration is positively related with earnings persistence, suggesting that the compensation of executives is influenced by the economic substance of the results reported.

It is possible that board members whose compensation is tied to results have differentiated mechanisms and objectives in monitoring CEOs – in terms of manipulation of results through discretionary accruals to report better earnings persistence, for example. The findings of Baber, Kang & Kumar (1998) and Gaver & Gaver (1998) support this evidence, since all of them indicated the existence of a relation between the compensation paid in cash to CEOs and the sensitivity to earnings persistence. According to those authors, evidence supports the hypothesis that compensation committees consider not only current profits, but also their persistence over time, in setting the remuneration of executives, a mechanism that reduces the propensity to myopic vision of managers.

Analogously, on the other hand, besides the fact the majority of board members in Brazil are external, do not have variable compensation and also do not hold executive positions, it is not known whether this type of compensation of board members is practiced, especially because studies considering compensation committees and their practices are still embryonic.

Although the effect of board interlocking on financial performance has been observed in Brazil, such as by Santos & Silveira (2007) and Mendes-da-Silva (2010), the relation between board interlocking and earnings persistence is still an incipient theme, both in the Brazilian and international literature.

What is known is that firms with stronger corporate governance tend to disclose results with significantly greater quality (such as persistence) compared to firms with lower levels of governance (Jiang, Lee & Anandarajan, 2008; Sivaramakrishnan & Yu, 2008), thus suggesting that the excessive practice of board interlocking is a sign of poor quality of earnings and thus less persistence. In this respect, Fontes Filho & Leal (2010) found that boards with overly committed directors are considered less active, less independent and less relevant to companies.

Another noteworthy point is the presence of the oversight board, whether permanent or not, and its relationship with the power of boards of directors to monitor accounting information. Considering the results found here, it can be said that the existence of an oversight board (whether during a specific interval or permanently) does not have relevant weight to significantly modify the levels of earnings persistence, consistent with the results reported by Baioco (2015). However, this assertion does not imply that the oversight board is not important. It is possible that companies that have an oversight board also tend to have more consolidated boards of directors, so that the monitoring of the information disclosed to the market is not significantly affected by the OB in this type of environment.

It is interesting to note that none of the proxies of enhanced governance levels had significant effects in the sample studied here. This indicates the possibility that the underlying constructs, by means of the characteristics that compose them, already reflect differentiated practices in function of the structure of the board, both regarding the functioning and the profile of the members and their compensation. This strengthens the argument that the examination of corporate governance mechanisms is complex and

that inferences based on a small number of variables tend to be inconsistent, as pointed out by Dechow *et al.* (2010).

Other variables that have attracted important attention in the national and international literature were not significant when considered together with a larger number of characteristics here, such as gender. In this sense, the results indicated that the larger presence of women on boards did not significantly affect the levels of earnings persistence of the sample, consistent with Ye, Zhang & Rezaee (2010), Hili & Affes (2012) and Cumming, Leung & Rui (2015), in all cases reporting the possibility that women have so many other attributions in companies that their presence does not improve or otherwise affect the quality of information disclosed.

Characteristics of Boards of Directors/Oversight Boards and Timely Loss Recognition

The main variable associated with the levels of loss recognition timeliness is variable compensation of board members, with a significant association for the periods related to RFs for 2015, 2012 and 2011. Besides this, characteristics associated with age of members are significant in some periods, indicating a tendency for more conservatism by firms with boards having older average age.

The international literature has demonstrated the existence of an association between the levels of variable compensation of directors and conservative earnings reporting. It is logical to expect the practice of conservatism (prudence) in recognizing bad and good news to reduce information asymmetry and also to be associated with stronger corporate governance. Fich & Shivdasani (2005) found that variable compensation, mainly remuneration based on profits, produces positive effects that strengthen the alignment effect among market agents.

Jeong & Kim (2013) reported a positive association between variable compensation of independent directors and levels of accounting conservatism regarding profits. More specifically, they found that the greater the level of variable compensation of directors, the higher the levels of accounting conservatism and the stronger the corporate governance of the firms analyzed tended to be.

The results of this study demonstrate an inverse association to that reported by those authors. Instead, the authors found reduced accounting conservatism with increased variable compensation of board members. These results are consistent with the arguments of Healey (1985), that executives with variable remuneration tend to make accounting choices to increase their compensation. In other words, the postulates and results reported by Healey (1985) signal a tendency of delayed reporting of bad news and faster reporting good news by internal directors so as to increase their profit-based compensation, although this relationship is controversial in the literature.

The fact is that the majority of Brazilian board members come from outside. However, this proxy for independence is not sufficiently consistent to configure independence of board members, since more than 75% of them are appointed by the controller, thus configuring a scenario of possible internal dependence and absence of better governance in function of this characteristic, reinforcing the conformity of the results with those reported by Healey (1985).

For this reason, the authors believe the divergences in the literature regarding the relation between compensation of directors and conservatism tend to be associated with structural differences of governance around the world. Despite the divergences found in the literature, the corporate governance arrangements do have an influence on the quality of accounting information, by increasing or decreasing the levels of conservatism contained in earnings.

It should be mentioned that the majority of studies that have analyzed the relationship between compensation and accounting conservatism have evaluated this relationship from the standpoint of the theory of compensation contracts, which is biased toward remuneration of officers instead of directors, besides considering a setting of dispersed ownership (unlike Brazil, where the ownership structure tends to be concentrated).

Theoretically, shareholders demand conservatism from executives to counteract the latter's bias toward myopic behavior, since they tend to have a shorter horizon than the stockholders. Graham, Harvey & Rajgopal (2005) identified that many managers tend to focus on the short-term results in detriment to long-term value, since short-term results translate more closely into their short-run personal gains. However, according to the theory of compensation contracts, a remuneration arrangement based on results should reduce that myopic behavior, since the timely recognition of bad news tends to make managers assume responsibility for projects with negative net present value and think of the company with a longer term perspective.

However, this theory was constructed considering a scenario of dispersed ownership, in which the principal-agent problem exists between shareholders and managers. In the Brazilian setting, where the agency problem mainly exists between the controller and minority shareholders, and where most of board members are outsiders, contracts with fixed time period and a certain degree of turnover are normally perceived. This suggests that an increase in the compensation based on profits will not produce effects similar to those found by Graham, Harvey & Rajgopal (2005), since that type of remuneration may not be sufficient to lengthen the investment horizon of the directors.

With respect to the relation between age and conservatism, it is possible to find studies in the psychology literature indicating a positive linear relation between these two characteristics. Results indicating this association in that area can be found in the studies of Wilson (2013), Feather (1977), Ray (1985), Truett (1993), Henningham (1996), Maltby (1997), Grant, Ross, Button, Hannah & Hoskins (2001) and Cornelis, Hiel, Roets & Kossowska (2008).

The accounting literature also contains works that have discussed the relation between age of the members of senior management of firms and conservatism in financial reporting. Hambrick & Manson (1984) argued that characteristics like experience and age affect the values and cognitive bases of managers and cause them to make different choices, especially in complex situations, thus producing different results than less experienced managers.

This study suggests this phenomenon might exist in Brazil, since the data indicate that firms with older board members tend to be more conservative in disclosing profits, consistent with the findings of Bamber, Jiang & Wang (2010) and Horváth & Spirollari (2012). The literature points to a positive association between age of directors and compensation of CEOs, such as Core, Holthausen & Larcker (1999), signaling a possible interest of older board members in the alignment effect with market agents and better corporate governance in general, in line with the results.

In this study, the independence of boards was not significant to explain the degree of timely loss recognition, consistent with the observations of Xia & Zhu (2009) but contrary to the results of Yunos, Ahmad & Sulaiman (2014), indicating that from the standpoint of protection of minority shareholders, it is possible that firms and minority shareholders in Brazil and other emerging countries demand different roles from independent directors in comparison with more developed countries, as pointed out by Bortolon & Brugni (2012).

The factor representing expertise of the board members also was not significant to explain the levels of accounting conservatism, contrary to the findings of Yunos, Ahmad & Sulaiman (2014). However,

tests with isolated variables indicated the significance of characteristics related to the training of directors and timely loss recognition, suggesting that methodological differences and the use of a small number of variables can cause the coefficients found to be inconsistent, as pointed out by Dechow *et al.* (2010).

The presence of women on the BDs also did not change the way the firms in the sample recognize bad news, consistent with the findings of Firoozi, Magnan & Fortin (2016) & Wang (2015), although other findings differ regarding the conservatism of women in comparison to men in top management positions (e.g., CFOs), such as Francis, Hasan, Park & Wu (2015).

Various studies have pointed to a significant association between the proportion of outsiders on the BD and accounting conservatism, such as Beekes, Pope & Young (2004), Ahmed & Duellman (2007) and Dimitropoulos & Asteriou (2010). The authors also conducted isolated tests considering “indep2” (which measures that characteristic) as the predictor variable. In all the periods, the variable alone was significant, consistent with the results mentioned above. However, when the authors included other variables in the factor analysis, it lost significance, suggesting that its characteristics can be reflected in other variables. This fact can be explained because the majority of board members in Brazil are external, facilitating the tendency for correlation with various other characteristics not originally included in the isolated model.

Studies of differentiated governance levels also have reported discrepant results, such as Almeida, Scalzer & Costa (2008), who indicated that the degree of conservatism was higher of firms with shares listed for trading in the enhanced governance segments of the BM&FBovespa (Level 1, Level 2 and New Market) than the other companies listed on that exchange. This signals that firms with better governance structures tend to be more conservative, in line with the findings of Ahmed & Duellman (2007), Lara, Osma & Penalva (2009) and Chi, Liu & Wang (2009), all reporting a tendency for greater conservatism of firms with stronger corporate governance. The results of this study are inconclusive, since in three of the five periods evaluated, the variables associated with different governance levels were significant, but with positive and negative signs in different periods. These results can be interpreted as indicating that firms with enhanced governance act differently than other companies, but do not follow a specific and constant pattern over time in comparison with firms not listed in the special trading segments.

Characteristics of Boards of Directors/Oversight Boards and Earnings Management

Our tests point to a significant inverse relationship between age of the board members and level of earnings management (alternatively, the authors test the Dechow, Sloan, and Sweeney (1995) model as a proxy for Earnings Management in EM_{it} and results were similar). Kang, Cheng & Gray (2007) previously argued for the relevance of examining the age of directors to assess the effectiveness of corporate governance instruments. Their findings converged indirectly to this assertion, given that they indicated that the experience of older directors appears to be more relevant than the presence of younger and more dynamic members of boards. In turn, according to Houle (1990), older directors have the necessary experience, while those in middle age assume more responsibilities and the younger ones are prepared for their management positions in the sense of assuring the future of the firm.

As previously mentioned, some authors have found a positive association between age of directors and compensation of CEOs, signaling the possible interest of this type of director in the alignment effect

among market agents and higher quality of corporate governance in general. Analogously, it is possible to hypothesize that older directors tend to be less tolerant of earnings management.

In this respect, the negative sign in this study indicates reduction of earnings management of firms with older directors, suggesting that firms whose directors are older on average tend to report higher quality earnings, consistent with the findings of Góis (2013). Other studies have also indicated this phenomenon, although indirectly. Francis, Hasan and Wu (2015) identified that firms with directors drawn from academia tend to manage earnings less, besides the fact these directors tend to be older than the average age of the respective board. In turn, Peterson, Rhoads & Vaught (2001) and Borkowski & Ugras (1998) found positive associations between age and ethical behavior, suggesting that groups of professionals with younger age tend to behave less ethically than older groups.

The results of the tests also suggest that the participation of members on other boards can influence the levels of earnings management. It is possible that firms manage earnings more when their directors sit on the board of other companies that engage in this management, through a contagion effect, consistent with the findings of Chiu, Teoh & Tian (2012).

Other characteristics, like the independence of boards, firm size and term of office, did not significantly affect the levels of earnings management in the sample, in line with the results found by Nugroho & Eko (2011) and Erfurth & Bezerra (2015).

On the other hand, it is not possible to affirm that the ownership structure is a significant characteristic to explain the levels of earnings management of Brazilian firms, in contrast to the observations of Jian & Wong (2010) and Beuselinck & Deloof (2012). According to those authors, firms with dispersed structure tend to manage earnings less than those with concentrated ownership. The size and small number of firms with dispersed capital in the sample might have influenced this result.

The proportion of women also was not a characteristic that significantly affected the levels of earnings management of the Brazilian firms studied. Therefore, it is not possible to state that women tend to monitor earnings management practices more strenuously than men. However, the presence of women in the sample was very modest and declined over the years studied, reaching only 7% in the last year of the interval examined. Therefore, it is possible that women do not have sufficient influence on boards to perform this type of monitoring and influence earnings management practices.

Convergent with this hypothesis, Kyaw, Olugbode & Petracci (2015) found that the presence of women on boards of directors tends to reduce the levels of earnings management in countries where their presence is more evenly balanced, which is not the case in Brazil. For example, in RF 2015, of the 323 firms analyzed, only 35% had female presence on the boards (114 firms), of which 68% (78 firms) had only one female member, and of the 36 remaining companies, 31 had only two women on the boards. Besides this, 209 firms had no female board members and only 9 had boards composed half or more by women.

Results do not allow stating that the existence of the oversight board has a positive effect on monitoring the quality of earnings reported in the Brazilian capital market, thus reducing levels of earnings management. This is consistent with Prado (2013), who identified that that body has little independence and/or competence to inhibit the practice of earnings management by managers. Although the results for RF 2014 point to a significant negative association between the likelihood of earnings management and the presence of an oversight board, these results were not consistent over the interval studied, reinforcing the findings of previous studies.

FINAL THOUGHTS

The authors found that the factors age, participation of members on the boards of other firms and variable compensation of members were the main characteristics directly or indirectly associated with the properties of the accounting information of the firms analyzed.

These findings indicate that firms with boards of directors composed by more dedicated members tend to report more persistent earnings compared to those with higher level of board interlocking. This result suggests that the level of occupation of board members with other boards is a good proxy to measure the impact of the structures of these bodies on earnings persistence, but does not necessarily indicate a cause-effect relation. It is possible that greater membership on multiple boards tends to reduce the time available to monitor subjects related to the quality of projects over the long run and their influence on earnings persistence – disregarding, for obvious questions, the existence of incentives for income smoothing by disclosing artificially persistent earnings.

Payment of variable compensation to board members also appeared to modify the persistence of the profits reported by the sample of firms. The authors found a negative association between the two variables, indicating, contrary to agency theory, that increased compensation of board members, especially through variable remuneration, can have an entrenchment effect among market agents. A possible explanation for this phenomenon is the fact that principal-agent conflicts differ from one country to the next, so that earnings-based incentives can cause a contrary effect than desired, reducing the persistence of earnings.

Variable compensation also was significant to explain the degree of firms' accounting conservatism. It is natural to expect the practice of conservatism (prudence) in recognizing bad and good news to tend to reduce information asymmetry and strengthen corporate governance. Results point to reduction of accounting conservatism with increasing variable compensation of board members. Therefore, it is possible that board members whose compensation is tied to results tend to make decisions that increase their gains by delaying recognition of bad news and hastening recognition of good news.

The results also indicated a significant negative association between the average age of boards and the firm's degree of accounting conservatism. A positive relationship between age and conservative behavior is widely documented in the psychology literature, so the findings of this study corroborate those previous empirical observations, suggesting that firms having boards of directors with older members tend to be more conservative in reporting results.

Besides this, the results also indicate that firms with older directors tend to manage earnings less, strengthening the idea that older members tend to be less willing to assume risks, considering that certain earnings management practices are viewed as unorthodox. On the other hand, it is possible that firms that have boards with more venerable membership are more often engaged in businesses where the need to manage earnings is more latent, or that older people are less willing to sit on the boards of firms where incentives for managing earnings are stronger.

Another noteworthy point is related to the association between the participation of members on other boards and the levels of earnings management. Because of the different signs of the coefficients depending on the controls applied and period analyzed, it is possible that firms are more likely to manage earnings when they share board members with other companies that engage in that practice (contagion effect).

Important results were found since a series of characteristics found to be consistently relevant in previous studies when considered alone or together with a small set of other variables were not relevant in this study. Characteristics like gender diversity, education levels and independence of members were

not relevant to explain the properties of Brazilian firms' earnings when considered along with 30 other traits of boards of directors and oversight boards in the country.

Adhesion to trading segments requiring enhanced governance also was not consistently significant to alter or influence the properties of accounting information. This result suggests that the adhesion to such special trading segments requires the existence of boards that are more concerned with the quality of earnings reported.

The factor related to education also was not statistically significant to explain the variations in the properties of profits of Brazilian firms, in contrast to some previous studies in Brazil and other countries. Results like this support the hypothesis that a strong correlation between variables that describe the corporate governance environment tend to bias the statistical coefficients, depending on the method applied in the investigation and the set of variables observed. Specifically regarding the results of this study, it is possible that the general and specific training and expertise of the members are relevant to influence the properties of accounting information, but other factors (e.g., related to age) can better explain that variance, including reflecting traits related to the education and experience of board members.

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ENDNOTES

- ¹ The oversight board is a purely advisory body that, different from audit committee, acts in name of the minority shareholders as a watchdog of management. The applicable rules are set out in the Brazilian Law of Corporations (Law 6,404/1976, as amended). Legally, it only needs to be temporarily established when shareholders representing a minimum threshold of equity so demand, or during reorganization/bankruptcy/liquidation processes. Also, firms listed in enhanced governance segments of the BM&FBovespa (Brazilian securities exchange) must have a permanent oversight board.
- ² The Reference Form is a form that gathers information about firms, such as activities, risk factors, details of directors and officers, capital structure, financial data, securities issued, and other matters. It is similar to the 20-F of the Securities and Exchange Commission in the United States.

Chapter 13

Measuring Firms' Financial Constraints: A Rough Guide to Unlisted SMEs

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ABSTRACT

Measuring firms' financial constraints can prove to be a difficult task for researchers because it is not possible to directly observe whether a firm is financially constrained. This chapter surveys the existing methodologies to measure such constraints at firm level, discussing the advantages and disadvantages of each one. In doing so, firstly, the authors review the direct and indirect measures of firms' financial constraints. Then they test the validity of the most commonly used indices using a large panel of (un-listed) Portuguese firms (2010-2017). The FCP index seems to outperform the other indices in capturing financial constraints of unlisted SMEs. This is not a surprising result, as most of the existing empirical literature on the field deals with listed (US) firms. It is not reasonable to expect that the coefficients of indices remain unchanged across countries and over time. Therefore, the authors propose their (re) estimation to apply them to different economies.

INTRODUCTION

In the last three decades there has been increasing interest in the question of whether the firms' investment decisions are constrained by the availability of finance. However, measuring firms' financial

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constraints can prove to be a difficult task. The first issue is immediately the definition. If we adopt a 'classical', more precise, but broader definition that a firm is financially constrained if there is a wedge between the costs of using external and internal funds, virtually all firms can be classified as so. Defining financial constraints as the inability of a firm to raise the funds needed to finance their investments will carry us to a higher level of abstraction (Carreira and Silva, 2010). As a matter of fact, it is not possible to directly observe whether a firm is financially constrained and the extent of such constraints. No matter how detailed our knowledge of a firm's balance sheet, no single item, or combination of items, answers this question. As a result, researchers have devoted their time to trying to find a methodology that consistently allow identifying and measuring firms' financial constraints.

Several empirical challenges arise when one thinks about what it means for a firm to be financially constrained. Firstly, it is not an either-or question. There are not two populations of firms, those with and without financial constraints. Any measure of financial constraints must be able not only to identify its existence, but also to provide an estimate of the extent to which it affects the firm. Secondly, said measures must be able to account for heterogeneity between firms. For example, young and small firms are likely to face more severe problems in accessing external finance as they are more likely to suffer from asymmetric information problems and they have fewer collateral values (Carreira and Silva, 2010). Finally, a firm that is currently constrained can move to unconstrained state in the future (or across different degrees of constraint). Therefore, a good measure of financial constraints would also be able to identify over time whether a firm is financially constrained as well as its extent. Overall, a good measure of firm's financial constraints should be objective, continuous (or accommodate different degrees of constraint), firm-specific and time-varying (Silva and Carreira, 2012a).

In their *Rough Guide* on how to measure firms' financial constraints, Silva and Carreira (2012a) surveyed the existing methodologies, discussing the advantages and disadvantages of each one. The article was organized in order to facilitate the choice of the most appropriate technique for a research purpose and available data. In the present Chapter, we extend their work by reviewing and examining the validity of the most commonly used indices of financial constraints: (i) the KZ index (Kaplan and Zingales, 1997; Lamont et al., 2001), (ii) the WW index (Whited and Wu, 2006), (iii) the SA index (Hadlock and Pierce, 2010), (iv) the ASCL index (Mulier et al., 2016), and (v) the FCP index (Schauer et al., 2019). In doing so, we examine whether these indicators can be reasonably applied to a sample of unlisted firms. The main motivation for the selection of these indices is that they allow a both firm-specific and time-varying treatment of financial constraints and, as a consequence, they can be used either as dependent or explanatory variables by researchers.

Most of the existing empirical literature on firms' financial constraints deals with listed firms, often US firms, which are likely to be relatively less financially constrained, as they are typically large, mature and financially healthy companies with good credit ratings. Conversely, evidence on unlisted small and medium-sized firms (SMEs) is more scarce, even if they are particularly prone to informational asymmetries and thus to financial constraints and their investments account for the bulk of total investments in most countries (Carreira and Silva, 2010). In this Chapter, we explicit focus on unlisted SMEs by using a large panel of financial data on Portuguese firms, over 99% of which are not listed on the stock market.

The remainder of the chapter is organized as follows. We start in Section 2 with an overview of the (direct and indirect) measures of firms' financial constraints. Section 3 reviews direct measures, and Sections 4 and 5 present the credit rating and the most widely employed proxies, respectively. Section 6 reviews the most commonly used indices of financial constraints, while Sections 7 examines their validity on a large sample of unlisted firms. Finally, Section 8 presents some concluding remarks.

DIRECT VERSUS INDIRECT MEASURES

Firms' financial constraints are empirically not observable – the best that we can know is a (subjective) firm self-evaluation. To overcome this issue, researchers have strived to develop methodologies that consistently allow identifying and measuring such constraints.

The empirical analysis of financial constraints can essentially be traced back to the seminal work of Fazzari et al. (1988), who introduced the well-known investment to cash-flow sensitivity (ICFS) approach. Since then, several researchers have proposed that the existence of constraints can be deduced from a positive relationship between the availability of internal cash flow and investment (see Carreira and Silva, 2010; or Silva and Carreira, 2012a, for a survey). The rationale behind the ICFS approach is that financially constrained firms cannot obtain external finance (or they do obtain them at significantly high costs), then they must rely on their internally generated funds as an optional response to investment opportunities. Meanwhile, financially unconstrained firms can easily resort to external funds to finance their investments. Common to all these studies, they investigate the intensity of cash flow investment classifying firms *a priori* as constrained and unconstrained based on unidimensional measures of financial constraint – for example, Fazzari et al. (1988) classified firms according to their dividend policy. Accordingly, while constrained firms will exhibit a positive propensity to use cash-flows to finance investment (i.e. positive and significant β), no systematic relationship should be found for unconstrained ones in the following empirical equation:

$$\left(\frac{I}{K}\right)_{it} = \alpha Q_{it} + \beta \left(\frac{CF}{K}\right)_{it} + \mu_{it}, \quad (1)$$

where I_{it} and CF_{it} represent investment in equipment and cash-flow for firm i during period t , respectively; Q_{it} represents the Tobin's q (investment opportunities); K_{it} denotes the beginning-of-period capital stock; and μ_{it} is an error term (see, for example, Mulier et al., 2016, for an application of this methodology to unlisted firms).

Even though ICFS is, by far, the most commonly employed approach to assess financial constraints, it has been seriously challenged both at empirical and theoretical levels. Kaplan and Zingales (1997; 2000), perhaps the first comprehensive critique of the ICFS approach, pointed out that certain assumptions made on the curvature of the cost function of external finance may not be verified. They also criticised the classification scheme used by Fazzari et al. (1988) noting that the dividend policy is an inadequate sorting variable. In fact, companies may hold high cash stocks not because they are currently financially constrained but because of precautionary savings or adverse risk management. More generally, critics of the ICFS methodology have often argued that it is difficult to classify firms into constrained and unconstrained (e.g. Cleary et al., 2007). Other researchers have emphasised that, on the one hand, control for investment opportunities using average Q may entail potential mismeasurements (see Chirinko, 1993; Hubbard, 1998), on the other, cash-flow may itself contain information on investment opportunities (e.g. Alt, 2003). Finally, Cleary et al. (2007) and Guariglia (2008), *inter alia*, argued that the relationship between investment and cash flow is U-shaped. It is therefore not surprising that studies have produced conflicting results.¹

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Thus, ever since, the empirical literature has strived to find other consistent methodologies to measure constraints. In a perspective of the firms' demand for liquidity, Almeida et al. (2004; 2011) suggested that financially constrained firms may be identified by looking at their cash policy. In fact, constrained firms tend to pass-up current investment opportunities and hoard cash in order to be able to take advantage of profitable future investment opportunities and hedge against future shocks. Therefore, one should expect that the higher the cash to cash-flow sensitivity (CCFS), the higher is the constraints of a given group of firms. Examples using this approach include Han and Qiu (2007), Lin, Y. (2007). Baum et al. (2011) and Silva and Carreira (2011; 2012b; 2012c; 2016). Conversely, Pál and Ferrando (2010) found that the cash flow sensitivity of cash holdings cannot be used for testing financing constraints of euro area firms.

Even though few studies have empirically questioned the validity of CCFS, it shares a number of drawbacks with ICFS approach. To avoid measuring Q, a major issue in the two previous approaches, a strand of literature as attempted to identify financially constrained firms by estimating a reduced form Euler equation (Whited, 1992; 1998). Applications of this methodology can be found, for example, in Bond and Meghir (1994) or Love (2003). However, as in the ICFS and CCFS approaches, the choice of the criteria used to classify firms (ex-ante) as financially constrained and unconstrained is critical. In other words, researchers need to assume that the *a priori* classification scheme (i) correctly identifies constrained versus unconstrained firms, (ii) has a monotonic relationship with financial constraints, and (iii) constrained/unconstrained state is non-dynamic, which may be unrealistic.

None of the indirect measures obtained from the previous estimations produce a firm-specific (and time-varying) variable that can be used by researchers as either a dependent or independent variable. In fact, they only provide a test, based on regression coefficients, for the presence of financial constraints within a given group of firms. Furthermore, these measures rely on (sometimes strong) theoretical assumptions needed to construct the underlying models for empirical equations (Coad, 2010). To avoid these theoretical and measurement issues, a direct measure of financial constraints can be a good alternative. The most commonly used direct measures, company reports and self-evaluation, are both firm-specific and time-varying. However, self-reported measure is to some extent subjective in nature, while the use of company reports is time-consuming and the resulting sample suffers from a lack of representativeness. Nevertheless, direct measures have gained increasing importance in recent years with the automatic text-extraction algorithms and the new data collection technologies for business surveys. For this reason, we devote the next section to a brief review of these two direct measures.

Most of the empirical literature on financial constraints based on firm-specific measures, the main focus of the chapter, uses credit ratings, proxies or indices. It is therefore imperative to examine these measures too. This is essentially what we do in the following sections.

On the whole, the measurement of firms' access to finance is vulnerable to a range of methodological challenges. As different measures have complementary advantages and disadvantages, it is hard to clearly point a superior approach.

DIRECT MEASURES

When available, a direct measure of financial constraints can prove to be a useful tool that avoids the theoretical and measurement issues of indirect measures. The most widely used direct approaches that have been employed in the literature are company reports from end-of-year financial statements and firm's self-evaluation through survey data. There are specificities associated with this type of measures

that one must bear in mind. Thus, in this section we discuss this two possible ways of directly measuring financial constraints.

Company Reports

In most countries, firms listed in stock markets must provide a report along with their end-of-year financial statements. Given its role as a mandatory channel through which firms provide public disclosure to shareholders, these reports contain rich information about the firm's financial position and need for external finance. The public release of this information allows researchers to use the company's perception of its own financial position to assign each a level of financial constraints. Examples of such work include Kaplan and Zingales (1997) and Hadlock and Pierce (2010).

In the following, an extract from the annual report of a firm that Kaplan and Zingales (1997) classify as not being financially constrained: *"We ended the year in an exceptionally strong financial condition for a company of our size. During the year we paid off all long-term debt, and our cash and cash-equivalent assets have throughout the year exceeded all current liabilities."*

In practice, with company reports in hand, researchers search for expressions and keywords that indicate whether the firm is facing constrained access to external funds. The qualitative information should be complemented with quantitative financial information. Finally, researchers rank each firm by assigning the corresponding degree of financial constraints. For example, Kaplan and Zingales (1997) classify their sample of US listed firms into five groups according to their degree of constraints based on qualitative and quantitative information.

The main advantage of using this type of approach is the richness of financial information available. The potential issue of deliberate misreporting is unlikely given that managers are legally responsible for the accuracy and truthfulness of information (this could be a problem in countries where this is not the case). Moreover, even if a firm has been providing misreporting information for a certain period, it is unlikely to be able to continue to do so every year.

The major drawback is related to the sample size and the corresponding representativeness. In fact, only listed companies are required to provide reports on its financial status. In principle, such companies should not be as financially constrained as the unlisted ones (Carreira and Silva, 2010). Therefore, inferences to the full population cannot be made due to the lack of representativeness.

Company reports provide rich and relatively accurate information, however, it is difficult to extract such information for many firms. Analysing these reports entails a significant amount of time and effort. Even if they were hypothetically available for the entire population of firms, it would be extremely difficult for researchers to examine all of them with the necessary level of detail. However, the recent explosion of computing power combined with the development of statistical algorithms has made it possible. Text-extraction and web-crawling techniques allow the automatization of the process of gathering the required data. Examples of such approaches can be found in Hoberg and Maksimovic (2015), whose textual data is available online for other researchers to use, Buehlmaier and Whited (2018) and Linn and Weagley (2019).

Self-Evaluation

An alternative to knowing whether a firm is experiencing constrained access to external funds is to simply ask firms directly on this issue. This can be done either by a single question, directly asking firms if

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they are financially constrained, or through a combination of questions such as the cost of external funds (excessive interest rates), credit denials and the availability of external financing sources.

Recent advances in data collection have stimulated a new wave of empirical research based on business surveys to identify and measure financial constraints. Examples of such studies include Beck et al. (2005; 2008), Angelini and Generale (2008), Savignac (2008), Silva and Carreira (2012b; 2017). The 2008 financial crisis has also encouraged surveys directly aimed at assessing the financing conditions of firms. In the European case, the EUROSTAT and European Central Bank (ECB) surveys on access to finance are the most notable examples.

The main advantage of self-reported financial constraints measures is that firms are better informed about the quality of their investment projects and the difficulties they are having in funding them. Thus, one should expect that firms' self-evaluation have already considered investment opportunities. Unlike company reports, financial constraints can be measured for small businesses, thus ensuring the representativeness of the sample.

However, given the subjective nature of the self-evaluation, biases can occur from idiosyncratic differences in the perception of the relative firm's position. One firm that believes itself to be highly financially constrained might be much less constrained by the standards of another firm who reports having a low level of financial constraints. To overcome this problem, some researchers have controlled for the potential bias using firms' financial data (e.g. Angelini and Generale, 2008; and Meuleman and De Maeseeneire, 2012; who used credit requested and effectively granted) as well as proxies (e.g. Angelini and Generale, 2008) and indexes (Silva and Carreira, 2017).

CREDIT RATINGS

Credit ratings are quantified assessments of borrowers' creditworthiness by specialized agencies. They incorporate much more information about the firm than cash-flow measures, since they summarize a vast set of firms' characteristics. Therefore, credit ratings should represent a more reliable (firm-specific and time-varying) indicator of financing constraints. Examples of empirical studies using credit ratings as a direct measure of the firm's access to external finance can be found in Czarnitzki (2006), Bottazzi et al. (2008) and Czarnitzki and Hottenrott (2011a; 2011b).

However, one should note that credit ratings captures the credibility of a given firm in the market for funds at a particular point in time (mostly relying on past economic and financial information, as well as default events). This means that they may fail to capture the true quality of new investment projects to be overtaken in the near. Furthermore, some firms may, at some point, become "too big" or "too important" to be downgraded, even though an objective analysis would suggest so. Additionally, credit ratings rely on the quality of the assessment of agencies. That is, one must believe that these credit rating agencies are able to correctly screen reliable companies.

Sample representativeness can also be another problem. In general, firms that ask to be rated are usually large, mature and listed, which should not be as financially constrained as the average firm (Carreira and Silva, 2010).

PROXIES

The most practical and simplest way to measure firms' financial constraints is the use of proxies. The question then becomes one of finding out what that proxy should be. By definition, a highly correlated variable with financial constraints should be a good proxy. Moreover, it is firm-specific and varies over time.

Many different proxies for financial constraints have been proposed in the empirical literature. Fazzari et al. (1988), in their seminal work on the empirical assessment of financial constraints, popularized the use of the dividend payout ratio. Examples of commonly used proxies in the empirical literature include (i) cash-flow, (ii) cash stocks, (iii) size, (iv) age, (v) leverage, (vi) dividend payout ratio, (vii) credit ratings, (viii) export, (ix) R&D intensity, (x) institutional affiliation, and (xi) ownership (see Carreira and Silva, 2010, for a survey of how financial constraints is related to these variables). However, it is rather hard to find a good proxy for financial constraints (Cleary et al., 2007). For this reason, several researchers have proposed the use of indices.

THE MOST COMMONLY USED INDICES

Existing Indices

The indices of financial constraints are rather recent in the economic literature. To our knowledge, the first index was proposed by Lamont et al. (2001), based on the work of Kaplan and Zingales (1997).

The combination of different types of information and different variables into indices provides a useful tool for analysing financial constraints at the firm level. There are various approaches. Since we do not have prior knowledge about which index is the best, we describe the most commonly used indices in this section, while the results of testing their validity for unlisted SMEs is presented in next section (see, for example, Mulier et al., 2016; and Schauer et al., 2019; for recent discussions about the validity of indices).

The basic idea of most indices is that, conditioned on having a qualitative variable representing the financial constraints, one can estimate the impact of a number of variables that are expected to influence firms' ability to obtain external finance using the appropriate (non-linear) regression technique. Having obtained the coefficients, it is then possible to construct an index that results from a (linear) combination of these dependent variables, weighted by the estimated coefficients. By definition, the indices are supposed to be increasing with financial constraints. Examples of well-known indices using a qualitative dependent variable are the KZ index (Lamont et al., 2001), the SA index (Hadlock and Pierce, 2010), and the FCP index (Schauer et al., 2019).

One of the key challenges facing this approach is how to classify firms *a priori* as constrained and unconstrained based on a unidimensional constraint measure. In fact, these indices are based on a qualitative dependent variable, which are subject to the same problems previously seen for ICFS and CCFS. Splitting the sample into different groups of firms, ranging from definitively constrained to unconstrained according to *a priori* classification, is quite problematic. Firstly, given that a perfect proxy has not yet been found, it is questionable that the segmenting variable correctly distinguishes between constrained and unconstrained firms (Musso and Schiavo, 2008). The leading example was provided by Kaplan and Zingales (2000), who criticize the use of dividend policy as a segmenting tool. Secondly, the proxy may

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be itself affected by financial constraints (Bond et al., 2003). Thirdly, the relationship between the proxy and financial constraints may not be monotonic (Hadlock and Pierce, 2010). Finally, firms may move across different states of the segmenting variable (i.e. across different groups).

In order to avoid these problems, some researchers have constructed indices that do not rely on a qualitative dependent variable. Examples include the WW index (Whited and Wu, 2006), the class ranking indices proposed by Musso and Schiavo (2008) and Mulier et al. (2016), and the CFSI index (Hovakimian and Hovakimian, 2009).²

In the following, we briefly present the five commonly used indices of financial constraints that we will experiment on a large sample of unlisted Portuguese firms. The main motivation for their selection is that they allow a both firm-specific and time-varying treatment of financial constraints. The CFSI (or Cash Flow Sensitivity of Investment) index also captures constraints at firm-level, but it is constant over time. That is, CFSI approach does not account for the possibility that the same firm faces different states of constraints along the timeline. For this reason, we have excluded this index from our analysis – an example of the application of the CFSI index can be found in Silva and Carreira (2017).³ This approach also fails to control for investment opportunities. In fact, it assumes that, holding investment opportunities constant, investment responds positively to cash-flow if a firm is financially constrained. D'Espallier et al. (2008; 2009) and D'Espallier and Guariglia (2015) overcome this limitation by estimating firm-varying cash-flow slopes in the investment Equation (1) – i.e. they estimate a cash-flow sensitivity coefficient β_i for each firm, which is the index of financial constraints. However, this is done at the cost of significant implementation complexity as it requires refined estimation techniques.

KZ Index

Using financial information of 49 US listed companies from 1970 to 1984, Kaplan and Zingales (1997) classify firms into five discrete categories of financial constraints by gathering this information from company reports, and then use an ordered logit regression to relate their firms' classification to accounting variables. Lamont et al. (2001) finally use the regression coefficients of Kaplan and Zingales (1997) to construct a firm-specific, time-varying, index known in the literature as the KZ (or Kaplan-Zingales) index:

$$KZ_{it} = -1.002 * CF_{it} + 3.139 * B_{it} - 39.368 * D_{it} - 1.315 * CH_{it} + 0.283 * Q_{it}, \quad (2)$$

where CF_{it} is the cash-flow (i.e. operating income and depreciation), B_{it} is total debt, D_{it} is total dividends paid, and CH_{it} is total cash holdings plus marketable securities (all these variables are scaled by beginning-of-year total assets); Q_{it} is market-to-book ratio (or Tobin's q).

WW Index

An alternative index, built using US listed companies from 1975 to 2001, has been proposed by Whited and Wu (2006). They used the Euler equation of a structural model of investment to estimate a vector of coefficients that is then employed to construct a firm-specific, time-varying, index. Known in the literature as the WW (or Whited-Wu) index, the proposed financial constraints index is a linear combination of the following six variables:

$$WW_{it} = -0.091 * CF_{it} + 0.021 * B_{it} - 0.062 * DD_{it} - 0.044 * S_{it} - 0.035 * \Delta Y_{it} + 0.102 * \Delta IY_t, \quad (3)$$

where CF_{it} and B_{it} are the cash-flow and long-term debt, respectively, both scaled by beginning-of-year total assets; DD_{it} is a dummy variable taking the value of one if the firm pays cash dividends, and zero otherwise; S_{it} is the natural logarithm of total assets; and ΔY_{it} and ΔIY_t are firm's sales growth and three-digit industry's sales growth, respectively.

FCP index

The most recently suggested index of financial constraints is the one proposed by Schauer et al. (2019). The FCP (or financial constraints for private firms) index differs from prior indices in that it is based on unlisted firms located in a European country, Germany. In particular, using data from a panel of German manufacturing firms from 1989 to 2012, including managers' self-evaluation on firms' financing status, Schauer et al. (2019) proposed the following index:

$$FCP_{it} = -0.123 * S_{i(t-1)} - 0.024 * IC_{i(t-1)} - 4.404 * ROA_{i(t-1)} - 1.716 * CH_{i(t-1)}, \quad (4)$$

where, $S_{i(t-1)}$ denotes size measured as the natural logarithm of total assets; $IC_{i(t-1)}$ denotes interest coverage ratio measured as earnings before interest and taxes (EBIT) over interest expenses; $ROA_{i(t-1)}$ is net income over total assets; and $CH_{i(t-1)}$ is cash holdings over beginning-of-year total assets. All variables are one year lagged to avoid potential endogeneity problems.

SA Index

One of the main limitations of prior indices is the endogenous nature of the variables used in their construction. Hadlock and Pierce (2010) replicated Kaplan and Zingales (1997) approach (including their categorization scheme for assessing firms' constraints) using financial information from a sample of 356 listed US firms for the period 1995-2004. Their findings cast serious doubt on the KZ index as a good measure of financial constraints. In contrast, they found that size and age are particularly useful predictors of constraints. Moreover, they are much more exogenous than most of the other variables that are frequently used as indicators of constraints. Therefore, Hadlock and Pierce (2010) proposed the SA (or size-age) index based on these two proxies:

$$SA_{it} = -0.737 * S_{it} + 0.043 * S_{it}^2 - 0.040 * A_{it}, \quad (5)$$

where S_{it} denotes size measured as the natural logarithm of total assets and A_{it} denotes firm age measured as the number of years a firm is listed in the stock market.

ASCL Index

Another limitation of prior indices is that they result from estimated coefficients, some of them derived from highly parameterized structural models, which may be sample-specific. To overcome this problem,

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some researchers have proposed the use of class ranking indices approach (e.g. Musso and Schiavo, 2008; Mulier et al., 2016). The strategy is to rank firms according to selected proxies of financial constraints in a certain class (e.g. industry or region) that is believed to be reasonably homogeneous. The motivation for using homogeneous classes is to account for specificities that may affect the relationship of the proxies and the level of constraints. The rankings are computed upon on a number of variables that are found to have a given relationship to financial constraints.

Generally, the class ranking indices construction procedure takes three steps. Firstly, researchers identify a homogeneous class (or classes) and a number of proxies of financial constraints. Secondly, they compute the relative position (the rank) of each firm to the corresponding class mean, median or percentile for each variable. Finally, researchers collapse the rankings from all the proxies into a single score for each firm-year. For example, Musso and Schiavo (2008) constructed their index by ranking firms in each industry and year based on the following variables: size (total assets), profitability (return on total assets), liquidity (current asset over current liabilities), cash-flow, solvency (own funds over total liabilities), trade credit over total assets, repaying ability (financial debt over cash-flow) – examples of the application of the Musso and Schiavo (2008) approach can be found in Bellone et al. (2010) and Silva and Carreira (2017).

Mulier et al. (2016) in turn proposed the ASCL (or age-size-cash flow-leverage) index that differs from prior surveyed indices in two dimensions. First, it is based on firm's size, age, cash-flow and leverage, data that is available for the large majority of unlisted firms – the authors did not include variables like bond rating, credit rating or dividend payout ratio, because these data are unavailable or even non-existent for unlisted firms. Second, as all class ranking indices, to compute the index, researchers do not need to rely on parameter estimates from an initial study, but simply identify for each variable whether a firm is scoring below or above its industry median each year. More precisely, if a firm is younger than the median firm in the same industry, it gets a score of 1 for age, and 0 otherwise. In the same way, if either its size (i.e. total assets) or average cash flows to beginning-of-year capital ratio of the past two years is below the median firm in the same industry, the firm obtains a score of 1 in each variable, and 0 otherwise. Similarly, a firm gets a score of 1 if the average leverage (i.e. long-term debt to beginning-of-year total assets) of the past two years is higher than its industry median, and 0 otherwise. Finally, for each firm-year, the four scores are then added up (unweighted). The ASCL index can take values between 0 (unconstrained) and 4 (constrained).

A disadvantage of score approach is the interpretation of the index itself. In fact, while the interpretation of the indices 0 and 4 is feasible – a value of 4 indicates that the firm is relatively young and small, with relatively low levels of cash flow and relatively high leverage ratio, thus, financially constrained, and the opposite for 0 –, the intermediate indices are less straightforward to interpret. For example, one cannot be sure that the interpretation of the difference between a firm scoring 1 and 2 is the same as the difference between scoring 2 and 3 (see Silva and Carreira, 2012a, for a discussion about this issue). Moreover, the scores are relative to the industry median, which may entail considerable difficulties when comparing firms across industries. In fact, firms operating in some industries are, on average, more financially constrained than firms in other industries (Silva and Carreira, 2012c; 2016). Thus, one cannot compare the scores of firms in different industries because of different benchmarks. To overcome this problem, for example, Silva and Carreira (2017) proposed a weighted version of Musso and Schiavo (2008) index using the regression coefficients of industry-level CCFS estimates as weights.

TESTING THE VALIDITY OF INDICES ON A LARGE SAMPLE OF UNLISTED FIRMS

Computing Indices of Financial Constraints

To estimate the indices, we use a large panel of financial data on Portuguese firms with 10 or more employees operating in manufacturing sector, from 2010 to 2017, over 99% of which are not listed on the stock market. The Appendix 1 provides additional information on the data set used in this Chapter, while the Appendix 2 offers the definition and the descriptive statistics of the main variables.

By construction, higher index values indicate greater financial constraints. To assign each firm a level of financial constraints using a continuous index, one must define cut-off points that may be somewhat arbitrary. Following prior literature, firms in the top 20% of the annual index distribution are coded as constrained and those in the bottom 80% quantile as unconstrained (i.e., we assign the scores of “4” and “0” to the most- and the least-constrained firms, respectively; see, for example, Schauer et al., 2019).

KZ Index

Following Mulier et al. (2016), we compute a modified version of the KZ index, which only differs from one proposed by Lamont et al. (2001) in not containing dividends because we do not have such information:

$$KZ_{it} = -1.0019092 * CF_{it} + 3.139193 * B_{it} - 1.314759 * CH_{it} + 0.2826389 * Q_{it}. \quad (6)$$

We also use the same variable definitions as in Mulier et al. (2016). Namely, *Cash Flow* (CF_{it}) reflects firms' free cash flows and is proxied by earnings before interests, taxes, depreciation, and amortization (EBITDA); *Debt* (B_{it}) is defined as long-term and short-term debt; and *Cash* (CH_{it}) is total cash holdings plus marketable securities (the three variables are scaled by beginning-of-year total assets).

As there is no market data available for the unlisted firms, marginal Q cannot be computed. To address this issue, as in D'Espallier and Guariglia (2015) and Mulier et al. (2016), Q_{it} is measured by an accounting proxy suggested by Honda and Suzuki (2000) that can be applied to unlisted firms. Basically, it is defined as the ratio of profit per unit of capital to the cost of capital, that is:

$$Q_{it} = (\pi_{it} / K_{it}) / [p_t (r_t + d)], \quad (7)$$

where π_{it}/K_{it} is the gross profit rate (defined as EBITDA minus taxes over beginning-of-year capital stock, which is proxied by the book value of tangible fixed assets; see D'Espallier and Guariglia, 2015, note 5); p_t and r_t are the price deflator for investment goods and the after-tax nominal cost of debt, respectively; and d is the depreciation rate, which we set at 7.5% as in Honda and Suzuki (2000) and D'Espallier and Guariglia (2015).

As an alternative, Baker et al. (2003) propose a modified index version that only differs from the one proposed by Lamont et al. (2001) in not containing Q . Actually, they show that the coefficient estimates remain the same as in Lamont et al. (2001) even without including marginal Q .

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Finally, all variables used to compute the KZ index were winsorized at the 1st and 99th percentiles to reduce the bias induced by extreme values.

WW Index

As we have no information on dividends, equivalent to the KZ index, our version of the WW index cannot take this dimension into account (Mulier et al., 2016), that is:

$$WW_{it} = -0.091 * CF_{it} + 0.021 * B_{it} - 0.044 * S_{it} - 0.035 * \Delta Y_{it} + 0.102 * \Delta IY_t, \quad (8)$$

The remaining variables were defined as in Whited and Wu (2006). Once again, the variables used were winsorized at the 1st and 99th percentiles.

FCP Index

We used original variable definitions to calculate the FCP index. Following Schauer et al. (2019), we assign the value of 100 (-0.1) if *Interest Coverage* (IC_{it}) ratio exceeds (falls below) 100 (0). The remaining variables were winsorized at the 1st and 99th percentiles.

SA Index

To calculate the SA index, given that our sample is mostly composed by unlisted firms, *Age* was measured as the number of years since the firm was founded. Hadlock and Pierce (2010) report a flattening of the relation above the 95th percentile and cap those observations (i.e. size at \$4.65 billion and age at 37 years). We also winsorize the two variables at the 95th percentile of their distributions in order to get an approximation to the original measure.

ASCL Index

We use the original variable definitions of Mulier et al. (2016). The industry median values were calculated at two-digits NACE Rev. 2 industry codes.

To collapse the scores from de four proxies into a single score, we calculated the unweighted sum of the variables as in original index. However, one should note that the score system is flexible in the weight that is given to each discriminating variable. As an illustrative example, Mulier et al. (2016) computed a weighted version of the ASCL index using the correlation between the variables and the interest rate as weights.

Testing the Discriminatory Power of Indices on a Large Sample of Unlisted Firms

We start our discussion by examining the relationship between the five indices of financial constraints. Table 1 shows that only the correlations between the ASCL, WW and FCP indices are moderately positive. The correlation between the KZ index and the other indices is even negative. Not surprisingly, these

Table 1. Correlation between financial constraints indices

| | KZ index | WW index | FCP index | SA index |
|------------------------------|----------|----------|-----------|----------|
| <i>a) Continuous indices</i> | | | | |
| WW index | -0,031 | 1 | | |
| FCP index | -0,277 | 0,211 | 1 | |
| SA index | -0,041 | -0,872 | -0,063 | 1 |
| <i>b) Score indices</i> | | | | |
| WW index | 0,029 | 1 | | |
| FCP index | -0,150 | 0,17 | 1 | |
| SA index | -0,069 | -0,923 | -0,058 | 1 |
| ASCL index | -0,011 | 0,476 | 0,365 | -0,389 |

Source: Authors' own calculations based on the data of the SCIE.

Notes: Scoring cut-off points are defined by the quantiles of the annual index distribution. Scoring indices assume values between 0 (unconstrained) and 4 (constrained).

figures broadly confirm those obtained by Mulier et al. (2016). Indeed, the FCP and ASCL indices were built using unlisted SMEs, while the other indices used data from listed US firms. Thus, assuming that the latter indices are still valid, implies assuming that the estimated parameters are stable over time and across samples and economies.

We next investigate whether our indices perform well in our sample of unlisted SMEs. To this end, we start by correlating each index against widely used proxies for financing constraints. Table 2 summarizes the different proxies that we consider in our study. The last column indicates the expected relationship between each proxy and the firm's financial constraints (see, for example, Carreira and Silva, 2010; D'Espallier and Guariglia, 2015, for an explanation of expected signals).

Table 2. Proxies for financing constraints and the expected sign

| Variable | Definition | Relation with financial constraints (index) |
|------------------------------------|--|---|
| <i>Cash-flow</i> | Cash-flow over total assets | Negative |
| <i>Liquidity</i> | Cash holdings plus marketable securities over total assets | Negative |
| <i>Leverage</i> | Total debt over total assets | Positive |
| <i>Interest coverage</i> | Net income over interest expenses | Negative |
| <i>External finance dependence</i> | Investment in equipment minus cash-flow | Positive |
| <i>Interest rate</i> | Total interest paid over long-term and short-term loans | Positive |
| <i>Profitability</i> | EBIT over total assets | Negative |
| <i>Size</i> | Natural logarithm of total assets | Negative |
| <i>Export Ratio</i> | Export sales over total sales | Negative |

Note: Total assets is measured as beginning-of-year total assets.

Measuring Firms' Financial Constraints

Table 3. Correlation between indices and proxies

| Proxies | KZ | | WW | | FCP | | SA | | ASCL |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | Index | Score | Index | Score | Index | Score | Index | Score | Score |
| <i>Cash-flow</i> (-) | 0,378 | 0,358 | -0,304 | -0,227 | -0,640 | -0,544 | 0,075 | 0,082 | -0,242 |
| <i>Liquidity</i> (-) | 0,142 | 0,085 | 0,166 | 0,171 | -0,552 | -0,508 | -0,201 | -0,234 | -0,113 |
| <i>Leverage</i> (+) | 0,072 | 0,258 | 0,384 | 0,303 | 0,461 | 0,373 | -0,196 | -0,230 | 0,384 |
| <i>Interest coverage</i> (-) | 0,131 | 0,077 | -0,103 | -0,082 | -0,426 | -0,336 | 0,053 | 0,042 | -0,153 |
| <i>External finance dependence</i> (+) | -0,051 | -0,042 | 0,443 | 0,322 | 0,254 | 0,259 | -0,553 | -0,293 | 0,250 |
| <i>Interest rate</i> (+) | 0,069 | 0,096 | 0,039 | 0,043 | 0,138 | 0,131 | -0,019 | -0,039 | -0,030 |
| <i>Profitability</i> (-) | 0,398 | 0,358 | -0,338 | -0,254 | -0,673 | -0,557 | 0,103 | 0,116 | -0,291 |
| <i>Size</i> (-) | -0,070 | -0,095 | -0,963 | -0,916 | -0,066 | -0,085 | 0,911 | 0,928 | -0,436 |
| <i>Export Ratio</i> (-) | 0,028 | 0,061 | -0,361 | -0,350 | -0,066 | -0,086 | 0,334 | 0,350 | -0,209 |

Source: Authors' own calculations based on the data of the SCIE.

Notes: Higher index values indicate greater financial constraints. Expected sign in parentheses. All variables were winsorized at the 1st and 99th percentiles.

Table 3 reports correlation coefficients between each index and the selected proxies. The table reveals that the sign of correlations of different proxies is consistent with the predictions reported in Table 2 in the cases of the FCP index, the WW index (except *Liquidity*) and the ASCL index (except *Interest rate*). Moreover, the KZ index and the SA index show signs contrary to those expected in most proxies. The FCP index even has the strongest correlation in 6 out of 9 proxies (*Cash-flow*, *Liquidity*, *Leverage*, *Interest coverage*, *Interest rate*, and *Profitability*).

One should note that firm size is either insignificantly or positively related to indices (except in the WW index case). D'Espallier and Guariglia (2015) suggest that within a sample of SMEs, size may not be a good proxy as SMEs of all sizes suffer of informational opaqueness, which typically drives financing constraints. In fact, SMEs are unlisted, hence have no market information available, and they are generally not followed by analysts. In the case of *Interest rate*, Mulier et al. (2016) also found low and contradictory correlation values.

Overall, the categorization into constrained and unconstrained firms using the FCP index seems to work best, while the KZ and SA indices seem to perform poorly according to the most frequently used proxies.

As a final test, we will estimate a dynamic version of the ICFS equation (1) for constrained (*i.e.* score=4) and unconstrained (*i.e.* score=0) firms. Given that marginal Q cannot be computed, we use firm's sales growth (Δy_{it}) as a proxy for investment opportunities (see, for example, Silva and Carreira, 2012c; D'Espallier and Guariglia, 2015; and Mulier et al., 2016). Table 4 shows the results for the first difference General Method of Moments (GMM) estimator developed by Arellano and Bond (1991). (Table 8 in Appendix 3 presents the results using Equation (7) as a proxy for Q). The first difference GMM estimator is the most commonly used by researchers to estimate the ICFS model since it controls for biases due to unobserved firm-specific effects, heteroscedasticity, autocorrelation, and endogeneity of explanatory variables. Following common practice, we employ the right-hand-side variables and/or further lagged values, as well as two-digit industry (NACE-Rev.2) and year dummies, as instruments.

We try to cap the number of instruments per regression as much as possible. In any case, the validity of the instruments was tested using the Hansen test of overidentifying restrictions, as well as the AR(2) test of second order serial correlation of the differenced residuals – unlike the Sargan test, the Hansen test is robust, but can be weakened by many instruments, which is likely not an issue in our case (Roodman, 2009). As can be seen in the last rows of Table 4, both tests do not reject the null hypothesis, suggesting that the instruments are valid.

As we had mentioned before, one should expect that constrained firms keep larger percentages of their assets in cash than the unrestricted ones. The impact of cash flow on investment in Table 4 is larger for firms classified as financially constrained than for firms classified as financially unconstrained. The only exception is the ASCL index. Specifically, in the case of the FCP and WW indices, as theoretically postulated, constrained firms exhibit a positive and significant (at the 1% and 5% level, respectively) propensity to use cash-flows to finance investment, while no systematic relationship is found for unconstrained firms. In the case of the SA and KZ indices, the investment-cash flow sensitivity coefficients for constrained firms are significant at the 1% and 5% level, respectively, and larger than those for unconstrained firms.

Somewhat unexpectedly, in the case of the ASCL index, the cash-flow coefficient for firms classified as most-constrained (*i.e.* score=4) is not statistically significant at conventional levels. This finding is inconsistent with the hypothesis that investment-cash flow sensitivities reflect financial constraints, hence categorizing firms into constrained and unconstrained using the ASCL index seems to perform poorly.

CONCLUSION

Whether a firm is financially constrained or not is a key concern given that it hinders their ability to pursue their investment projects and thus achieve the full potential of their growth trajectory. The empirical study of financial constraints has spawned a variety of approaches, each of them with their own strengths and methodological challenges.

In this Chapter, after reviewing the direct and indirect measures of firms' financial constraints and discussing their main advantages and disadvantages, we analysed the validity of the most commonly used indices in the context of unlisted SMEs. In doing so, we computed each index using a large panel of Portuguese firms, over 99% of which are not listed on the stock market.

Our results show that only the correlation of the ASCL, WW and FCP indices is moderately positive. Looking at the correlation between each index and the most widely used proxies of financial constraints, only the FCP index seems to work well. The WW and ASCL indices also perform adequately in some proxies. Surprisingly, the categorization into constrained and unconstrained firms using the ASCL index seem to perform poorly according to the ICFS estimates.

These results are much in line with those reported by previous literature. In fact, research in the field has continuously been casting serious doubts on the validity of previous indices. The studies of Hadlock and Pierce (2009), Mulier et al. (2016) and Schauer et al. (2019) are striking examples.

We thus raise some concerns about the stability of the coefficients of indices across countries and over time. It is not reasonable to expect that they will remain unchanged if one intends to apply the indices to different samples. Therefore, future research should re-estimate the indices to apply them to different economies.

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Table 4. Investment-cash flow sensitivities: constrained vs unconstrained firms

| Dependent variable (I/K) _{it} | KZ index | | WW index | | FCP index | | SA index | | ASCL index | |
|--|--------------------|---------------------|---------------------|---------------------|---------------------|-------------------|---------------------|---------------------|--------------------|---------------------|
| | 4 | 0 | 4 | 0 | 4 | 0 | 4 | 0 | 4 | 0 |
| $(I/K)_{it-1}$ | 0.000 (0.001) | 0.001 (0.001) | 0.001*** (0.000) | 0.000 (0.001) | 0.045* (0.027) | -0.001 (0.002) | 0.000* (0.000) | 0.004 (0.007) | 0.001 (0.019) | 0.070** (0.035) |
| $(CF/K)_{it}$ | 0.425** (0.188) | 0.091*** (0.029) | 0.079** (0.018) | 0.800 (0.600) | 0.108*** (0.039) | 0.176 (0.122) | 1.123*** (0.335) | 0.068*** (0.025) | 0.069 (0.046) | 0.116*** (0.024) |
| Δy_{it} | 0.003 (0.002) | 0.008* (0.004) | 0.022*** (0.007) | 0.222*** (0.067) | 0.000 (0.000) | 0.002* (0.001) | 0.068 (0.052) | 0.029** (0.012) | 0.049** (0.024) | 0.007** (0.003) |
| Industry/year dummies | yes / yes | yes / yes | yes / yes | yes / yes | yes / yes | yes / yes | yes / yes | yes / yes | no / yes | no / yes |
| #Obs. | 10963 | 11997 | 11063 | 12747 | 11208 | 11730 | 13541 | 10704 | 1538 | 6679 |
| #Firms | 5199 | 4883 | 3929 | 3297 | 5430 | 4399 | 3057 | 3287 | 819 | 2293 |
| #Instruments | 48 | 47 | 73 | 38 | 39 | 63 | 36 | 74 | 13 | 25 |
| Wald tests | 27883*** | 674*** | 323043*** | 48477*** | 1299*** | 195*** | 3.35e+07*** | 2901*** | 26*** | 2117*** |
| Hansen (p-value) | 0.145 | 0.150 | 0.182 | 0.113 | 0.603 | 0.440 | 0.866 | 0.082 | 0.143 | 0.105 |
| AR(1) (p-value) | 0.004 | 0.000 | 0.000 | 0.027 | 0.000 | 0.012 | 0.031 | 0.000 | 0.000 | 0.000 |
| AR(2) (p-value) | 0.269 | 0.514 | 0.144 | 0.320 | 0.817 | 0.339 | 0.283 | 0.131 | 0.776 | 0.775 |

Source: Authors' own calculations based on the data of the SCIE.

Notes: The Table shows the output for the first difference GMM estimator of a dynamic version of the ICFS model (1). “4” and “0” denote constrained and unconstrained firms, respectively. Q is proxied by firm's sales growth (Δy_{it}). I_{it} and CF_{it} denote investment in equipment and cash-flow, while K_{it} is the beginning-of-year total assets. All variables were winsorized at the 1st and 99th percentiles. Robust standard errors are given in parentheses. Hansen reports the p-value of the Hansen test of overidentifying restrictions of the instruments. AR(1) and AR(2) reports the p-value for the test for the first- and second-order autocorrelation of the differenced residuals, respectively. ***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

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ENDNOTES

¹ Kaplan and Zingales (1997) noted that the accumulation of positive results in the literature might suffer from publication bias because only publications disproving the null hypothesis that internal funds do not matter for investment would be written and published.

² Another drawback of these indices is that they result from estimated coefficients, some of them derived from parameterized structural models, which may be sample-specific. To avoid this issue, Cleary (1999) and Linn and Weagley (2019) proposed the use of multiple discriminant analysis (MDA) index and random forests (RF) index, respectively. However, once again, both approaches must firstly establish a segmenting variable (i.e. an *a priori* classification scheme) that enables the distinction of firms into two (or more) mutually exclusive groups (e.g. financially constrained and unconstrained firms).

³ The CFSI index compares the cash-flow weighted time-series average investment, against the simple arithmetic time-series average investment, that is:

$$CFSI = \sum_{t=1}^n \left(\frac{(CF/K)_{it}}{\sum_{t=1}^n (CF/K)_{it}} * \left(\frac{I}{K} \right)_{it} \right) - \frac{1}{n} \sum_{t=1}^n \left(\frac{I}{K} \right)_{it},$$

where n is the number of annual observations for firm i , and t is the period in years; CF , I and K are the cash-flow, the investment (defined as capital expenditures) and the beginning-of-period net capital, respectively. To avoid negative and extreme weight values, negative cash-flows are set to zero.

Investment receives a higher weight in years when cash-flow is higher, capturing the sensitivity of investment with respect to variations of cash-flow. Therefore, if a firm invests more (less) in years with higher cash-flow, the CFSI index will yield positive (negative) values. An example of the application of the CFSI index can be found in Silva and Carreira (2017).

APPENDIX 1

Data

The data set used in this Chapter covers the period 2010–2017 and consists of the profit and loss account and balance sheet data of Portuguese firms with 10 or more employees operating in manufacturing sector (NACE 10-33). The raw data was extracted from *Sistema de Contas Integradas das Empresas* (SCIE), a mandatory annual business survey administrated by *Instituto Nacional de Estatística* (the Portuguese Statistical Office) that covers all limited liability companies. Our sample comprises an unbalanced panel of 18,705 firms or 96,754 year-firm observations. Table 5 presents the lists of industries covered by the study and the corresponding number of firms by size class – we follow the European Commission enterprise size classification, where small firms are those with 10-49 employees, medium firms with 50-249, and large firms with 250 or more employees. Table 6 shows the number of firms-year by size class.

Table 5. Number of firms by industry and size class

| NACE | Industry | Small | Medium | Large | All |
|------|---------------------|-------------|------------|----------|-------------|
| 10 | Food | 1481 (55.5) | 265 (6.4) | 32 (4.3) | 1777 (60.8) |
| 11 | Beverages | 208 (8.9) | 37 (1.9) | 7 (0.4) | 252 (8.4) |
| 12 | Tobacco | 0 (0.0) | 2 (0.0) | 1 (0.0) | 3 (0.0) |
| 13 | Textiles | 54 (31.3) | 144 (5.4) | 24 (1.2) | 708 (34.1) |
| 14 | Apparel | 1564 (70.9) | 364 (15.9) | 17 (1.4) | 1944 (80.5) |
| 15 | Leather | 800 (34.6) | 225 (13.9) | 11 (1.9) | 1035 (48.3) |
| 16 | Wood | 491 (33.0) | 65 (6.5) | 8 (0.8) | 564 (38.2) |
| 17 | Paper | 116 (6.9) | 40 (3.2) | 7 (1.1) | 162 (6.4) |
| 18 | Printing | 315 (34.9) | 37 (1.8) | 3 (0.8) | 355 (36.6) |
| 20 | Chemicals | 42 (3.7) | 8 (1.5) | 1 (0.0) | 51 (5.0) |
| 21 | Pharmaceutical | 130 (7.6) | 41 (2.2) | 5 (0.5) | 176 (6.9) |
| 22 | Rubber | 22 (2.2) | 24 (2.5) | 6 (1.0) | 53 (2.5) |
| 23 | Other non-metallic | 319 (10.1) | 98 (4.5) | 12 (2.5) | 429 (13.5) |
| 24 | Basic metals | 580 (63.0) | 116 (9.7) | 20 (2.6) | 717 (73.0) |
| 25 | Metals | 61 (3.6) | 34 (2.1) | 7 (1.3) | 102 (4.6) |
| 26 | Computer | 1408 (76.0) | 248 (21.6) | 16 (1.7) | 1672 (82.2) |
| 27 | Electrical | 38 (3.0) | 22 (2.3) | 7 (0.7) | 66 (4.2) |
| 28 | Machinery | 131 (6.3) | 43 (4.5) | 14 (0.5) | 188 (10.2) |
| 29 | Motor vehicles | 322 (10.5) | 74 (7.2) | 10 (1.3) | 405 (15.6) |
| 30 | Other transport | 104 (10.7) | 56 (3.6) | 33 (0.9) | 193 (13.9) |
| 31 | Furniture | 39 (5.0) | 21 (3.3) | 2 (1.4) | 61 (4.5) |
| 32 | Other manufacturing | 567 (81.4) | 83 (5.2) | 5 (1.8) | 654 (83.6) |
| 33 | Repair | 181 (16.3) | 28 (2.4) | 6 (1.0) | 215 (17.2) |

Source: Authors' own calculations based on the data of the SCIE.

Notes: Two-digit level of the European Community (NACE-Rev.2). Mean values over the period 2010–2017 and standard deviations (in parenthesis) of the number of firms.

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Table 6. Number of firms-year by size class

| Year | Small | Medium | Large | All |
|------|-------|--------|-------|-------|
| 2010 | 10558 | 2125 | 246 | 12929 |
| 2011 | 10131 | 2127 | 251 | 12509 |
| 2012 | 9458 | 2023 | 246 | 11727 |
| 2013 | 9184 | 1985 | 248 | 11417 |
| 2014 | 9356 | 2058 | 250 | 11664 |
| 2015 | 9578 | 2117 | 263 | 11958 |
| 2016 | 9762 | 2176 | 270 | 12208 |
| 2017 | 9779 | 2269 | 294 | 12342 |

Source: Authors' own calculations based on the data of the SCIE.

APPENDIX 2

Statistics

The Table 7 reports summary statistics of main variables used in our study for unlisted manufacturing firms in Portugal, with 10 or more employees, between 2010 and 2017. The mean firm in our sample has total assets of €4,4 million and a debt of €2,6 million. The mean firm's cash-flow is €362 thousand and its cash holding €298 thousand. The mean firm's sales growth is 10% with 10 years old.

Table 7. Descriptive statistics

| Variable | Mean | Std.Dev. |
|--|---------|----------|
| Investment in equipment (<i>I</i>) | 176.80 | 529.43 |
| Cash-flow (<i>CF</i>) | 362.75 | 1117.27 |
| EBIT | 194.99 | 774.65 |
| Net income | 112.28 | 604.78 |
| Total assets (or size) (<i>S</i>) | 4397.21 | 11123.26 |
| Tangible fixed assets (<i>K</i>) | 1297.67 | 3318.65 |
| Cash holdings (<i>CH</i>) | 298.30 | 810.71 |
| Total debt (<i>B</i>) | 2562.33 | 6228.41 |
| Long-term debt | 740.76 | 2078.84 |
| Short-term debt | 1725.02 | 4083.51 |
| Interest | 46.37 | 132.29 |
| Marginal <i>Q</i> | 4.61 | 17.30 |
| Firm's sales growth (ΔY) | 0.10 | 0.44 |
| Industry's sales growth (ΔY) | 0.04 | 1.74 |
| Age | 9.92 | 3.48 |

Source: Authors' own calculations based on the data of the SCIE.

Notes: The monetary variables are measured in thousands of euros. Cash-flow (*CF*) is defined as operating income and depreciation (proxied by EBITDA, earnings before interests, taxes, depreciation, and amortization). EBIT denotes earnings before interest and taxes. Cash holdings (*CH*) includes marketable securities. Marginal *Q* (or Tobin's *q*) is the accounting proxy developed in Honda and Suzuki (2000) and defined as the ratio of profit per unit of capital to the cost of capital (Equation (7)). is measured by an accounting proxy suggested by Honda and Suzuki (2000). All variables were winsorized at the 1% tails.

APPENDIX 3

Table 8. Investment-cash flow sensitivities using Equation (7) as a proxy for Q

| Dependent variable $(I/K)_n$ | KZ index | | WW index | | FCP index | | SA index | | ASCL index | |
|------------------------------|--------------------|---------------------|---------------------|-------------------|---------------------|-------------------|---------------------|---------------------|--------------------|---------------------|
| | 4 | 0 | 4 | 0 | 4 | 0 | 4 | 0 | 4 | 0 |
| $(I/K)_{n-1}$ | 0.000 (0.001) | 0.000 (0.000) | 0.001*** (0.000) | 0.001 (0.001) | 0.045* (0.027) | -0.001 (0.003) | 0.001* (0.000) | 0.010 (0.010) | 0.001 (0.019) | 0.070** (0.035) |
| $(CF/K)_n$ | 0.426** (0.188) | 0.097*** (0.030) | 0.080** (0.033) | 1.203 (0.740) | 0.109*** (0.040) | 0.193 (0.144) | 1.145*** (0.353) | 0.073*** (0.026) | 0.069 (0.046) | 0.116*** (0.024) |
| Q_n | 0.000 (0.000) | 0.000 (0.000) | 0.000*** (0.000) | -0.000 (0.000) | 0.000 (0.000) | -0.02 (0.000) | 0.000 (0.000) | 0.000** (0.000) | 0.049** (0.024) | 0.007** (0.003) |
| Industry/year dummies | yes / yes | yes / yes | yes / yes | yes / yes | yes / yes | yes / yes | yes / yes | yes / yes | no / yes | no / yes |
| #Obs. | 10963 | 11997 | 11063 | 12747 | 11208 | 11730 | 13541 | 10704 | 1538 | 6679 |
| #Firms | 5199 | 4883 | 3929 | 3297 | 5430 | 4399 | 3057 | 3287 | 819 | 2293 |
| #Instruments | 48 | 47 | 71 | 48 | 39 | 36 | 37 | 74 | 13 | 25 |
| Wald tests | 1.22e+07*** | 149380*** | 4990*** | 2.69e+06*** | 1299*** | 195*** | 1.25e+07*** | 47789*** | 26*** | 2117*** |
| Hansen (p-value) | 0.132 | 0.439 | 0.103 | 0.318 | 0.594 | 0.440 | 0.817 | 0.018 | 0.189 | 0.105 |
| AR(1) (p-value) | 0.004 | 0.000 | 0.000 | 0.049 | 0.000 | 0.012 | 0.048 | 0.000 | 0.000 | 0.000 |
| AR(2) (p-value) | 0.269 | 0.519 | 0.125 | 0.287 | 0.813 | 0.339 | 0.282 | 0.160 | 0.828 | 0.775 |

Source: Authors' own calculations based on the data of the SCIE.

Notes: See notes to Table 4. Q is proxied by the ratio of profit per unit of capital to the cost of capital as proposed by Honda and Suzuki (2000). ***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Section 3

Creative Accounting, Accrual Manipulation, Fraud, and Social Responsibility

Chapter 14

A Critical Look at Social Reporting Evolution: Social Case in Its Future?

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ABSTRACT

This study analyzes the evolution of social reporting. After reviewing the literature on this topic and the main initiatives, reports, and standards, three stages can be distinguished: early moments, middle course, and current situation. All these stages have a coinciding concern that is accountability, but a very different way of putting it into practice. As the main conclusion, accountability continues to be the main objective of social reporting because companies understand the need to attend to stakeholders' demands in line with the stakeholder theory. However, voluntariness seems to give way to a regulatory horizon that allows the information received by these groups to be more relevant and reliable according to Directive 2014/95/EU for Non-Financial Information as a benchmark example of the social case in an international sphere. This contribution can help accounting regulators to address the immediate future of social reporting because understanding the past is a key to approaching the future.

INTRODUCTION

Stakeholder Theory is one of the most used frames of reference in the field of Social Responsibility (hereinafter SR)¹. This concept can be defined following one of its most relevant definitions carried out by the European Union (EU) “a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis” (European Union, 2011)². Thus, when SR is assumed strategically, the demands of its stakeholders must be attended in line with the arguments pointed out by this theory (Freeman, 1984). This also implies social reporting reaching a key place in order to communicate SR to third parties or groups of interest.

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A Critical Look at Social Reporting Evolution

Rupley et al. (2017:172) state that “stakeholders demand transparency, accountability, and strategic information connecting the past to future risks and opportunities”. This information has not been broadly provided in financial statements until today but it is necessary to maintain or to create a good relationship with these groups (Nielsen and Thomsen, 2007). In this context, social reporting understood in an broad way³ emerges as a tool to achieve transparency in decision-making processes considering all stakeholders in a moral, administrative, political, management, marketing, legal and judicial perspective, that is for accountability. Many studies (Kaptein and Van Tulder, 2003; Moneva, 2007; Fernández-Feijoo et al. 2013) also insist on the role of transparency within the conceptual declarations on SR, since according to their criterion they all establish it as a basic principle. Logically, transparency consists of the preparation of information that reflects responsible action and that allows the company to display accountability. In this sense, it is a key condition for social reporting but the latter also is a tool for improving transparency (Fernández-Feijoo et al. 2013).

With that in mind, the objective of this study is to analyse how the evolution of SR information has been put into practice by companies from their past to their current situation to meet stakeholder demands on social performance. Only a contextual and critical analysis of these disclosures and their reasons behind would allow accounting regulators and SR’s associations to perceive what the way forward in this field might be. For this reason, all references, frameworks, guidelines and initiatives offered to help companies to carry out this type of disclosures will be reviewed in order to determine whether accountability, transparency, inclusiveness or other reasons justified their being put into practice. In addition, we will look deeper into the case of the EU, due to the new and innovative level of developments into social reporting regulation and its consideration as a social case.

There are previous papers based on the evolution of social reporting such as Owen (2014), based on an overview of its “early days”, Gray et al. (1988) and their reflection on accountability and the social contract, Kurucz et al. (2008) who delve into SR as a business case, and Rupley et al. (2017) in the United States from stand-alone reports to integrated reporting. However, as key point of our study, we should point out that to date there have been no studies that delve into the field of social reporting evolution and its links with the accounting requirements of relevance and reliability and the reasons behind it. That is, a double vision is introduced based on two main questions: a) how are these disclosures being carried out? and b) what are the corporate expectations in them?

The structure of this study includes the following topics. In the second section, we will introduce Stakeholder Theory as our research framework. Later, in the third section we will begin with the revision of the early initiatives of social disclosures. In the fourth section, we will introduce SR standards and their role into the middle course of this evolution. In the fifth section, we give an overview of the current situation introducing the debate between SR as a business or as a social case. The specific case of the EU and its advances in social reporting regulation will be analysed in the sixth section. We will end with some conclusions and recommendations on this subject derived from the learning that the past allows us to carry out in the future.

Describe the general perspective of the chapter. End by specifically stating the objectives of the chapter.

BACKGROUND: A STAKEHOLDER THEORY VIEW OF SOCIAL REPORTING

Among the different theories used to justify companies’ interest in social disclosures, Stakeholder Theory (Freeman, 1984) stands out for accounting researchers. For some time now, financial information has

been supplemented with other information that stakeholders demanded. Mahoney et al. (2013: 350) conclude in this respect that “to reap the benefits conferred on good corporate citizens; firms wish to be perceived as good by their stakeholders”. Thus, voluntary disclosures constitute a channel for transparency between a company and their stakeholders. Among these, those focused on disclosing SR, known as social reporting, play a priority role by encompassing the most relevant results of the corporate SR assumed and exercised, which are communicated to all its stakeholders, who can evaluate it (Dawkins and Fraas, 2008).

Morsing and Schultz (2006) propose three possible strategies between a company and their stakeholders that range from the “one-way symmetric” disclosure where the company decides what to disclose, the “response”, with a two-way asymmetric approach where there is already minimum interaction with stakeholders, to “involvement”, which is a two-way symmetric approach where a greater interaction with stakeholders is required as a result of the interaction between both in the design of sustainable corporate actions. The third approach, involvement, would be the most appropriate according to Stakeholder Theory to maintain that “good” relations with stakeholders, due to the level of dialogue and commitment required. Moreover, the best competitive result would probably be triggered for the company, as managerial perspectives on this theory (Dong et al., 2014) allow different competitive advantages to be obtained.

The expectations of the various stakeholders will affect the reporting policies of the company (Deegan and Unerman, 2011). Tschopp and Nastanki (2014) comment on the different needs because, depending on the interest group, the information demanded on SR probably will be different. In this regard, Pérez et al. (2017: 670) propose evaluating the intensity of this reporting defined as “the percentage of issues that are discussed out of the total amount of issues that could have been discussed to achieve the maximum rating”. Equally, as proposed by Fernández-Feijoo et al. (2013), the level of pressure from stakeholders is a key variable to study the relationship between these groups and the transparency required of their social reporting. In addition, the type of stakeholders, as Da Rocha et al. (2017) found, moderates the relationship between SR and performance in primary stakeholders (employees, community and suppliers). All these variables should be considered to analyse social reporting in each type of company, affecting both the contents and the quality offered.

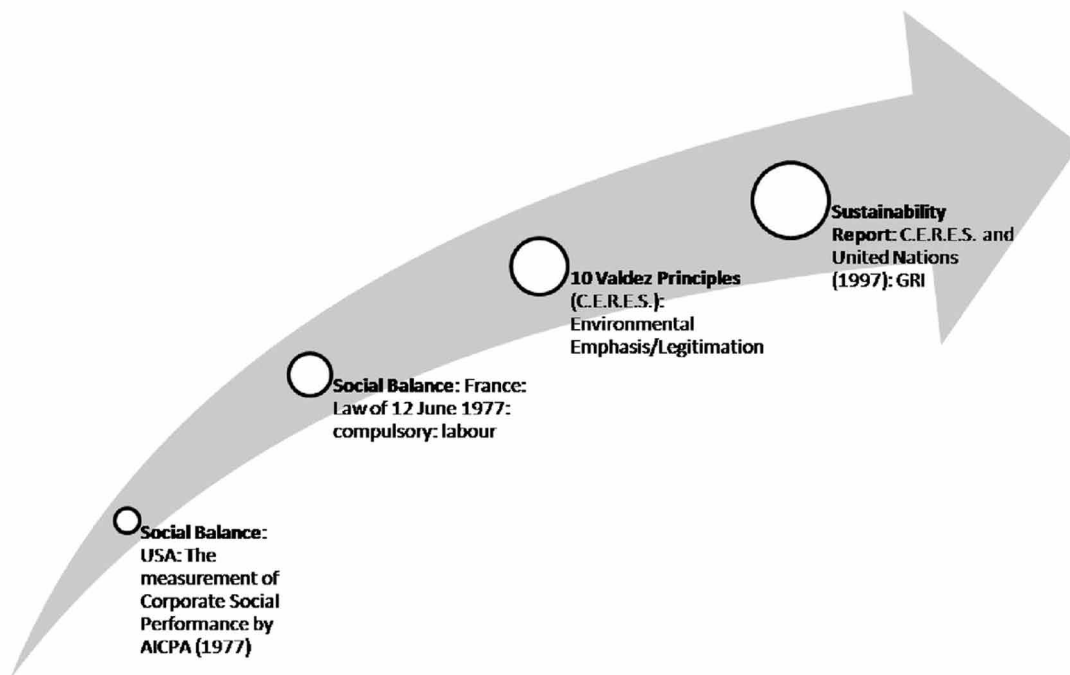
However, social reporting per se is not a sufficient condition to ensure good relations with stakeholders. Van der Laan et al. (2005) conclude that reporting is necessary but it also requires a dialogue between the management of a corporation and its stakeholders to ensure its usefulness. This implies a relevant question which is valid for all types of voluntary disclosures but especially for social reporting, the volume disclosed is not in itself a valid condition for the usefulness to stakeholders (Gray, 2006). This leads us to differentiate between quantity and quality in social reporting (Castilla-Polo and Ruiz-Rodríguez, 2019). Whereas the content dimension of social reporting will determine what should be communicated, the quality dimension will involve providing the necessary guarantees and requirements so that stakeholders can trust it, a fundamental question for addressing the future of these disclosures.

In view of all the above, in the following sections we propose to analyse which attributes are associated with social reporting and whether they have changed over time, distinguishing early developments from the current situation. As we commented, there are previous studies about the evolution of social reporting, such as Gray et al. (1988), Owen (2014) and Rupley et al. (2017), but none of them takes into account the role of accounting characteristics as we intend to. In addition, the reasons behind this will also be reviewed to determine if Stakeholder Theory supports them or not.

SOCIAL REPORTING: EARLY DEVELOPMENTS

Social reporting is largely a product of the past half century as Carroll and Shabana (2010) stated. For Owen (2014:75) it achieved real importance in the 1970s, “as a consequence of the debate, then raging, concerning the role of the corporation in society at a time of rising social expectations and emerging environmental awareness”. Nevertheless, it can be defended that **Social Balance** is the first tool used in the field of social reporting, with its theoretical origins dating from the second half of the sixties and early seventies in the United States, through the report *The Measurement of Corporate Social Performance* prepared by the AICPA (1994: 3) and its theoretical advances in the matter. This report demanded enhance the utility of business reporting “focus more on the factors that create longer-term value, including nonfinancial measures indicating how key business processes are performing” where SR has a key role. The practical or applied origins of this report are located in the French Law 12/07/1977 with the obligation for companies with more than 300 employees to communicate (mostly numerically) general issues such as the global situation, remuneration, occupational safety, among others. The purpose of this report was to complete the information contained in the traditional financial statements with information on SR but trying to address its accounting, an issue that is considered as being mainly responsible for the low degree of success achieved (Castilla and Gallardo, 2003). In fact, European companies tended to focus on employee issues while United States companies began to publish non-financial information within their annual report (Weber and Marley, 2012). See Figure 1.

Figure 1.



Subsequently, the idea of social disclosures was tackled again because of the environmental disasters of the late 80s without so much emphasis on the reporting of these aspects. Only disclosing information about SR was already an important advance among companies at that time, an issue that was understood through social reports. Specifically, for Rupley et al. (2017), the origins of sustainability reporting in a modern way is traced to the Exxon Valdez oil spill and the subsequent call for greater disclosures of environmental risks. “Greenwash” is an idea repeated within this stage social development (Tschopp and Nastanski, 2014). In a more concrete way, at the end of the 80s, the Coalition for Environmentally Responsible Economies (CERES) elaborated the Valdez Principles on voluntary behaviour in environmental issues that were very well accepted by companies in sensitive sectors. In fact, the Valdez oil spill in Alaska in 1989 is considered as its origin. Sanyal and Neves (1991: 888) defined them as a code for corporate conduct towards the environment that implies a self-reporting mechanism, “before of the Valdez Principles there was no comprehensive framework to guide or evaluate corporate conduct toward the environment”.

Another significant milestone at the early-to-mid 90s and outside the scope of CERES, are the voluntary reports on environmental and social aspects, the so-called **Corporate Social Reports** or **Social Reports** (Mahoney et al. 2013). These terms describe non-standardized formats for social reporting and are included under the label *Stand-alone Reports*⁴. One remarkable example is that developed by The Body Shop Company stands out for its pioneering role.

However, it was not until 1997 that CERES and the United Nations for the Environment (UNEP) developed the Global Reporting Initiative (GRI), introducing the concept of **Sustainability Report**, which has been of great relevance since then. Following Moneva (2007), a broader report concept was needed that would add social, environmental and economic performance. In this report, according to the latter author (2007), the need for company transparency is combined with the concept of sustainable development and is a real breakthrough in the field of social disclosure. However, in our opinion, the real breakthrough of GRI comes from the type of communication strategy it proposes “involvement”. Unlike previous initiatives, GRI proposes to overcome the one-way symmetric strategy, incorporating dialogue and engagement with stakeholders throughout its reporting framework. Hence, its success was justified because a large percentage of companies opted for the GRI methodology. In 2018, GRI has been followed by 4042 organizations worldwide, according to their database. In fact, it constitutes the world’s most widely used standards on sustainability reporting.

There have been different versions: 2000 (G1), 2002 (G2), 2006 (G3), 2013 (G4), and currently 2016 (Standards). Although in all of them the role of stakeholders is fundamental, specifically “all elements of the Reporting Framework are created and improved using a consensus-seeking approach, and considering the widest possible range of stakeholder interests which includes business, civil society, labour, accounting, investors, academics, governments and sustainability reporting practitioners” (GRI, 2018: 1)⁵.

STANDARDS FOR SOCIAL REPORTING: THE MIDDLE COURSE

From GRI, numerous initiatives have emerged to contrast the validity of a voluntary framework for social reporting during the middle course. Different GRI versions, the latest being the *GRI Standards*, as well as initiatives such as the *Sustainability Accounting Standard Board (SASB)* in 2012 and the *Integrated Information Reporting Framework (IIRF)*, the *AA 1000 series*, *ISO 26000*, the *Sustain-*

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able Development Goals and the *Principles of the Global Compact*, among others, configure a range of tools known as SR standards.

A middle stage can be differentiated from the late 90s with the publication of GRI until 2014, where SR standards assisted companies and social disclosures became relevant to the point of being the most relevant category of non-financial information. According to Tschopp and Nastanski (2014), at this time social reporting resurfaced and then it was clearly regarded as a multi-stakeholder approach where these groups had a stronger voice in social and environmental issues. In their opinion, it was the beginning of a new stage in social reporting evolution, where the rise of socially responsible investing also demanded more accountability and credibility of these disclosures and where SR standards occupied a key role.

Lim (2017: 78) corroborates its value to foster greater transparency and accountability in social disclosures: “companies are encouraged to voluntarily reveal their social and environmental practices according to core global principles and standards”. Following De Colle et al. (2014:178) “all share a common objective: to advance the social, ethical and environmental performance of organizations by codifying aspects of organizational behaviour”, but there are significant differences between them. There are different categories for this concept depending on their focus, nature or scope, among others. Especially relevant for our study is the use of SR standards for accountability processes. Social reporting is considered the last stage in the SR strategy of a firm, which would lead us to distinguish between those SR standards aimed at disclosure and those with a broader purpose centred in the implementation and communication of SR. We review the most widely recognized standards that involve external reporting on all type of contents regarding SR: AA1000, GRI Standards and United Nations (UN) Global Pact in combination with Sustainable Development Goals (SDGs).

AA 1000

The Institute of Social and Ethical Accountability created AA1000 in 1999, although the current version dates from 2018. The AA1000 Series includes AA1000 Accountability Principles (2018), AA1000 Assurance Standard (2008 and forthcoming 2019) and AA1000 Stakeholder Engagement Standard (in revision).

It deals with all organizational, economic, social and environmental performance included in the triple bottom line approach (Elkington, 1994). This standard examines how an organization knows, understands and integrates their different stakeholders. Communication is considered as a permanent business commitment with their group of interests and in this process there is a fundamental concern with assuring its credibility. However, there is no fixed structure, but instead it sets out four principles that companies interested in following this standard should follow. “Impact is a principle of central importance to the accountability process and supports the interactions between the rest of principles: inclusivity, materiality and responsiveness” (AA1000:13).

GRI Standards

GRI Standards are an update of the G4 version, which started to be applied in July 2018. They are different standards designed to be used together when sustainability reports are made. As a key point, they are modular and flexible and are divided into two main blocks: Universal Standards and Thematic Standards (Economic, Environmental and Social). The former are applicable to any organization, while the latter will be used to provide information on the material issues of a company, whether economic,

social or environmental. In addition, there are two options for preparing sustainability reports: core and comprehensive. However, these last options do not have to do with the quality of the report but with the level of information that the company is willing to communicate.

Materiality dominates as a principle in GRI Standards, as in the previous G4 version where that principle was introduced. Thus, information should be provided on those indicators that the organization has considered to be material due to the impact of its activity and for its stakeholders. This principle requires the communication of those aspects that reflect the organization's significant economic, environmental and social effects, or that substantially influence stakeholder assessments and decisions. For this reason, it is obvious that stakeholders play a key role within this standard, to the extent that they constitute a basic principle for electing the content of any sustainability report.

GRI Standards maintain the G4 principles both to guarantee the quality of the information contained (accuracy, balance, clarity, comparability, reliability and timeliness) and those requirements to address the content (stakeholder inclusiveness, sustainability context, materiality and completeness) (GRI 101 Standard:7). It also offers a comprehensive list of indicators to address each of the blocks, which helps considerably when drawing up a sustainability report. Tschopp and Nastanski (2014:153) justified all these specifications because in their opinion, the mission of this standard is "that reporting on economic, environmental, and social performance by all organizations becomes as routine and comparable as financial reporting".

United Nations Global Pact

The Global Pact is an international standard proposed by the United Nations (UN). It is made up of 10 principles organized in four areas: human rights, labour standards, the environment and corruption. See Figure 2.

These principles are directly related to the Sustainable Development Goals (SDGs) approved in September 2015 and endorsed by more than 150 heads of state and governments. SDGs form part of the Agenda for Sustainable Development 2030 and replace the previous Millennium Development Goals. They constitute 17 objectives "to eradicate poverty, protect the planet and ensure that all people enjoy peace and prosperity"⁶, which should be achieved or improved until 2030.

Within the UN Global Pact, there is an essential commitment of the adhering entities to communicating to their stakeholders the degree of compliance with its principles as well as with the SDGs. The proposed model includes the preparation of a Communication on Progress (CoP) for companies and a Communication on Engagement (CoE) for the rest of the organizations. Based on a company's self-assessment, three levels of adhesion can be differentiated (UN Global Pact)⁷ "Advanced: cover the company's implementation of advanced criteria and best practices; Active: meet the minimum requirements; and Learner: that do not meet one or more of the minimum requirements".

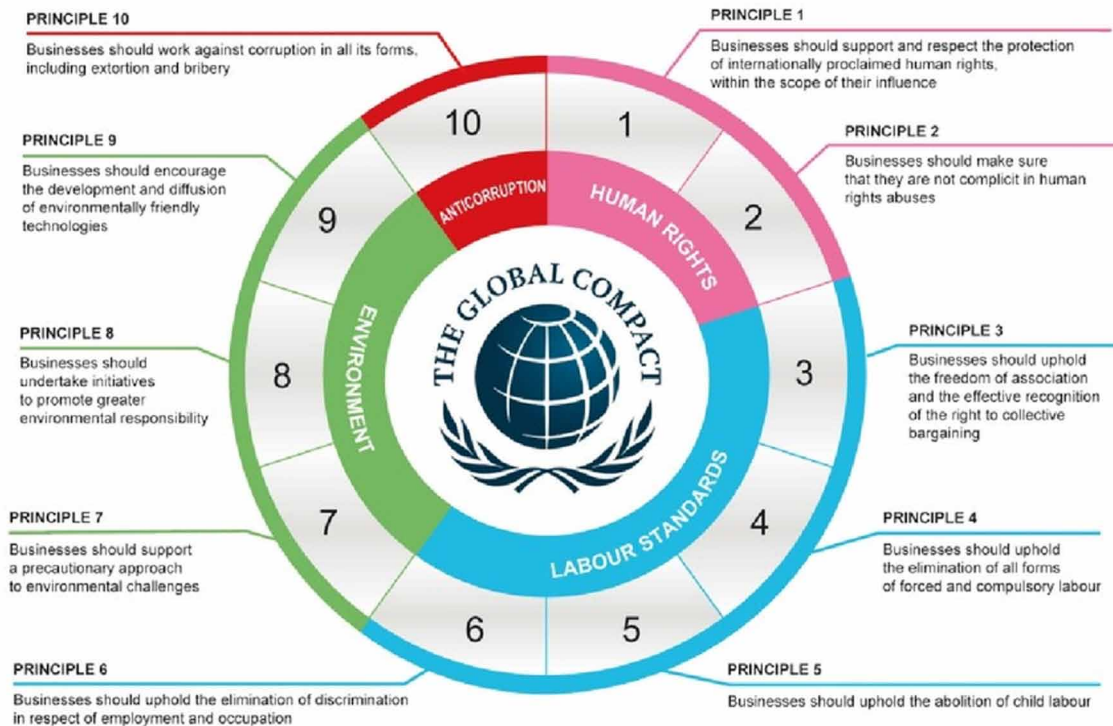
The signatory companies of the UN Global Pact have grown exponentially in recent years, and it can be stated that at the beginning of 2019, there are more than 13,000 signatories from 164 countries as can be observed in its database⁸.

Accountability and SR Standards

We move on to linking social reporting with accounting requirements. The role of academic accounting community in this topic has been analyzed by Gray et al. (1988) in its early moments claiming a more

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Figure 2.



systematic, coherent and integrate empirical framework based on the concepts of accountability and social contract. Another relevant papers about the opportunity of a social debate are raised by Perks and Gray (1979) and the technical difficulties for the accountancy “Beware of Social Accounting” (as the title of their article” and Gray and Perks (1982) who review the main arguments for and against social reporting. Since these first debates, the discussion has ceased to be about who should confront them for whom and how it should be done (a question that Gray et al. (1988) already anticipated in their study.

Focusing on the latter issues, in Table 1 are included SR standards reviewed and their main specifications are divided into 4 aspects: contents, requirements, tools for implementation and connections between them, if it is the case.

One of the most relevant differences between the revised standards is how to guide social disclosures. Thus, GRI Standards offers a totally structured and closed scheme unlike the AA1000 and the UN Global Pact, which only offer principles and recommendations to communicate. The structure of the latter is much more open and flexible than that of the former where the decision is whether to complete that section or indicator depending on its materiality.

There are also differences in terms of content. GRI offers different standards for the economic, social and environmental blocks. For its part, the UN Global Pact proposes a quadruple structure for its 10 principles where the social sphere prevails in the human rights and labour sections over the economic block which includes anti-corruption practices. With a different approach, AA1000 raises the need to comply with principles in the reporting not by defining categories of contents.

Table 1. SR Standards and conditions for reporting

| SR Standard | Contents | Requirement for Social Reporting | Tools for implementation | Connections |
|-----------------------|--|---|---|------------------------|
| GRI STANDARDS | <input type="checkbox"/> Economic (200 series) <input type="checkbox"/> Environment (300 series) <input type="checkbox"/> Social (400 series) | Content: Stakeholder Inclusiveness, Sustainability Context, Materiality and Completeness. Quality: Accuracy, balance, clarity, comparability, reliability and timeliness | -Reference standards -GRI Content Index tool for “it makes information traceable, increasing the value of your reported data and the transparency of your report” ⁹ | GRI and UN Global Pact |
| AA1000 | Principles-based standard for sustainability reporting. Non-specific items, indicators of categories. | Inclusivity, materiality, responsiveness and impact | -Reference series | |
| UN GLOBAL PACT | <input type="checkbox"/> Human rights (Principles 1-2) <input type="checkbox"/> Labour (Principles 3-4-5-6) <input type="checkbox"/> Environment (Principles 7-8-9) <input type="checkbox"/> Anti-corruption (Principle 10) | Transparency, accountability and inclusiveness | -Reference principles -CoP tool “interactive tool, which aims to make it easier for entities to prepare the Progress Report and, therefore, to report on their commitment and progress in CSR” ¹⁰ . | |

Source: Own elaboration based on GRI Standards, AA1000 and UN Global Pact.

If now we link all the comments above about what to disclose (content and structure) with the accounting requirement of relevance, we also find differences between these standards. Relevance, understood as a condition where that information will be useful for decision-making, is achieved through two channels in these standards. A first channel is followed by GRI in relation to their stakeholders using materiality as a guide to select what information will be disclosed within a complete selection of indicators and by AA1000 understanding materiality as a previous step to be considered in combination with the rest of its principles. For its part, the UN Global Pact endorses this requirement, in a certain way defining its principles and demanding communication of what the company is doing in this regard.

In terms of comparability, we could conclude that AA1000 is not promoting it, unlike GRI with a clearly delimited structure for blocks and indicators and the UN Global Pact where the existence of fixed content (principles required) does allow comparisons. Comparability is a basic principle for SR standards because, as stated “if CSR reporting is to be used as a market based mechanism on a macro-scale to improve social and environmental performance, then the use of comparable and consistent standards is important” (Tschopp and Nastanski, 2014: 148).

If we focus now on the study of how SR should be disclosed, we can find that GRI specifically is the only standard reviewed that sets out specific quality principles; this is a common gap between them. In that sense, Ortas et al. (2015) find that it is a fact that organizations that follow the GRI guidelines have greater reliability and credibility compared to those disclosures that are not based on these international standards. Empirically, also Mahoney et al. (2013) highlight the role of GRI as a framework that justifies higher levels of quality than use of SED without it.

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It is usual to ask for assurance as a guarantee of reliability for the information disclosed within SR standards. AA1000 and GRI recommend assurance, but the difference is important between them. While AA1000AS is a specific guide in the assurance of AA1000, GRI admits assurance without setting specific specifications for its sustainability report beyond its principles for quality. For its part, there are no references either to quality reporting or to assurance in the UN Global Pact. Arevalo and Fallon (2008) consider its self-assessment as the main critique over this last standard, proposing a theoretical researcher's model to improve this last standard.

To sum up, if we had to select one of the SR standards reviewed that would help set accounting requirements for social reporting, there is no doubt that GRI would be our choice; perhaps this would be one of the reasons for its success as Tschopp and Nastanski (2014) also corroborate.

SOCIAL REPORTING: HOME STRAIGHT

Nowadays social reporting constitutes one of the categories of non-mandatory information most disclosed by companies although in some countries the disclosure of certain contents are becoming obligatory, as is the case of the EU, which we will see next. KPMG (2017) in its last published report, *The Road Ahead: The KPMG Survey of Corporate Responsibility Reporting 2017*, concludes that there has been a large increase in the reporting of SR reports since 1993, since nearly three quarters of the 4900 firms analysed use SR reports as current practice (See Figure 3).

In addition, another highlight in this recent social reporting evolution has to do with SR standards and their role assisting organizations, especially those interested in reporting, with GRI having the most extended use at an international level (KPMG, 2017).

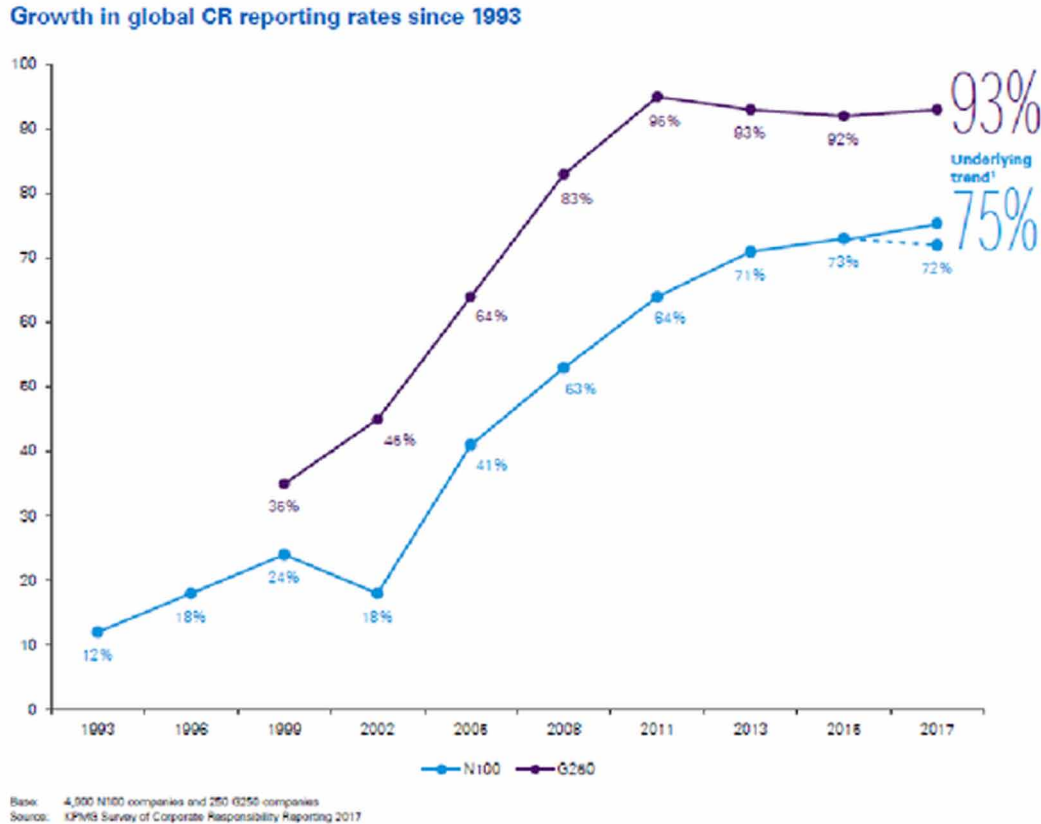
However, De Colle et al. (2014: 177) argue that not everything has been positive for the increased use of SR standards. They propose the existence of a *Paradox of Corporate Social Responsibility Standards* insofar as these cause three serious disadvantages: “deceptive measurements; the problem of responsibility erosion, and the problem of blinkered cultures”. All of them support that when a company follows a SR standard; it complies with the proposed measurements and contents and does not worry about adapting its discourse to the needs of its specific interest groups.

Together with this critical approach, recent concerns of researchers on this subject address two major issues that will mark the future development of social reporting: *real accountability and reliability in social reporting*. Deloitte (2016: 7) confirms all the above when concluding “a more rigorous analysis and disclosure of environmental, social and governance (ESG) performance will be essential for companies to improve credibility and trust among an expanding set of stakeholders and, at the same time, drive performance in a manner that can be transparently evaluated by internal and external stakeholders”. We will now move on to a more detailed commentary.

Real Accountability

A currently repeated criticism is that social reporting fails to inform the degree of real commitment in SR acquired by the companies, that is, that accountability is not achieved. De Colle et al. (2014: 185) name this problem as responsibility erosion as organizations “align their behaviours to the process or outcomes specified by the standard in an algorithm-like mode, rather than in a deliberative, responsible mode”.

Figure 3.



Stakeholders are worried about the non-financial information provided by the companies in social terms. De la Cuesta and Valor (2013: 221) state that “consultant reports have also concluded that existing reports are of little use for accountability purposes”. Other authors such as Lim (2017: 78) warn that “nevertheless, global corporate responsibility disclosure may merely reflect a disconnection between corporate commitment to GCR principles and the application of those principles to what corporations report about their social and environmental practices”; Brooks and Oikonomou (2017:3) believe that “a thread of the literature even goes so far as to argue that corporate sustainability reporting has nothing to do with sustainability”; Michelon et al. (2015: 59) claim “increasing scepticism about the use of CSR reporting practices as tools used to enhance perceived accountability”; or in other words, social reporting has not been used to reduce or improve social and/or environmental issues as might have been expected (Brammer and Pavellin, 2006).

Deloitte (2016) proposes stakeholder engagement as one possible solution to this problem as a recently repeated orientation for social reporting in order to evaluate diverse stakeholder audiences and to communicate valuable insights to them for more effective communication.

Reliability and Social Reporting

Secondly, many opinions during the last decade introduce accounting characteristics into social reporting even though it is non-financial information. Relevance and reliability as the most demanded are directly related to the quality of social reporting (Leitoniene and Sapkauskiene, 2015), an issue that grabs the attention of accounting regulators. In fact, Deloitte (2016) confirms that while stakeholders demand more information, they also ask for more quality and comparability. Indirectly, all the above has to do with the real accountability problem as Odriozola and Baraibar-Diez (2017: 121) raised “the level of quality in sustainability reports may enhance its credibility and in turn, influence the perception of stakeholders”.

Relevance has to do with the contents disclosed but reliability is based on the accuracy for the stakeholders that trust in them. It is obvious that the volume of social reporting is not in itself a sufficient condition about its quality. In other words, one issue is the quantity revealed and another is its quality. The last can be obtained through a variety of methods among which assurance stands out. Deloitte (2017) found that 76% of Spanish companies that disclose social information add assurance to their content. This figure that can be generalized to other countries shows the importance of reliability for social reporting. For García-Sánchez et al. (2019) not only external validation must necessarily be considered in social reporting, also they argue for a better assurance quality. Tschopp and Nastanski (2014) also include verification and certification as other ways to ensure reliability. In that sense, some SR standards like AA1000AS include an assurance standard, but others such as GRI or UN Global Pact do not offer verification services and companies have looked for assurance services. Assistance for social reporting is one of the essential aspects of social consultancy and the Big 4 audit firms “are looking to make major in-roads into the climate change and sustainability services (CCSS) market”¹¹.

SOCIAL CASE VS BUSINESS CASE: A PUZZLING FUTURE

Considering the problems faced by social reporting in the coming years which we have pointed out, we could open the door on a disconcerting debate, which is SR as a social case or a business case. The word “voluntarily” has been part of the SR definition and in its consideration as a business case; however, the problems that have been generated pose a certain regulation that requires its possible consideration as a social case, and this is not such a bad thing (Unerman and O’Dwyer, 2007).

Thus, the future of social disclosures could be defended as a business or social case and each position has its respective supporters and opponents. Within the first, companies will decide what to do and how to communicate it as opposed to social case followers, where some level of SR regulation would be necessary. According to Kurucz et al. (2008: 84), “a business case is a pitch for investment in a project or initiative that promises to yield a suitably significant return to justify the expenditure”. There are four reasons that explain SR in the opinion of these authors as a voluntary decision: cost and risk reduction, profit maximization and competitive advantage, reputation and legitimacy, and synergistic value creation (p. 85). Stakeholder theory would also endorse the business case because their postulates indicate that companies will be socially responsible for serving their stakeholders, since it is a general demand of the market, and at the same time, they will communicate that they are doing so, in order that their stakeholders may know it. All of these reasons would theoretical and pragmatically endorse the view for the business case, where it should be up to companies to decide what to do and how to disclose it, given the voluntary nature of SR. “Only when firms are able to pursue CSR activities with

the support of their stakeholders can there be a market for virtue and a business case for CSR” (Carroll and Shabana, 2010: 102).

However, criticism is beginning to be heard demanding the regulation of socially responsible actions because there is a clear risk of companies leaning towards those activities of SR that can bring more profitable as they are directly related to reputation. Gray et al. (1988: 9) considered it as one of the reasons justifying social reporting under the term “enhancing corporate image”. The relationship between social reporting and reputation has been widely studied and although the results are not coincident, most of them corroborate a positive and direct sense between both variables, such as Mahoney et al. (2013), Moura-Leite and Padgett (2014), Saeidi et al. (2015), and Casimiro and Coelho (2016). For Nikolaeva and Bicho (2011) GRI principles are adopted by companies as a reputation tool, introducing sustainability reporting into the marketing scope.

Another reason that would justify the social case for SR has to do with and is caused by the role of governments as guarantors of the public good, avoiding negative externalities. If society demands that the behaviour of companies be respectful of the environment and the community through SR, why should not governments demand the same?

These two reasons would justify the social case or regulation of SR to some degree. Unerman and O’Dwyer (2007: 349) are in favour of this position: “increased effectively promulgated and enforced independent regulation designed to protect social and environmental interests of a range of stakeholders can also serve to enhance corporate economic performance and shareholder value”. Among other advantages, stakeholders could benefit from relying on these disclosures if they are subject to regulation, improving levels of risk and confidence. Although SR is by definition a “voluntary activity”, these authors pose an alternative discourse for regulation that is gradually gaining followers. In a similar sense, Japhet et al. (2015) review the arguments for and against mandatory social reporting in the Indian context where it has been implemented by the Section 135 of Companies Act 2013. They concluded about the relevance of these disclosures, in a mandatory or voluntary way.

The EU Directive for Non-Financial information: A Step Forward into the Social Case

The accounting regulatory environment is in a period of concern about non-financial information that companies are voluntarily disclosing. This justifies the orientation offered by our study to the role of accounting requirements within the recent history of social reporting.

We are in a situation where the debate about harmonization and the fit of social reporting, as the most relevant non-financial information, is analysed both at the international level and more closely at EU level. In fact, the European context is a case study due to its role of prime mover. In 2001, France was the first country that required social information from listed companies, a pioneering role as in the case of its Social Balance required in 1977. After Denmark, Sweden and Norway were other followers who shared the pathway of social reporting regulation. These previous initiatives encouraged the European-level publication of Directive 2014/95/EU of the European Parliament and of the Council (October 22, 2014)¹². It has already made it necessary to standardize the way of reporting on social and ethical aspects for companies with more than 500 employees by making such content mandatory, which is, betting on the social case as a way of solving the deficiencies detected in this type of reporting.

Figure 4.



Directive 2014/95/EU allows member states to regulate specific requirements on companies regarding the social reporting framework, disclosure format and content. It does, however, offer compulsory references about how different countries should make their transposition, which can be commented on in the following sections. It is interesting to note that more than 80% of the countries affected have tightened their regulation for social reporting in three areas: 95% have widened the regulations in relation to the type of company required or the contents to be disclosed; 36% have included the need for verification and, finally, 86% have established sanctions (Deloitte, 2016). This corroborates that the member countries endorse the choice of the social case as we can clearly observe in Figure 4.

Organizations That Must Disclose a Non-Financial Report

According to Directive 2014/95/EU, a non-financial report is an obligatory task for large public-interest companies, which include listed companies, banks, insurance companies, and others designated as such by national authorities, with more than 500 employees.

Consequently, the passage of voluntary to mandatory information is already a fact among the “big European companies” which opens the door for the social case of SR in the field we intend to study. Nowadays, SR as a business case, and social reporting within this, is mostly voluntary, but this situation can be changed in line with the position of the EU as far as non-financial information is concerned.

Non-Financial Report’s Formal Requirements

As article 19a (section1) from Directive 2014/95/EU states, companies should report at the minimum on the following matters: “environmental, social and employee matters, respect for human rights, anti-corruption and bribery matters”. However, the approach that must be offered includes not only disclosing this information but also linking it to the business model, policies, strategies and results expected by the company in each of these areas. We understand that this demand favours greater engagement with stakeholders, partly alleviating the problem of seeking real accountability in social reporting.

According to GRI and CSR Europe (2018: 5), this Directive “has set a clear course towards greater business transparency and accountability on social and environmental issues”. Nevertheless, at the same time, SDGs are a priority on the policy agenda and for this reason there are policies and initiatives devoted to SDG target 12.6, “Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle”.

Another compulsory question is related to where social information is required. According to the Directive, the non-financial report must be presented in the management report or in a separate report published on the website and referenced in the management report during a period that does not exceed 6 months from the date of publication of the balance sheet (Article 19.a, section 4).

Recommendations for Non-Financial Reports

As required by Directive 2014/95/UE, in 2017 the Commission published the *Guideline on Non-Financial Reporting (Methodology for Reporting Non-Financial Information)* (EU, 2017). This is a non-binding guideline to help companies disclose social information required but using “a principle-based methodology relevant to companies across all economic sectors and that helps them disclose relevant, useful and comparable non-financial information” (Article 2).

These principles are to “disclose material information, fair, balanced and understandable, comprehensive but concise, strategic and forward-looking, stakeholder orientated, consistent and coherent” (EU, 2017, art. 3). Many of them include explicit reference to Stakeholders Theory, specifically the stakeholder oriented principle, as well as the materiality of the information already requested by some SR standards. On the other hand, as far as purely accounting requirements are concerned, all of them can be related both to their relevance and/or reliability. However, this last requirement is not explicitly cited in the text.

As means of drawing up the non-financial report, Directive 2014/95/EU offers the following possible SR standards in article 9 as the most extended in an international scope: “Eco-Management and Audit Scheme (EMAS), or international frameworks such as the United Nations (UN) Global Compact, the Guiding Principles on Business and Human Rights implementing the UN “Protect, Respect and Remedy” Framework, the Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises, the International Organization for Standardization’s ISO 26000, the International Labour Organization’s Tripartite Declaration of principles concerning multinational enterprises and social policy, the Global Reporting Initiative, or other recognized international frameworks”.

A Critical Look at Social Reporting Evolution

This list should not be considered exhaustive, as it is in the EU's interest that companies take advantage of this flexibility to encourage innovation in social reporting practices (EU, 2017). In fact, due to the variety of SR standards that are admitted, if the company complies with one or more of them, the effort made will undoubtedly be lower. This question is also raised by Deloitte (2017: 32): “the application of the non-financial report will depend on the company's previous use of the GRI, with a smaller effort for those that have opted for this standard since they cover transparency requirements in ESG aspects”.

FUTURE RESEARCH DIRECTIONS

SR standards do not seem to be useful for solving the two main problems that social reporting has to face in the coming years: real accountability and reliability. This is the reason why the business case for SR begins to be replaced with a social case that appears as the immediate future of social reporting. Proof of this is the case of Directive 2014/95/EU where acceptance among member countries augurs a promising future for this type of regulatory initiatives. SR as a social case emerges strongly in a regulatory accounting context concerned with the harmonization and embedding of non-financial information. Nevertheless, regulation will not meet all stakeholders' demands for a real commitment in any company; it will only guarantee reliability of some standardized SR contents. Alongside this question, there are still many questions that researchers in this field should address:

- Should social reporting remain a voluntary activity, i.e. SR as a business case?
- Should the regulation of social reporting be considered in all cases: companies, industries, juridical regimes, among other variables?
- How could engagement, proposed by Stakeholder Theory, be achieved in the face of an SR social case?
- Could SR standards be adapted to meet the demands of reliability and be used as basic tools for the regulation of social reporting?

CONCLUSION

As the report *Member State Implementation of Directive 2014/95/EU: A comprehensive overview of how Member States are implementing the EU Directive on Non Financial and Diversity Information* (GRI and CSR Europe, 2018) conclude, the future of social reporting is bright.

However, companies should take into account two actual limitations that we have detected after reviewing its most recent developments. Firstly, social reporting appears to the extent that the search for a coherent solution to ensure the commitment of companies to provide relevant and reliable information to their groups of interests would allow engagement with them as Stakeholder Theory proposes (Freeman, 1984). Secondly, relevance and reliability should be guaranteed in social reporting if the companies' purpose is to offer a “real accountability”. Stakeholders ask for relevant information that includes SR performance as well as fitting into the company's strategy. In addition, they need reliable information that ensures that it can be relied upon.

It is our hope that this critical paper will renew the debate about SR as a business or social case, and facilitate future contributions in this new line of research, recently fostered by the European Union, with new insights. The results will be of interest for studies and actions aimed at regulating the improvement of social reporting in the hands of academics and practitioners but also investors and regulators.

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KEY TERMS AND DEFINITIONS

Accountability: Is a concept used to describe the way in which a company offers information about its behavior.

Business Case in Social Responsibility: When social responsibility is considered as a voluntary decision for companies.

Global Reporting Initiative (GRI): One of the most extended SR standards. It is based on the Stakeholders Theory.

Social Case in Social Responsibility: When social responsibility is considered as a mandatory question for companies.

Social Reporting: Voluntary disclosures of social information.

Social Report: A specific type of format use to disclose social information.

Social Responsibility Standard: A guide to assist companies into social responsibility management.

ENDNOTES

See Kurucz et al. (2008) for a more comprehensive analysis of the theories used in SR.

² See Carroll (1999) for a seminal paper about the SR evolution.

³ This involves social and environmental information in all types of formats used by the companies to disclose their SR also known as SED (social and environmental disclosures) or sustainability reporting.

⁴ Stand-alone reports also include sustainability reports.

⁵ <https://www.globalreporting.org/information/sustainability-reporting/Pages/gri-standards.aspx> (Accessed May 2019).

⁶ <https://www.un.org/sustainabledevelopment/> (Accessed June 2019).

⁷ <https://www.unglobalcompact.org/participation/report/cop> (Accessed June 2019).

⁸ <https://www.unglobalcompact.org/what-is-gc/participants> (Accessed June 2019).

⁹ https://www.globalreporting.org/services/reporting-tools/Content_Index_Tool/Pages/default.aspx (Accessed June 2019).

¹⁰ <https://compactlink.pactomundial.org/informe-de-progreso> (Accessed June 2019), in Spanish.

¹ <https://environment-analyst.com/27804/big-4-accountancy-firms-sustainability-advisory-strategies-and-opportunities> (Accessed June 2019).

² <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0095&from=EN> (Accessed April, 2019).

Chapter 15

Corporate Social Responsibility Reporting in the Gambling Industry: Interaction With Government

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ABSTRACT

The social cost of the gambling industry has always been controversial. In 2015, the Macau Special Administrative Region (SAR) government initiated a midterm review to evaluate the overall performance of the gambling industry. The objective of the study was to investigate how does the government influence and guide the operators to control their social cost and create value to society. This study applied content analysis and collected data from annual reports, sustainability/social reports, and corporate websites of all gambling operators in Macau from 2005 to 2016. The results were further analyzed by looking into the critical policy documents released and issues occurred during the period. The result indicated that the gambling operators have used CSR reporting as a communication channel with the government, which is consistent with legitimacy theory and stakeholder theory. In addition, most of the companies have reinforced their disclosure related to government policies after the midterm review report. This finding also reflects some insights of the political economy theory.

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INTRODUCTION

Macau, Las Vegas, Atlantic City and Monte Carlo are the four largest casino cities in the world. The gambling industry in these regions is highly related to the local economic development. In addition to creating large numbers of jobs, they also attract many tourists and bring rich taxes to the government. However, on the other side of the gambling industry, there exist high social risks, including money laundering, crime, bankruptcy, suicide, family problems, fraud, which need a lot of government control. Therefore, the responsible operation of gambling enterprises to prevent social problems and promote economic development has become the expectation of the local residents as well as the government (Guan et al., 2018). Many casinos have started to publish CSR reports, incorporate CSR information into their annual reports, or establish rules for responsible gaming. However, in-depth analyses of these reports in terms of the collaborations and value co-creation between the local government and gambling operators are yet to be conducted in the accounting academia (Leung & Gray, 2016). Therefore, this study investigates the annual reports and CSR related reports with the hope to better understand the social practices of the gambling operators and their perceptions, responses and interpretations of the government's expectations. Considering Macau as the world's largest gambling city since 2018, the findings of this study provide significant insights and hopefully can be generalized to other gambling cities in terms of "how gambling enterprises cooperate with the government to better fulfill their social responsibilities", so as to help themselves integrate into the local society and achieve sustainable development goals in the long-run. In addition, the study can also provide valuable references to the governments for policy adjustments and improvements.

CSR and CSD Related to Government Policies in the Gambling Industry

Corporate social responsibility (CSR) was firstly defined by Bowen (1953) as the obligation of a corporation to pursue its policies, to make its decisions, or to follow its lines of action desirably in terms of the objectives and values of the society (Carroll, 1999). As time goes by, more and more scholars, authorities, and organizations define CSR in various ways. Dahlsrud (2006) compared and contrasted 37 definitions of CSR. He found that the CSR definition suggested by the Commission of the European Communities (2001, p. 6) was the most widely adopted one. It defines CSR as "*a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis*".

The increase in CSR studies is partially caused by the gradual increase in the reporting of CSR. According to a KPMG report (2011), 95 percent of the largest global 250 companies in the world have disclosed their social responsibilities and this kind of reporting is often known as "Corporate Social Disclosure (CSD)". Although CSD shows a growing trend, the pressure of companies to disclose their CSR activities mainly comes from two stakeholder groups, namely the general public and the government regulatory agencies. CSD is believed to be an attempt to counteract the prevailing belief, especially the belief from these two parties, that many business actions are illegitimate (Abbott and Monsen, 1979).

The Macau Government released the "mid-term" review report of the local gambling industry in May 2015 to examine the overall impact made on the industry after its liberalization in 2001. This report has included many non-financial indicators such as the effort in developing non-gambling attractions and compliance with laws and regulations. However, in the report, there was no comprehensive evaluation on the CSR performance regarding the requirement specified in the concessionary contracts signed

between the casino operators and the government. Therefore, this study also aims to investigate the extent of disclosure by relating the government's policies and requirements and the CSD of Macau's gambling industry.

Gambling

Gambling has been accompanying human beings for a long time. On the one hand, it brings many positive benefits. The most important and attractive benefit is the great effect on economic development. Legalized gambling brings in a large amount of tax revenue which can be used to provide not only public goods, education, pension and health care services (Christiansen, 1998; Blaszczyński et al., 2004; Beem and Mikler, 2011), but also infrastructure, occupation and tourism (Christiansen, 1998; Felsenstein et al., 1999; Collins and Lapsley, 2003). In addition, liberal sociological research treats gambling as a legitimate leisure activity which can enrich ordinary people's lives (McMillen, 1996b; Cheng, 2009). Since gambling is always accompanied with entertainment activities like cruises and sports, some scholars even view gambling as a tool to maintain a social structure since it can weaken the impact of modern work (Parker, 1976 cited in McMillen, 1996b). In summary, the lure of a handsome tax revenue, a safety net to escape from the burden of work, and a mechanism to preserve social order (Herman, 1967 and Devereux, 1968 cited in McMillen, 1996b; Aasved, 2003) are some reasons for the government to legalize gambling.

However, on the other hand, criticisms on the gambling industry have never stopped. For example, gambling is caught up in behavioural problems such as alcoholism, addiction, and prostitution (Reith, 2007). Moreover, Quinn (2001) found that gambling might cause psychological health crises. Gradually, a notion called "problem gambling" has arisen. Problem gambling is different from social recreational gambling (McMillen, 1996b) and it is sometimes also notoriously known as "compulsive gambling" or "pathological gambling" (Raylu and Oei, 2002). During the past few decades, scholars have found that the issue of problem gambling had become more prominent than that of recreational gambling (Hing, 2001). According to the opinion of many psychologists and psychiatrists, gamblers are not able to resist gambling because their states of mind concerning impulse and sensation can be classified as "impulse control disorder" and "disorders in thinking" (Reith, 2007). Hence, gamblers will have a higher probability to commit suicide and impose family violence (McMillen, 1996b; Schalkwyk et al., 2006). Additionally, problem gamblers can affect social relationships and the equilibrium of society (England and Albrecht, 1984; McMillen, 1996b). One problem gambler can negatively influence an average of 10 to 17 people, most commonly family members, friends and employers (Shaffer and Korn, 2002). Some studies in the social sciences have even tried to highlight the link between criminal behaviors and illegal gambling (McMillen, 1996b). Grinols and Mustard (2001) critically asserted that the social costs of gambling activities were 1.9 times higher than their social benefits.

Based on the above discussion, with the lure of benefits, especially the significant tax revenue, the government seeks to legalize gambling. However, as gambling leads to high potential social costs, how to influence and guide the industry has become an important task for the government.

Gambling in Macau

With the goal of "recognizing the strategic social and economic importance of a healthy and sustainable development of the gambling industry" (McCartney, 2006), the Macau SAR government proposed to liberalize the gambling industry in Macau in July 2000. The liberalization was finally completed on 1

October 2001, and the number of casino concessions increased from the original maximum of three to six (DICJ, 2019).

Since the liberalization, the gambling industry has contributed much to the economic development of Macau. According to the Macau's Yearbook of Statistics 2016 (DSEC, 2017), the tax revenue from the gambling industry reached MOP89.57 billion and MOP84.38 billion in 2015 and 2016 respectively, which contributed to 77.14% (2015) and 76.36% (2016) of the total revenue of the government. Besides, the Yearbook shows that the population of labor force in the Gaming and Junket Activities reached 121,600 (2015) and 117,000 (2016), representing 20.1% and 19.92% of Macau's entire labor force. Thus, there is no doubt that the gambling industry has played an important role in the development of Macau's economy.

However, the social costs of the gambling industry cannot be ignored. According to the study undertaken by Fong et al. (2011), the social costs of gambling, which include treatment costs, prevention costs, family or friends' physical and psychological costs, legal costs, rent-seeking costs, regulatory expenses and public costs of training, and promotion and research in Macau, rose from USD40 million in 2003 to USD106 million in 2007 and had serious social impact on neighboring regions, such as mainland China.

Thus, how to improve the image of the gambling industry has become an important issue to the Macau SAR government. In May 2015, the government initiated a mid-term review to examine the overall impact of the gambling industry after its liberalization. This report includes many non-financial indicators such as the investments in non-gambling attractions and compliance with laws and regulations. It is considered that all the indicators in the mid-term review are factors that the government will consider when they assess the gaming operators' performance and decide the renewal of future concessions after the expiration of the current ones in 2022.

Though some researchers (Leung, 2014; Sio, 2013) have studied the trend of CSR disclosures in the gambling industry in Macau, they have not evaluated the disclosure contents related to a particular stakeholder group, such as the employees and government, and their influence. Hence, this study aims to contribute to CSR studies by assessing the influence of a powerful stakeholder on social disclosure and at the same time investigate how the corporate management of gaming operators perceive government policies and the change of disclosure extent before and after the mid-term review report.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Many theories have been used to explain and understand the CSD of companies. Most of them are developed based on three schools of thought. They are political economy theory, legitimacy theory and stakeholder theory.

Political Economy Theory

Political economy theory (PET) focuses on the "interaction and connection between business and society and on the power and position of business and its inherent responsibility" (Garriga and Melé, 2004). According to PET, the economic domain should be studied together with the political, social and institutional framework where the economy takes place (Gray et al., 1995, p. 52). Generally, CSR is considered to be the result of and the response to social and/or political pressure. The bourgeois variant of PET also argues that disclosures can only be explained together with the socio-political environment where companies operate. The broader political CSR literature has often addressed the relationship between government

and business (Moon and Vogel, 2008; Guan & Noronha, 2018). It states that companies facing greater social or political pressure will provide more extensive CSR.

Therefore, if there is a change in the political pressure, the change will be reflected in the CSR disclosures. This study assumes that the change will be specifically reflected in the government policy related disclosures. As a tool to assess the performance of the gambling industry, the mid-term review can be considered as increased political pressure for the operators to contribute more in these aspects. Thus, according to PET, it is inferred that more policy related information would be disclosed after the release of the mid-term review report.

Legitimacy Theory

Contested products or services are the main features of any controversial industry. Some researchers found that the level of cognitive beliefs about the products or services helped to constitute product acceptability and reconfigure a controversial industry's legitimacy (Galvin, et al., 2004-05). Legitimacy could be considered as the conformation with social norms, values, and expectations (Oliver, 1996; Palazzo and Scherer, 2006). As legitimacy was regarded as a precondition for the continuous inflow of resources, some researchers considered it as an important factor affecting an organization's survival (Palazzo and Scherer, 2006; Parsons, 1960; Pfeffer and Salancik, 1978; Weber, 1978). Some argued that organizations could only continue to exist if the society in which they operated recognized that they were operating within a value system that was consistent with the society's own (Suchman, 1995; Gray et al., 1996). Therefore, the cognitive beliefs about the products or services are related to constituting the company's legitimacy, which is vital to its survival.

For the gambling industry, due to its historical background, tends to be socially constructed as illegitimate (Reith, 2007; Leung & Snell, 2017). However, with the evidence from the western world, it has gradually transited from an illegitimate form to a legitimate form of socially undesirable behavior of recreation and consumption due to economic, political, and cultural changes (Reith, 2007). It means that the legitimacy of gambling is susceptible to re-interpretation and changes over time (Johnson and Holub, 2003).

To answer the question "what are the factors that affect the legitimacy of gambling?", some studies have shown that the gambling industry faces debates about its benefits and costs and which kind of gambling activities should be legalized. However, Galvin et al. (2004-05) stated that "*the struggles over industry legitimacy are less about the activity of gambling, and much more about the authorized organizations and locations in which these activities take place*". As a result, the government always takes significant regulations and controls to influence and guide the industry (Miller & Michelson, 2012; Leung, 2019). On the other hand, how gambling operators comply with regulations largely influences the enforcement effect of the governance and supervision system.

Some studies pointed out that corporate management might use CSD to anticipate or avoid any possible pressure and boost its public standing (Parker, 1986). In addition, some other studies found that although legitimacy was judged by the outsiders, a corporation might have control on it (Ashforth and Gibbs, 1990; Buhr, 1998; Dowling and Pfeffer, 1975; Elsbach, 1994; Elsbach and Sutton, 1992; O'Donovan, 2002; Pfeffer and Salancik, 1978; Woodward et al., 1996). Corporate disclosures, such as those contained in the annual reports and other documents released to the public, have strategic importance and power in this perspective (Deegan 2002). Besides, Deegan (2002) also stated that how and whether corporate management react to the legitimacy gaps will depend on the managers' perception. Therefore, as one

kind of legitimacy, compliance with government policies can also be controlled by corporate management through such reporting channels. The weight of disclosure of each different category can point to the manager's perspective on government policies.

Stakeholder Theory

In the management literature, the word "stakeholder" was firstly pointed out by the Stanford Research Institute (SRI) in 1963, and stakeholders were defined as "those groups without whose support the organization would cease to exist". Later, Freeman (1984) defined stakeholder as "any group or individual who can affect or is affected by the achievement of the firm's objectives". This definition is regarded to deserve full credit for popularizing the term (Belal, 2008).

Stakeholder theory was proposed by Ansoff (1965) to define the goals of a company to balance the conflicting demands of various stakeholders (Roberts, 1992). Later, Ullmann (1985) presented a three-dimensional model to describe how a company used CSR disclosures to manage its relationships with stakeholders in terms of stakeholder power, strategic posture and economic performance. Based on how the company treats stakeholders, stakeholder theory can be classified into two branches - an ethical branch and a managerial branch (Donaldson and Preston 1995). The ethical branch suggests that a company should be responsible and accountable to all the stakeholders, regardless of their power and ability to influence the economic objectives of the firm. As a result, the company should treat all the stakeholders equally in terms of CSR reporting. On the other hand, the managerial branch claims that a company would focus on more economically powerful stakeholders and CSR reporting would be used to seek support and approval from those more powerful stakeholders, or to distract their opposition and disapproval (Gray et al., 1996; Leung & Snell 2019).

The Macau SAR government, with the power to grant the casino license, is a powerful stakeholder of the gambling operators. As a result, according to the managerial branch of stakeholder theory, the gambling operators would pay more attention to government policies and their CSR disclosures are, to a large extent, influenced by the government's direction .

RESEARCH METHODOLOGY

To assess the government's influence on CSD and investigate how corporate management of the gaming operators perceive government policies, content analysis was conducted to capture and analyze the CSR and government policy related disclosures. Content analysis is a widely used methodology in CSD studies. It can be regarded as a combination of quantitative and qualitative methods (Unerman, 2000). In this study, quantitative content analysis was used to measure the volume of disclosure and qualitative content analysis was used to measure the completeness of the context of disclosures. In CSD research, what a reporting organization says on a particular subject (e.g. a social or environmental issue) can be regarded as an indication of the importance that it attaches to this subject (Krippendorff, 1980; Deegan and Rankin, 1996; Neu et al., 1998). Therefore, content analysis can be used to investigate what the reporting entities' claims of CSR might be and obtain some indicators of the contents (Bryman and Bell, 2007). Content analysis is used as an exploratory tool to examine past data as well and it enables the researcher to study organizational documents and communication channels/media with their stakeholders, such as annual reports, stand-alone reports and corporate websites.

Corporate Social Responsibility Reporting in the Gambling Industry

In this study, the first sampling unit used was the corporate annual report. Of course, there are other forms of media, such as brochures, advertisements and press notices. The annual report was selected for the following reasons. Firstly, other forms of corporate documents such as employee magazines or internal brochures cannot be easily accessed publicly in the gambling industry. Compared with other internal documents, annual reports are more easily accessible via corporate websites (Adams and Harte, 1988; Wilmshurst and Frost, 2000). Secondly, annual reports tend to have a higher degree of credibility than other types of reports and represent the most important information provided to stakeholders (Tilt, 1994; Deegan and Rankin, 1997; Buhr, 1998; Neu et al., 1998). Thirdly, a regularly produced annual report is not only a legal document, but also a way of communication and social construction (Hines, 1988; Neimark, 1992). Such materials not only offer valuable background information about the company, but also provide insights into past managerial decisions and a timeline of organizational change (Bryman and Bell, 2007). The public cannot observe most organizational activities. As a result, they rely on words and numbers, such as annual reports or financial statements as proxies for these activities (Gjesdal, 1981 cited in Neu et al., 1998). Fourthly, annual reports can be considered as a statutory form of reporting that incorporates mandatory and voluntary disclosures (Hackston and Milne, 1996; Wilmshurst and Frost, 2000).

It is obvious that the sole use of annual reports has some drawbacks. For example, relying only on annual reports tends not to give a full picture of the CSR policies among companies (Roberts, 1992) and annual reports may only cover superficial disclosures (Gray and Bebbington, 2001). Additionally, the primary focus of annual reports is on communicating the economic function of a corporation and other functions are often disclosed in separate reports (Gray and Bebbington, 2001). Therefore, the study has also investigated stand-alone CSR or sustainability related reports and official websites.

The abovementioned reports were downloaded from corporate websites. In order to get a full picture of the gambling industry in Macau, all the six gambling operators were included, namely Galaxy Entertainment Group Limited, Melco Crown Entertainment, SJM Holdings, Wynn Macau Limited, Sands China Ltd. and MGM China Holdings Limited. In the analysis part, these six operators were named Companies A, B, C, D, E and F (not respectively). The study covered the period 2005 to 2016, which was determined by the time of data collection (2017).

For quantitative analysis, Gray et al. (1995a) stated that there were two general ways to identify the measurement, namely the quantity of CSD and the amount of disclosures. The authors also claimed that the second one could provide a richer data set than the first one. The enumeration units often include words (Deegan and Rankin, 1996; Wilmshurst and Frost, 2000), sentences (Hackston and Milne, 1996; Buhr, 1998) and pages (Guthrie and Parker, 1990; Gray et al., 1995b), the frequency of disclosures (Cowen et al., 1987) or high/low disclosure rating (Patten, 1991). Generally, the three most common units are words, sentences and pages. In this study, the number of sentences was counted, since it is less likely to be manipulated by formatting such as the insertion of texts or pictures that are irrelevant to the reporting content (Steenkamp and Northcott, 2007; Vandemaele et al., 2005).

Quantitative analysis provides a general view of the CSR disclosures. However, it does not address the content. Therefore, qualitative analysis was also used to measure the completeness of CSR disclosures. Similar to Sio (2013), a 0-3 point scale was employed. 0 point means the aspect of CSR is absent; 1 point is rated when there is only a very brief statement of CSR; 2 points are given when there is some descriptive information rather than merely a statement about the aspect of CSR; 3 points indicate that there is detailed information about the CSR aspect disclosed (such as monetary amounts, percentages or lists of activities).

After quantitative analysis and qualitative analysis, an intensity score was calculated to combine the frequency and completeness of CSR disclosures. The score was calculated by multiplying the quantitative percentage by the score of completeness. The annual reports were also examined to locate which part of them contained the CSR disclosures since some companies report CSR information separately in the annual reports while some other companies mix the CSR disclosures with other information. For example, Sands China Ltd. has recorded the CSR information as a part of stakeholders' information. Besides, the disclosed contents were further traced back to the related policy documents and the Concession Contract for Operating Casino games of Chance or Games of other Forms in the Macau Special Administrative Region in measuring their compliance with the government rules, regulations and requirements.

The CSD of the companies was classified into five aspects as emphasized in the concessionary contract and also implied by the stakeholder theory, namely 1) Laws and Regulations; 2) Local Employment; 3) Education, Sports and Culture; 4) Responsible Gambling and 5) Macau SMEs. The volume of CSD was measured after the location was identified. The sentences related to all the above five categories were counted to make up the total volume of government policy disclosures. After quantitative analysis, all the contents of the categories were assessed and scores were given based on the qualitative standard introduced above. Finally, an intensity score was calculated for each separate category as well as the overall government policy disclosure.

The data collection process of stand-alone CSR or sustainability related reports was the same as that of annual reports. For the disclosure in the websites, two measures were adopted since there were two kinds of information, namely descriptions and media news. For the descriptions in the official websites, the recording process was the same as that of the annual reports and stand-alone CSR or sustainability related reports. The volume was measured by the number of sentences. However, for the media news, one piece of news was regarded as one sentence and the total volume of CSR disclosure posted as media news was represented by the total number of media news posted in the websites.

ANALYSIS AND DISCUSSION

As aforementioned, the sample units used in the study included corporate annual reports, stand-alone CSR or sustainability related reports and websites. All the materials were extracted from the official websites of the six gaming operators. In this section, the government policy disclosure of the six companies in these three channels is analyzed.

Analysis of the Formats of Government Policy Disclosures

The first part of this section attempts to figure out how many and which kind of channels were used by the gaming operators to disclose their government policy information during the observed period. The results are summarized in Table 1 below.

It can be seen that only two companies used individual CSR or sustainability related reports to disclose information related to government policies. Company F began to publish the sustainability related report called the Year Book in 2015, while Company E started to issue the sustainability report in 2016. However, all the six gaming operators used websites to disclose government policy information.

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Table 1. Locations of government policy disclosures in various media of the companies

| Company | Annual Reports | Company Websites | Stand-alone CSR related Reports |
|-----------|----------------|------------------|---------------------------------|
| Company A | Yes | Yes | Nil |
| Company B | Yes | Yes | Nil |
| Company C | Yes | Yes | Nil |
| Company D | Yes | Yes | Nil |
| Company E | Yes | Yes | Yes |
| Company F | Yes | Yes | Yes |

Table 1 also shows that all of the gaming operators have reported information related to government policies in their corporate annual reports. However, the locations of the contents were different. Company A and Company C recorded this kind of information in a part called “corporate social responsibility”. Company E called the section “stakeholder information”. Company F reported the information in a section called “reporting sustainability”. As for Company B, the section was called “corporate citizenship and responsible gambling” before 2014 but was renamed “corporate environmental, social and governance report” afterwards. For the last company, Company D, government policy disclosures were reported in a section called “report of the directors” from 2011 to 2015. However, in 2016, a new section called “environmental, social and governance report” was inserted to specifically record this type of information.

Thus, based on the analysis, it was found that all of the companies have disclosed government policy information through their annual reports. However, only two of them had such disclosures in their stand-alone CSR or sustainability reports.

Analysis of Government Policy Disclosures in Websites

This section aims to figure out what kind of information and how much of the contents was being recorded in the websites. The data are summarized in Tables 2-5 below.

The volume of government policy disclosure was counted by two methods: one included the media news posted in the websites and the data are summarized in Table 2; the other excluded the media news and the result is shown in Table 3. Since all the gaming operators have allocated separate sections in their official websites to report their CSR initiatives to the public, all the government policy disclosures counted were extracted from these CSR sections and the percentages were calculated by dividing the total volume of CSR disclosures in these sections. For the media news, each piece of news was counted as one sentence for quantitative analysis.

Firstly, the CSD was analyzed from the perspective of the five categories. Table 2 shows that only Company A disclosed information related to its compliance with regulations and laws, such as anti-corruption and anti-money laundering practices. In contrast, only Company E failed to disclose contents related to Macau SMEs and education, sports and culture. However, the table also indicates that no specific category was heavily and commonly focused by all the six companies. Companies A and E paid more attention to responsible gambling; Companies B and D tended to disclose more information about supporting local enterprises. Companies C and F preferred to report more contents on how to support the local youth education, sports and culture.

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Table 2. Volume (Percentage) of government policy disclosures in the websites (including news)

| Company | Laws and Regulations | Local Employment | Education, Sports and Culture | Responsible Gambling | Macau SMEs | Sub-total | Total CSR Disclosure |
|---------|----------------------|------------------|-------------------------------|----------------------|------------|-----------|----------------------|
| A | 4 | 4 | 39 | 44 | 5 | 92 | 331 |
| | 1.21% | 1.21% | 11.78% | 13.29% | 1.51% | 27.79% | |
| B | - | - | 14 | 2 | 17 | 33 | 64 |
| | 0.00% | 0.00% | 21.88% | 3.13% | 26.56% | 51.56% | |
| C | - | - | 26 | - | 1 | 27 | 75 |
| | 0.00% | 0.00% | 34.67% | 0.00% | 1.33% | 36.00% | |
| D | - | - | 4 | - | 15 | 19 | 37 |
| | 0.00% | 0.00% | 10.81% | 0.00% | 40.54% | 51.35% | |
| E | - | - | - | 12 | - | 12 | 40 |
| | 0.00% | 0.00% | 0.00% | 30.00% | 0.00% | 30.00% | |
| F | - | 4 | 57 | 19 | 18 | 98 | 384 |
| | 0.00% | 1.04% | 14.84% | 4.95% | 4.69% | 25.52% | |
| Total | 4 | 8 | 140 | 77 | 56 | 281 | 931 |
| | 1.21% | 2.25% | 93.98% | 51.37% | 74.63% | 222.23% | |

Table 3. Volume (Percentage) of government policy disclosures in the websites (excluding news)

| Company | Laws and Regulations | Local Employment | Education, Sports and Culture | Responsible Gambling | Macau SMEs | Sub-total | Total CSR Disclosure |
|---------|----------------------|------------------|-------------------------------|----------------------|------------|-----------|----------------------|
| A | 4 | 4 | 17 | 41 | 5 | 67 | 160 |
| | 2.50% | 2.50% | 10.63% | 25.63% | 3.13% | 41.88% | |
| B | - | - | - | - | 12 | 12 | 15 |
| | 0.00% | 0.00% | 0.00% | 0.00% | 80.00% | 80.00% | |
| C | - | - | 4 | - | - | 4 | 9 |
| | 0.00% | 0.00% | 44.44% | 0.00% | 0.00% | 44.44% | |
| D | - | - | 4 | - | 15 | 19 | 37 |
| | 0.00% | 0.00% | 10.81% | 0.00% | 40.54% | 51.35% | |
| E | - | - | - | 12 | - | 12 | 40 |
| | 0.00% | 0.00% | 0.00% | 30.00% | 0.00% | 30.00% | |
| F | - | 2 | 31 | 16 | 11 | 60 | 310 |
| | 0.00% | 0.65% | 10.00% | 5.16% | 3.55% | 19.35% | |
| Total | 4 | 6 | 56 | 69 | 43 | 174 | 571 |
| | 2.50% | 3.15% | 75.88% | 60.79% | 127.21% | 267.03% | |

Corporate Social Responsibility Reporting in the Gambling Industry

Table 4. Completeness of government policy disclosures in the websites

| Company | Laws and Regulations | Local Employment | Education, Sports and Culture | Responsible Gambling | Macau SMEs | Total |
|---------|----------------------|------------------|-------------------------------|----------------------|------------|-------|
| A | 3 | 3 | 3 | 3 | 3 | 15 |
| B | - | - | 3 | 2 | 3 | 8 |
| C | - | - | 3 | - | 1 | 4 |
| D | - | - | 3 | - | 3 | 6 |
| E | - | - | - | 3 | - | 3 |
| F | - | 3 | 3 | 3 | 3 | 12 |

As mentioned by legitimacy theory, managers can control the compliance of their companies with government policies. The result of website analysis indicated that managers of the six gaming operators had different understanding of this aspect. Companies A and F performed best on government policy disclosures among the six operators. From the aspect of volume, Company A had 67 sentences of descriptions and 25 pieces of news related to government policies, while Company F had 60 sentences of descriptions and 38 pieces of news. Besides, in terms of coverage, Company A covered all of the five categories and Company F covered four. In contrast, Companies D and E appeared relatively weak in this aspect. However, the interesting point is that the percentages of government policy disclosures of Companies A and F were the lowest, while the percentages of Companies D and E were the highest. For Companies A and F, their volume of CSD was four to 10 times of the other four companies but the number of sentences was even less than 100. Therefore, it can be inferred here that the percentage of government policy disclosures is higher in the early stage of CSR than in the mature stage.

When Table 2 and Table 3 are compared, it can be seen that four of the six companies (Companies A, B, C and F) used the news media to report relevant activities, while C and E did not. And, for the four companies which used the news media to report CSR information, all of them have released information related to education, sports and culture. Additionally, when the volumes of descriptions and news were compared, it can be found that Company B preferred to use news rather than descriptions. Therefore, it can be concluded that the six gaming operators have used different presentation styles to disclose CSR information and their CSD therefore had different levels of completeness. The qualitative analysis and the data are summarized in Tables 4 and 5.

Table 4 shows that for most of the observed companies, the categories reported in the websites had explanations, monetary amounts or lists of activities. But there were two exceptions. Company B only used general statements to report responsible gambling while Company C only briefly mentioned its support to local SMEs. After the quantitative and qualitative analyses, the intensity scores as in Table 5 were then calculated. Consistent with the result found in the quantitative analysis, Companies D and B had the highest scores while Companies A and F got the lowest scores. As mentioned in the previous section, this phenomenon may indicate that in the early stage of CSR disclosure, companies may put more effort on government policy disclosures since there is no systematic rule to follow and fewer stakeholders are considered.

Table 5. Intensity scores of government policy disclosures in the websites

| Company | Laws and Regulations | Local Employment | Education, Sports and Culture | Responsible Gambling | Macau SMEs | Total |
|---------|----------------------|------------------|-------------------------------|----------------------|------------|-------|
| A | 0.04 | 0.04 | 0.35 | 0.40 | 0.05 | 0.87 |
| B | - | - | 0.66 | 0.06 | 0.80 | 1.52 |
| C | - | - | 1.04 | - | 0.01 | 1.05 |
| D | - | - | 0.32 | - | 1.22 | 1.54 |
| E | - | - | - | 0.90 | - | 0.90 |
| F | - | 0.03 | 0.45 | 0.15 | 0.14 | 0.77 |

(Intensity score = percentage calculated in quantitative analysis x completeness score in qualitative analysis)

All in all, through the analysis of websites, it was found that different gaming operators had different focuses on government policies. This supports the prediction made earlier that legitimacy theory posits that managers of gaming operators can take control of the compliance with government policies based on their understanding of the policy documents. In addition, also consistent with the prediction made earlier when discussing about stakeholder theory, gaming operators do pay attention to government policies and the government has the power to influence the related disclosures. It can also be inferred that the weight of government policy disclosures will decrease when CSD becomes more complex and systematic.

Comparisons of Government Policy Disclosures of Selected Companies

The previous sections have analyzed the government policy disclosure in all the three channels for the six gaming operators. In this section, all the scores calculated in the previous analysis are aggregated in Table 6 below to reflect a full picture.

The ranking of the six gaming operators is as follow: Company F (2.75), Company D (2.45), Company E (2.24), Company C (2.15), Company B (2.08) and Company A (1.77). It is not surprising that Company F obtained the highest scores since it started to publish the Yearbook in 2015 and almost half of the materials in the books were related to government policy disclosures. The newly published Yearbooks strongly indicated that the focus of Company F was on government polices.

However, for the other companies which had also published stand-alone CSR or sustainability related reports, Company E was surpassed by Company D. There are two possible reasons behind. Firstly, though Company E had published the sustainability report in 2016, the report did not contain many government policy disclosures. The percentage of government policy disclosures was only 17.85%. Secondly, in respect of the disclosures in the websites, the score of Company D was much higher than that of Company E. In the website analysis, Company D obtained a score of 1.54, which was the highest among the six gaming operators. However, Company E only got a score of 0.9.

Another interesting phenomenon is that Company A got the lowest score. It is obvious that Company A performed much better than Company D in terms of the disclosure in both the websites and annual reports in respect of the coverage and volume of government policy disclosures. However, due to the large volume of the overall CSD, the intensity score of Company A was much lower.

Finally, the next part compares the scores among the five categories. Firstly, it was found that four of the six gaming operators tended to focus on education, sports and culture. However, Company D and Company E seemed to have no clear focuses. For Company D, the focus of the websites was on Macau SMEs while the focus of annual reports was on laws and regulations. And for Company E, it only reported responsible gambling on its websites, while the focus of its annual reports was on education, sports and culture. The score of annual reports represents the average performance of government policy disclosures after the gaming operators have conducted complex and systematic CSD. The 2016 annual report of Company D and sustainability report of Company E indicated that both of them have put their attention on the compliance with laws and regulations.

In short, there are two major findings. Firstly, in the early stage of CSR disclosure, the weight of government policy disclosure is higher than that in the mature stage when the gaming operators have complex and systematic CSD. Secondly, four of the six companies generally focused on education, sports and culture, which also reflects these categories have a more implicit meaning and broader coverage.

CSR as a Long-Term Strategy

As one of the most typical controversial industry, in order to turn over the original sin, gambling operators are actively transforming their business approach. CSR is a very important part of their long-term strategies which can enhance the legitimacy of their business operations. The gambling industry nowadays is very different from the casinos in the traditional impression. As shown in the annual reports and CSR reports, the observed companies have expanded their service scope from casinos to sightseeing, accommodation and shopping, and positioned themselves as integrated resorts with diversified entertainment elements. Through CSR, they improve the performance of ESG (environment, social, corporate governance) and strive to change the social perception and to get rid of the sin industry name.

In CSR reports, it can be found that when Macau was hit by Super Typhoon Hato in 2017, which brought serious damage to the city, gambling operators not only made donation to charitable organizations, but also provided life-saving items and materials such as bottled water, canned and dried food, masks, garbage bags, clean and reusable towels to the victims. In addition, casinos' engineering support teams also assisted the community in repairing houses damaged by the typhoon. In terms of environment, they adopt green buildings, purchase electric buses to transport passengers, and provide customers with healthy food materials. For employees, gambling companies adhere to the gender equality policy. From dealers to senior management, the number of female staff is no less than that of male. They also cultivate staff's non-gaming skills for their sustainable career development.

As encouraged by the Concession Contract for Operating Casino games of Chance or Games of other Forms in the Macau Special Administrative Region¹, the observed gambling operators have signed purchase contracts with local small and medium-sized enterprises for products and services. Although the amount is only tens of millions, the demonstration and spillover effects driven by them are highly recognized.

In recent years, the government has adjusted its gambling policies and focuses more and more on the localization of business operations and sustainable development. In a broad sense, the six gambling enterprises have made positive contributions to the economic and social development and improvement of residents' livelihood in Macau. For example, they have made significant contribution in reducing the local unemployment rate, trained local employees to help them get promotion opportunities, paid large amount of gambling taxes every year, and also sponsored social welfare and poverty relief. As shown

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Table 6. Intensity scores of six companies in three channels

| Company A | | | | |
|-------------------------------|-----------------|-----------------------|--------------------------------|--------------|
| | Websites | Annual Reports | Stand-alone CSR reports | Total |
| Laws and Regulations | 0.04 | 0.16 | - | 0.20 |
| Local Employment | 0.04 | - | - | 0.04 |
| Education, Sports and Culture | 0.35 | 0.48 | - | 0.84 |
| Responsible Gambling | 0.40 | 0.24 | - | 0.64 |
| Macau SMEs | 0.05 | 0.02 | - | 0.06 |
| Total | 0.87 | 0.90 | - | 1.77 |
| Company B | | | | |
| | Websites | Annual Reports | Stand-alone CSR reports | Total |
| Laws and Regulations | - | 0.19 | - | 0.19 |
| Local Employment | - | - | - | - |
| Education, Sports and Culture | 0.66 | 0.28 | - | 0.94 |
| Responsible Gambling | 0.06 | 0.09 | - | 0.16 |
| Macau SMEs | 0.80 | - | - | 0.80 |
| Total | 1.52 | 0.56 | - | 2.08 |
| Company C | | | | |
| | Websites | Annual Reports | Stand-alone CSR reports | Total |
| Laws and Regulations | - | 0.38 | - | 0.38 |
| Local Employment | - | 0.05 | - | 0.05 |
| Education, Sports and Culture | 0.32 | 0.11 | - | 0.44 |
| Responsible Gambling | - | 0.30 | - | 0.30 |
| Macau SMEs | 1.22 | 0.06 | - | 1.27 |
| Total | 1.54 | 0.91 | - | 2.45 |
| Company D | | | | |
| | Websites | Annual Reports | Stand-alone CSR reports | Total |
| Laws and Regulations | - | 0.35 | - | 0.35 |
| Local Employment | - | 0.01 | - | 0.01 |
| Education, Sports and Culture | 1.04 | 0.56 | - | 1.60 |
| Responsible Gambling | - | 0.17 | - | 0.17 |
| Macau SMEs | 0.01 | 0.00 | - | 0.02 |
| Total | 1.05 | 1.10 | - | 2.15 |
| Company E | | | | |
| | Websites | Annual Reports | Stand-alone CSR reports | Total |
| Laws and Regulations | - | - | 0.34 | 0.34 |
| Local Employment | - | 0.14 | - | 0.14 |
| Education, Sports and Culture | - | 0.43 | 0.04 | 0.47 |
| Responsible Gambling | 0.90 | 0.22 | 0.08 | 1.20 |
| Macau SMEs | - | 0.01 | 0.07 | 0.09 |
| Total | 0.90 | 0.80 | 0.54 | 2.24 |
| Company F | | | | |
| | Websites | Annual Reports | Stand-alone CSR reports | Total |
| Laws and Regulations | - | 0.01 | - | 0.01 |
| Local Employment | 0.03 | 0.01 | 0.06 | 0.10 |
| Education, Sports and Culture | 0.45 | 0.30 | 1.16 | 1.90 |
| Responsible Gambling | 0.15 | 0.18 | 0.10 | 0.43 |
| Macau SMEs | 0.14 | 0.05 | 0.13 | 0.32 |
| Total | 0.77 | 0.54 | 1.45 | 2.75 |

(Intensity score = percentage calculated in quantitative analysis x completeness score in qualitative analysis)

in the public reports, the gambling operators' actions of fulfilling social responsibility have achieved positive results.

But on the other hand, the prosperity and rise of the gambling industry in Macau has also brought some disadvantages, among which the most criticized by the society is the occupation of urgently needed human and land resources for the development of small and medium-sized enterprises. In addition, the large-scale facilities built by the gambling operators have taken over tourists' dining, accommodation, transportation, consumption and entertainment activities, which put pressure on the development of small and medium-sized enterprises in Macau. With more and more projects invested by gambling enterprises, such conflicts and problems will keep increasing. Therefore, "how to coordinate and handle the relationship between gambling operators and local enterprises, and how to achieve mutual benefit and inclusive development?" is an urgent item in the agenda of the Macau government's policy.

The Chief Executive of the Macau government has put forward a package of policies to support local small and medium-sized enterprises. In addition to following the multi-year funding plan and tax relief, he also pointed out that it is necessary to encourage gambling enterprises and government departments to increase local purchasing activities from small and medium-sized enterprises.

Most of the gambling operators responded positively to this policy. As disclosed in their reports, through the collaboration with the Macau Chamber of Commerce, gambling operators have started to provide rich procurement opportunities to local small and medium-sized enterprises, including both basic items (such as food and beverage, hotel services, creative design, exhibition tourism) and some high value-added items.

The practice of expanding local procurement and providing business opportunities to small and medium-sized enterprises will benefit Macao in the following three aspects. First of all, it can help to release the problem of single industrial structure and fulfill the expectation of the government to implement "vertical diversification", which is using gaming tourism as the leading industry, service industry as the main body and coordinated development of other industries. Second, it helps to publicize entrepreneurial spirit in Macau. All the six gambling operators are international enterprises listed in the United States and Hong Kong (global recruitment of employees, tourists from all over the world). Their procurement activities and systems also comply with international standards, which brings both challenges and opportunities for local small and medium-sized enterprises. By participating in this process, the internal management and after-sales service level of local enterprises can be improved, their intelligent information system can be accelerated, and professional talents in finance, advertising and design are provided with more training opportunities. Third, it is essential to plan for future development. In the next two years (by 2022), the government will step up preparations for the transition after the current concession contracts expire, among which specific requirements will be put forward in terms of supporting economic diversification, providing cooperation opportunities for small and medium-sized enterprises and increasing local procurement contracts. The action has evolved into the legal content of the development of the gambling industry in Macau, and has become a common guideline for all enterprises engaged in gambling related business. The larger the gambling operators are, the more risks and challenges there will be in Macau. More and more small and medium-sized enterprises will need to expand, not only to share pressures and responsibilities, but also to increase the potential for sustainable development. It is hoped that the cooperation between gambling operators and local enterprises can be carried out smoothly and in a more systematically and diversified manner.

CONCLUSIONS

Based on the information disclosed by the six gaming operators in Macau, this study has conducted a series of content analyses to investigate CSR disclosures related to government policies.

It was found that all of the six gaming operators have disclosed government policy information in their corporate annual reports and official websites. In addition, two companies have disclosed their compliance with government policies in their stand-alone CSR or sustainability reports after the mid-term review report was published. This indicates that the gaming operators have used social disclosures to communicate with the government, which is consistent with the implications of legitimacy theory and stakeholder theory.

Besides, except two observed companies, all of the other four companies showed a significant increase in the volume of government policy disclosures in 2015, when the mid-term review was released. This result is exactly in line with the prediction made in the section discussing PET. That is, there will be more relevant government policy disclosures when political pressure is increased. Furthermore, it also reflects the government's power in influencing the CSR disclosure of the gaming operators.

Furthermore, although all of the six companies have conducted government policy reporting, they followed different approaches. For example, the website, Yearbooks and annual reports of Company F indicated its focus on education, sports and culture, especially on cultural development. While the 2016 annual report of Company D and the sustainability report of Company E showed their attention on the compliance with the legal system. The result is in line with the insight of legitimacy theory that different emphases on government policy disclosures reveal corporate managers' different perceptions towards such policies.

As the leading industry of the Macau economy, the gambling industry has mastered and controlled huge economic resources, and it is inevitable that people will have higher expectations. Therefore, the industry needs to undertake broad social responsibilities including economic responsibility and make due contributions to the stable development of Macau. However, the social responsibility of the gambling companies involves a wide range of stakeholders and extremely complex interests. It requires the government, enterprises and society to work together to reduce or eliminate the negative social effects brought by the gambling industry.

In addition, it is necessary here to follow up on the two implications which have been revealed. First of all, for the Macau SAR government, specific and operational standards should be worked out to explicitly require and encourage gambling companies to assume social responsibilities. With the rapid development of the industry, the related legal system construction has also been improving. The Legislative Council has successively formulated four laws on the gambling industry. In addition, more than 40 administrative regulations and Chief Executive's instructions were issued, as well as having the concessionary contract to act as an important guiding instrument. Although the government has put a lot of efforts in these legal aspects, unfortunately no local CSR reporting requirement has been initiated up to date. Based on PET, the CSR disclosure made by the gambling companies is mainly for demonstrating their fulfillment of the responsibilities as required by the government (or as specified in the concessionary contract). However, if we consider from an opposite direction, the government is actually playing an engineering role to stimulate the CSR performance of the industry. Thus, it is necessary for the government to develop a set of CSR reporting framework or guidelines based on a top-down approach.

Secondly, in line with stakeholder theory, for employees, communities, social groups, all residents and other stakeholders, it is necessary to cooperate with gambling companies to undertake social responsibili-

ties through various measures. Besides, the social intermediary organizations or local associations are the third sector between the government and the enterprises. They are characterized by autonomy and self-discipline, which can overcome “market failure” and prevent from “government failure”. Therefore, they have the characteristics of actors of balanced coordination functions, conformance to the concept of social standards, and thus can become an important bridge to connect the government, community and the industry together to promote the development of CSR disclosure.

Last but not the least, at present, it is important that the SAR government should absolutely grasp the development direction of the gambling industry. It must be based on a set of macro, scientific, reasonable, forward-looking and highly social responsible gambling tourism policies. For example, when handling the renewal of concession contracts in 2022, the SAR government should take consideration of a series of CSR contents which have been disclosed in the reports as evaluated in this study, such as whether the concessionaire can effectively develop foreign markets, whether it can effectively optimize the source structure of Macau’s tourism industry (especially the source structure of gamblers), whether it can adapt to the size of Macau’s labor market, whether it is conducive to promoting the development of creative industries, whether it is conducive to promoting the development of regional tourism and so on. The examination and approval criteria shall be formulated with transparency and feasible mechanism to urge gambling operators to implement the plans for expanding foreign markets and fulfill other commitments.

For future research, other empirical studies can be conducted to triangulate the research findings of this study and also to reinforce the level of generalization.

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ENDNOTE

- ¹ Retrieved from <https://www.sec.gov/Archives/edgar/data/850994/000085099403000001/exhibit10-40.htm>

Chapter 16

Earnings Management and Fraud: A Theoretical Background and Discussion

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ABSTRACT

The purpose of the chapter is to provide a rounded discussion of the concept of earnings management and theories underpinning this behavior. The chapter presents an overview of the concept, with a discussion of alternative definitions and the theories related to this behavior, including the commonly discussed agency theory as well as some less-researched theories such as socioemotional wealth theory and upper echelons theory. The chapter also presents incentives that can lead to this behavior and evidence in the academic literature, followed by some examples in developed and developing countries of earnings management that spilled into fraud. The chapter concludes with a summary and some potential extensions to the academic literature.

INTRODUCTION

This chapter provides a discussion of the concepts of earnings management and fraud as well as the main motivations and strategies of earnings management as found in current academic literature. Earnings management, which is sometimes also known as creative accounting, occurs when companies' managers use their judgment in either the recognition or the set-up of the transactions to influence the

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financial reports, and specifically the income statement. The end result in either case is the same. The numbers in the financial reports, which include the bottom-line earnings or losses, deviate from what would have been reported without this intervention. There are many reasons why earnings management is exercised and the motives are usually diverse but ultimately it is to either increase or decrease earnings. The benefits arising from earnings management may accrue to either individuals within a company, or to the firm as a whole and the method used can range from fairly innocuous adjustments of accounting figures to gross deception and fraud. The chapter begins with definitions followed by a discussion of the theories that underpin these concepts. Section 1.4 presents the motivations for this behavior followed by strategies used by firms. The final section discusses some international cases of earnings management that included fraudulent behavior.

Definition of Earnings Management and Fraud

Over the years, numerous researchers have attempted to define earnings management but to date there is no consensus or an accepted definition that fits all cases. Many scholars disagree on the purpose or outcome of this type of behavior, hence the multitude of definitions in the literature. In addition, there are several terms that are used interchangeably with earnings management that have slight variations in terms of their purpose or outcome. For example, aggressive accounting, cooking the books, cosmetic accounting, financial engineering, window dressing and income smoothing are sometimes used as equivalents (Akpanuko & Umoren, 2018; Gowthorpe & Amat, 2005). Earnings management (EM) is usually thought of as a means of manipulating company earnings in a way which may or may not involve fraud.

However, this is too simplistic a definition and there are many more aspects which need to be considered. Healy & Wahlen (1999) state that:

Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers.

Another definition given by Fields, Lys, & Vincent, (2001) states that EM arises when executives use their discretion to adjust accounting numbers. This adjustment may be either opportunistic (to further the interest of the manager), or to maximise firm value.

EM was described by Davidson, Stickney, & Weil (1987) as “the process of taking deliberate steps within the constraints of generally accepted accounting policies to bring about a desired level of reported earnings”. It should be noted that the stress is on the process being *deliberate*. Schipper (1989) confirms this view by saying that EM is a *purposeful* intervention in financial reporting with the intention of increasing personal gain by meeting management objectives (opportunistic EM) or shareholder objectives (informative EM). It thus can be seen that EM is always intentional and not accidental. There is always awareness by the perpetrator of the action being taken and its intended consequence. Beneish (2001) argues that EM is detected by comparison of firm performance over successive periods, using various methods and is often found to occur when performance is unusually good or unusually bad. Table 1 below presents alternative terms and definitions for EM as well as prior literature that has used these specific definitions.

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The difficulty with all the definitions is that they do not sufficiently differentiate between EM on one hand and fraud on the other (Dechow & Skinner, 2000). The definitions point to the fact that EM cannot be classified easily, and it can range between ultra-conservative accounting and complete illegitimacy. Fraud is usually understood to mean the manipulation of accounting records in order to gain an illicit advantage. Although the word 'fraud' has been used extensively to describe this action, there is no universally accepted definition and it is usually governed by the legislation of various countries. In the UK, the Fraud Act 2006 defines the criminal offence of fraud as false representation, fraud by failing to disclose information and fraud by abusive position.

Dechow & Skinner (2000) attempt to distinguish the difference between EM and fraud, saying that there is only a fine line between the two. They suggest that it is difficult to differentiate between legitimate use of accounting discretion and opportunistic EM without identifying the degree of managerial incentive to adjust earnings.

Many of the different terms and definitions cover the same ground; for example, they include the intent to mislead, opportunism, the possibility of fraud and ethical issues. However, as mentioned above, there is no general consensus on all aspects. However, there is a view that EM could be beneficial as a signalling mechanism to provide stakeholders with information about future earnings that the use of Generally Accepted Accounting principles (GAAP) may not allow. This view was confirmed by Subramanyam (1996) who finds that current discretionary accruals are related to future cashflows and therefore add informational content to earnings. More recent evidence on the signalling benefits can be found in Jiraporn, Miller, Yoon, & Kim (2008).

Furthermore, sometimes the manipulation is intended to alter the balance sheet figures rather than earnings itself and this is a form of creative accounting that cannot be defined as earnings management (Akpanuko & Umoren, 2018).

It is not easily appreciated how widespread the use of EM is and it is often only brought to the attention of the general public when there are headline-making financial scandals. However, it is apparent that there are many other instances which pass unnoticed, as they are kept within the confines of the company or, unless substantial, remain within the confidentiality of the auditors. It is the responsibility, in the first instance, of corporate governance and effective regulation to prevent the occurrence of EM and not allow it to occur.

The remaining problem with EM is that it is largely unobservable both within the company (except to the perpetrator) and to outside investors and commentators. The adjustment of financial figures could potentially be due to factors other than EM, such as adopting different accounting policies. Also, changes in accruals may be justified as permitted smoothing or window dressing. Some researchers claim that although there are many different models to detect and measure EM, many of them are imprecise and their results are debatable.

Theories Related to Earnings Management

The relevant theories that underpin the behavior of individuals involved in earnings management include: agency theory, managerial power theory and stakeholder theory. Other theories that may be relevant but are less well-cited include gender socialization theory, socioemotional wealth theory and upper echelons theory. These are discussed below.

Table 1. Alternative terms and definitions of EM

| Term | Definition(s) | Use in literature |
|---------------------|--|--|
| Earnings management | <p><i>“Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers” (Healy & Wahlen, 1999)</i></p> <p><i>“A purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain” (Schipper, 1989)</i></p> <p><i>“Earnings management is the choice of a manager of accounting policies or other actions - including voluntary earnings forecasting, voluntary disclosure, and estimation of accruals - to affect earnings intentionally” (Man & Wong, 2013)</i></p> | <p>Dechow, Sloan, & Sweeney (1995); Xu, Taylor, & Dugan (2007); Roychowdhury (2006)</p> <p>Xu, Taylor, & Dugan (2007); Gunny (2010)</p> <p>Wilbanks, Hermanson, & Sharma (2017); Bao & Lewellyn (2017)</p> |
| Creative accounting | <p><i>“It is the use of permitted cosmetic window dressing accounting techniques to present a flattering picture of a company’s financial state” (Mellahi, Morrell, & Wood, 2010)</i></p> <p><i>“It is not against the law. It operates within the letter both of the law and of accounting standards but it is quite clearly against the spirit of both...It is essentially a process of using the rules, the flexibility provided by them and the omission within them, to make financial statements look somewhat different from what was intended by the rule. It consists of rule-bending and loophole-seeking” (Jameson, 1988)</i></p> | <p>Khaneja & Bhargava (2016)</p> <p>Naser (1993) ; Breton & Taffler (1995)</p> |
| Income smoothing | <p><i>“It involves the repetitive selection of accounting measurement or reporting rules in a particular pattern, the effect of which is to report a stream of income with a smaller variation from trend than would otherwise have appeared” (Copeland, 1968)</i></p> <p><i>“It is the intentional dampening of fluctuations about some level that is currently considered to be normal for a firm. It represents an attempt on the part of the firm’s management to reduce abnormal variations in earnings to the extent allowed under sound accounting and management principles” (Beidleman, 1973)</i></p> | <p>(Akpanuko & Umoren, 2018)</p> <p>Tucker & Zarowin (2006) ; (Tessema & Deunes, 2018)</p> |

Agency Theory

Agency theory explains the relationship between two parties, namely the principal and the agent and the concept has been used in many branches of social studies, such as economics, political science, marketing and organizational behavior (Eisenhardt, 1989).

Modern organizations have widely dispersed ownership in the form of shareholders (the principal), who are not generally involved in management, which they delegate to executives (the agent). The agent manages the day-to-day operations of the company on behalf of the shareholders and this places him in a privileged position, which entails responsibility and honesty. However, it also gives opportunity for abuse and promotion of his self-interest.

Jensen & Meckling (1976) comment that principals are ‘unable’ to monitor agents’ performance and that there may be significant ‘monitoring costs’. Costs to the firm are also incurred in the drafting of contracts, controlling agents’ actions, and losses incurred by inappropriate decisions taken by agents. It was argued by Fama & Jensen (1983) that although these costs are initially borne by the principal, they will ultimately be charged back to the agent as a reduction in his compensation.

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Some critics claim that the view of agency theory where agents are also looking to increase their personal utility and wealth is too simplistic and presumes a pessimistic assumption of human behavior which does not take account of trust and cooperation between the two parties (Fehr & Falk, 2002). They claim that there are emotional and social elements in motivating agents, such as their wish to obtain the approval of their peers and society in general and job satisfaction.

Compensation contracts are often drafted by companies in an attempt to limit management behavior and to encourage alignment more closely with the interest of stakeholders. A theory of 'positive accounting' was developed by Watts & Zimmerman (1978) who stated that managers tend to select accounting policies in line with their self-interest, resulting in higher earnings and consequently enhanced incentive bonuses. As an extension of agency theory, it has been recognised that, in addition to shareholders, agents have a broader responsibility to different classes of stakeholders, such as clients, employees, suppliers and society (Donaldson & Preston, 1995) and these groups have to be considered when making management decisions.

Managerial Power Theory

Managerial power theory, sometimes called 'executive power theory' or 'self-serving executive model', is often proposed as an alternative or extension to agency theory in explaining the relationship between owners (principals) and the executives (agents) of a company, particularly with regard to executive pay. The principle was established by Bebchuk & Fried (2003) who recognise that a contract is not the only factor influencing executive compensation and managers are in a strong position to influence the level of their own pay. This is because even independent directors are often linked to executives by common interests and aims. Excessive power can provide excessive benefits, which are not only criticised by other members of the organization but also by outsiders and can considerably reduce firm value.

Managerial power theory suggests that executive compensation arrangements are not made at arm's length on behalf of shareholders, but executives have the power to determine their own pay to extract rents. This can result in excessive pay, to the detriment of shareholders. It may also attract unwelcome criticism and adverse media attention, often termed "outrage". Bebchuk & Fried (2005) argue that outrage at dominant CEOs setting their own pay is perhaps the only efficient constraint on excessive executive pay. In an attempt to avoid this, CEOs and other executives may attempt to "camouflage" their pay and benefits or the performance measures that are related to their pay.

Stakeholder Theory

Whereas agency theory dictates that the main objective of boards of directors is to look after the interests of shareholders, stakeholder theory extends this aim to include other stakeholders. It recognises that agents have a broader responsibility to different classes of stakeholders (Donaldson & Preston, 1995). They identified stakeholders as "persons or groups with legitimate interests in procedural and/or substantive aspects of corporate activity". These groups and individuals all have to be considered when making management decisions as they have an interest in the success or failure of the business.

Two classes of stakeholders are identified: internal and external. Internal stakeholders include employees, managers and shareholders and their relationship is determined by established rules and contracts. External stakeholders include suppliers, customers and members of the local community. Their conduct is governed by rules sometimes informal, but also controlled by contracts (Clarke, 2004).

The stakeholder management theory was developed to provide an alternative understanding of the aims and organization of a business, moving away from the traditional concept that the firm exists primarily to make profits for one group - the shareholders. Several researchers proposed that, in addition to financial measures of firm efficiency, other measures of effectiveness might be used and one of the alternatives suggested was the stakeholder management theory, which is defined by McWilliams & Siegel (2001) as a method of assessing organizational effectiveness by measuring the extent to which interests of non-shareholders, such as employees, suppliers, customers and individuals in the community are protected. These classes do not benefit primarily from shareholder returns. Several motivations discussed in the literature regarding creative accounting highlight the incentives provided by stakeholders other than shareholders, as discussed in section 1.4.

Gender Socialization Theory

Gender socialization theory posits that gender identity is defined and established through a childhood socialization process (Shawver & Clements, 2015). Because it is irreversible and stable, gender identity could explain the divergence between values, interests and traits that males and females use in their ethical decision-making at the workplace (Shawver & Clements, 2015). Rest (1986), through his proposed four-stage model, argues that ethical decision-making encompasses moral sensitivity, moral judgement, moral intention and moral behavior.

Scholarship on psychology and management is not univocal about gender-earnings management relationship. In relation to moral sensitivity, while Shawver, Bancroft, & Sennetti (2006) suggest that females view earnings management are less ethical than their male counterparts, Cohen, Pant, & Sharp (1998) found that females were not more sensitive vis-à-vis earnings management than males. Shawver & Clements (2015) report no gender differences in all four components of Rest's model for earnings management. Moreover, Srinidhi, Ferdinand, & Tsui (2011) and Krishnan & Parsons (2008) argue that gender diversity results in higher earnings quality (and hence reduces the probability of earnings management). Furthermore, Harris, Karl, & Lawrence (2019) assert that in the presence of equity-based incentives, gender identity does not prevail culminating in both male and female CEOs managing earnings.

As the link between gender and earnings management appears to be unclear, studies have tried to provide some explanations. Feldberg & Glenn (1979) identify socialisation as a factor that could alleviate gender differences. Also, Owoso (2002) points at the prevalent reward structure or provided trainings as potential mitigating factors.

Socioemotional Wealth Theory

According to Gómez-Mejía, Haynes, & Núñez-Nickel (2007), the socioemotional wealth theory pertains to “*non-financial aspects of the firm that meet the family's affective needs, such as identity, the ability to exercise family influence, and the perpetuity of the family dynasty*”. Closely linked to the socioemotional wealth theory, is the concept of social identification that predicts that individuals should be aware of their group membership (i.e. family), value it and be emotionally invested in it (Deephouse & Jaskiewicz, 2013). It is therefore not unreasonable to believe that social identification could lead individuals to differentiate and favour the social group they belong to (Van Knippenberg, 2000) so as to increase their reputation (Deephouse & Jaskiewicz, 2013). With all the benefits of reputation (e.g.

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more skillful employees attracted, empire building, prestige), individuals could potentially engage in earnings management.

The extant literature does not provide a clear link between firm status (i.e. family or non-family) and the propensity to manage earnings. Paiva, Lourenço, & Dias Curto (2019) find that family-owned companies have a higher tendency to manage earnings than their non-family counterparts unless analyst coverage is significant. Jiraporn & DaDalt (2009) report that family-owned firms are less likely to manage earnings due to their specific features (i.e. the focus is on the family socioemotional wealth rather than the firm's financial performance, in line with Gómez-Mejía, Haynes, & Núñez-Nickel (2007)). Furthermore, Achleitner, Günther, Kaserer, & Siciliano (2014) argue that family-owned businesses manage earnings selectively compared to non-family firms by focusing on accruals-based earnings management (i.e. that create value) and avoiding real earnings management (i.e. non-value adding).

Upper Echelons Theory

According to Hambrick (2007), “*the central premise of upper echelons theory is that executives’ experiences, values, and personalities greatly influence their interpretations of the situations they face and, in turn, affect their choices*”. (In other words, the starting point to understanding organizational behaviors is understanding those at the top. While previous studies have extensively investigated the specific features of companies that engage in earnings management, the impact of the top management team (i.e. the characteristics of top management team members) on the earnings management proclivity has lately received considerable attention.

The proponents of the upper echelons theory argue that because firm leadership and management is a shared activity and responsibility (i.e. not incumbent to the CEO alone), it is essential to understand the characteristics of the entire top management team. Numerous studies have suggested that the top management team (i.e. not the CEO alone) has a non-negligible effect on firm outcomes (Huovinen & Pasanen, 2010), firm performance and operations (Colbert, Barrick, & Bradley, 2014) and corporate changes (Wiersema & Bantel, 1992).

In relation to earnings management, Qi, Lin, Tian, & Lewis (2017) find that top management team specifics such as age, gender, educational level and accounting experience correlate strongly with accrual based and real earnings management. Moreover, Hsieh, Chen, Tseng, & Lin (2018) report that educational level, finance expertise and tenure of the top management team are inversely correlated with earnings management.

Incentives for Creative Accounting

The definitions of EM discussed give some indication of motives for using creative accounting or earnings management. Healy & Wahlen (1999) recognise three major types of earnings management incentives: stock market, contract-based and regulatory. Beneish (2001) detail the incentives for EM as arising from: debt-covenants, compensation agreements, equity offerings, and insider trading.

EM is often employed to smooth successive income levels to satisfy budgets and to maintain the confidence of investors and debt providers. It may also be used to improve the reputation of managers in meeting and exceeding company expectations within the firm and to beat outside analysts’ targets. Where incentives are given contractually in the form of performance bonuses, EM may enable a threshold to be reached. Regulatory pressure may also encourage executives to manipulate earnings’ results.

Of course, EM may be motivated by sheer greed with executives grabbing as many benefits as they can without being detected. Below is a discussion of the three main incentives of EM identified which relate to executive compensation, the capital market, and political and regulatory incentives.

Incentives Through Executive Compensation

Executives have an incentive to increase their cash compensation as well as other forms of compensation. These can be achieved through accrual adjustments. Earlier studies on the association between managers' accruals adjustments and decisions on the choice of accounting policies are criticised by Healy (1985) who finds the results to be contradictory. This is because many researchers ignore the incentive plans' earnings definition and define earnings in a way that has no effect on executives' bonuses. As a result, they do not find any association between the accounting method and accounting-based compensation. In addition, previous researchers assume that managers always use income-increasing accounting procedures. Healy (1985) includes in his study income-decreasing procedures. Where there is no expectation of reaching target earnings, managers may decrease current earnings, thus increasing the possibility of meeting targets in future years. Similarly, where the specified earnings target is exceeded, managers may use income-decreasing methods so that they may benefit in future years.

Holthausen, Larcker, & Sloan (1995) support Healy's argument, confirming that managers manipulate earnings downward when their maximum bonus level has been reached. However, contrary to Healy's research, they find no evidence of earnings manipulation downwards when the minimum target is not reached. This may be because, in such circumstances, managers may decide not to reduce earnings further as this might jeopardise their continued employment. There may also be technical reasons why earnings should not be reduced further, for example this may cause loan conditions to be breached because there are insufficient earnings.

Jensen & Meckling (1976) state that CEO compensation linked to firm performance provides strong incentive alignment and results in higher firm value. However, Sun (2014) who studies the relationship between executive compensation and contract-driven earnings management, finds that where executive compensation is strongly linked to earnings, EM behavior will often be detected as, in such circumstances it is understandable that CEOs will manipulate earnings to improve their pay. Prior research also finds that firms that rely on financial performance measures in their bonus compensation are more likely to manipulate their earnings than firms that use a mix of financial and non-financial performance measures in the US setting (Ibrahim & Lloyd, 2011) as well as in the UK setting (Tahir, Ibrahim and Nurullah, 2019).

With regard to the award of stock options as an incentive, there are two lines of thought on its efficacy to limit EM. Some researchers find a negative relationship, whilst others detect a positive association between equity incentives and financial adjustments arising from EM. Burns & Kedia (2006) find that there is a positive relationship between stock option incentives and restatements of accounting reports. Supporting this view, Johnson, Ryan, & Tian, (2009) state that there is a positive relationship between unrestricted stock incentive and regulation by the US Securities and Exchange Commission's enforcement rulings. Cohen, Dey, & Lys (2008) claim that US companies show an increase in accruals in line with an increase in stock-based options in the years leading up to the Sarbanes-Oxley Act of 2002.

In the UK, Kuang (2008) find a positive relationship between performance-vested stock options and EM. Other researchers, such as Erickson, Hanlon, & Maydew (2006) do not observe any association, either positive or negative between executive stock incentives and accounting manipulation.

Capital Market Incentives

There are stock market incentives for management to utilise EM as there is a strong association between reported earnings and stock price. Matsunaga & Park (2001) state that missing an earnings benchmark adversely affects stock returns. EM is often practiced in connection with initial public offerings (IPOs) and seasoned equity offerings (SEOs) where managers may try to increase stock sales by inflating earnings. This can often be evidenced by the fact that firms underperform in subsequent years. With regard to IPOs, there is no prior stock price and the opening price is mainly based on historical reported earnings. EM may be used by managers to restate these prior earnings to enable them to set a higher initial offer price. Teoh, Welch, & Wong (1998) find that IPO firms have abnormally high accruals in the year of issue which result in higher reported earnings and improved stock returns. The same is true about SEOs where post-issue earnings are lower than pre-issue. Additionally, Iqbal, Espenlaub, & Strong (2009) claim that in the case where new securities are issued, earnings in excess of the industry median are reported in the year before and the year after issue. However, some IPO firms are careful to be more conservative as they are aware that there will be close monitoring at these times. Evidence also points to EM being used before mergers and acquisitions to improve the outcome and reduce the acquisition price (e.g. Kassamany, Ibrahim & Archbold, 2017).

There is always stock market pressure to maintain or improve on the previous year's earnings and this may incentivize managers to manipulate earnings. Supporting this argument DeGeorge, Patel, & Zeckhauser (1999) find that managers try to avoid reporting losses and then when profitability is achieved their aim is to meet or improve on analysts' forecasts. Abarbanell & Lehavy (2003) state that "buy" recommendations by financial analysts encourage managers to manipulate earnings to match analysts' forecasts, whereas "sell" recommendations encourage them to engage in income-decreasing earnings management to create accounting reserves for future years.

Political and Other Contractual Incentives

Regulatory rules as well as political pressure and contractual obligations based on earnings can also create pressure on companies to manipulate reported earnings. Liu, Ryan, & Wahlen (1997) give the example of banks manipulating accruals when their capital is reducing towards the minimum requirement. Managers may look for loopholes in the current regulations to find ways of using creative accounting to increase earnings. Political considerations may also lead to EM, as in the case of oil companies during the Gulf War changing accounting policies to avoid criticism of making excessive profits by unduly increasing retail prices (Hang & Wang, 1998)

Firms have political connections where controlling shareholders or top executives have associations with politicians or political parties (Faccio, 2006). Such firms may attempt to hide their political association, particularly if it is questionable or open to criticism (Braam, Nandy, Weitzel, & Lodh, 2015). Taxation legislation and other government laws based on reported earnings may also encourage manipulation to reduce liabilities.

Creative Accounting Strategies

There are two major strategies used by executives to carry out EM; accrual-based (hereafter AM) and real activity management (hereafter RAM). AM involves adjusting accruals or accounting procedures

to increase or decrease earnings within Generally Accepted Accounting Principles (GAAP) (Dechow & Skinner, 2000). On the other hand, RAM changes the way real business transactions are carried out (Roychowdhury, 2006). Firms can meet short-term targets by changing the timing or structure of their operating activities which improves cash flow and increases the long-term economic value (Braam, Nandy, Weitzel, & Lodh, 2015). Recent empirical evidence based on US firms using US GAAP show a preference for the use of RAM rather than AM methods following the Sarbanes-Oxley Act of 2002 (Cohen, Dey, & Lys, 2008; Cohen & Zarowin, 2010). Strict regulation requires both effective detection and reporting of AM and this encourages firms to use RAM instead as, despite it being more costly, it is more difficult to detect (Evans, Houston, Peters, & Pratt, 2014). The following sub-sections will explore the empirical evidence using the two EM strategies.

Accrual-based Management (AM)

Many companies use the manipulation of accruals to adjust reported earnings for various purposes, as have been discussed above. AM does not involve changing underlying operating activities but is achieved by managers using their discretion in adopting accounting procedures (Gunny, 2010). Accounting accruals are sometimes the preferred method of creative accounting, rather than adjusting cash earnings, which are more difficult to manipulate.

In the US, accrual-based earnings management became increasingly popular in the period 1987-2002. However, its popularity steadily declined after the introduction of the Sarbanes-Oxley Act of 2002 (SOX). On the other hand, the use of RAM which was declining before SOX, increased after SOX as companies abandoned AM (Cohen, Dey, & Lys, 2008). At the same time, they find that with the increase of AM prior to SOX there was an associated increase in equity-based compensation. After SOX, new options granted in the current period are negatively associated with AM intended to increase income.

Several researchers find a significant association between discretionary accrual decisions and executive compensation (e.g. Holthausen, Larcker, & Sloan, 1995 ; (Guidry, Leone, & Rock, 1999); (Cheng & Warfield, 2005)) but Erickson, Hanlon, & Maydew (2006) were unable to find any evidence that such incentives are associated with fraud.

Leuz, Nanda, & Wysocki (2003) claim that there is a decrease in AM in countries which have robust investor protection. Similarly, effective regulatory disclosure systems and in-depth analyst interest both bolster investor protection with a consequent reduction of AM (Degeorge, Ding, Jeanjean, & Stolowy, 2013).

In China, extensive research has shown that companies use discretionary accruals adjustments to manage their earnings (Kuo, Ning, & Song, 2014). Further research in China reveals that discretionary accruals are used to inflate earnings and improve stock valuations prior to an IPO and to meet the regulator's requirements to return positive earnings for three consecutive years (Chen & Yuan, 2004).

Several studies in the UK also find the use the manipulation of accruals to manage earnings, either by increasing or decreasing it. Gore, Pope, & Singhv (2001), measuring discretionary accruals find a positive relationship between EM and auditors' non-audit fees in the case of non-Big 5 (later Big 4) audit firms. However, they find no such positive relationship for clients of Big 5 audit firms. Ferguson, Seow, & Young (2004), taking a sample of 610 UK firms, measure three proxies for EM. They find that all three EM measures are positively associated with the purchase of non-audit services.

Real Activities Management (RAM)

In current periods, following the strengthening of corporate governance, there is evidence that RAM is more frequently adopted. Cohen, Dey, & Lys (2008) confirm that there has been a move away from AM towards RAM since passing the Sarbanes-Oxley Act (2002) in the US.

RAM is used to meet specific earnings targets and to avoid reporting losses. There are three main methods of real activities manipulation: sales manipulation, reduction in discretionary expenditures and overproduction. Sales manipulation is carried out by bringing forward the timing of sales and/or generating temporary increases in sales by giving price discounts or more lenient credit terms. Such manipulation is less apparent when there are more knowledgeable investors (Roychowdhury, 2006). The short-term improvement in sales achieved by such manipulation is at the expense of the following year's performance (Gunny, 2010).

Another method of real activities manipulation is by the reduction of discretionary expenditures such as research and development (R&D), maintenance, advertising, staff training and travel, particularly when these costs are not essential at that time. This has the effect of increasing earnings for the year but, once again, this is at the expense of future years' profits when the inclusion of such expenditures becomes essential (Roychowdhury, 2006; Gunny, 2010).

Osma (2008), using a broad sample of UK firms and firm-years across 29 different industries, determined that independent directors are capable of detecting and constraining EM involving cuts in R&D costs.

Overproduction is another form of real activities management in manufacturing firms and involves production of goods in excess of current demand. This has the effect of reducing fixed costs per unit as overheads are spread over a higher number of units. However, this is only a short-term solution and higher production and holding costs such as insurance and storage have to be recovered from future earnings (Roychowdhury, 2006; Gunny, 2010).

Another method of real activities management involves the timing of asset sales to manage reported earnings. Bartov (1993) finds instances where fixed assets are sold to improve earnings growth and avoid violation of debt covenants.

Where a seasoned equity offering (SEO) is made by a company, Cohen & Zarowin (2010) find that firms engage in RAM to improve the issue prospects, but after the issue of the shares there is a marked reduction in performance, which is not found when AM is used.

Although some RAM may be acceptable in difficult economic circumstances, excessive RAM designed to mislead shareholders to believe that performance targets have been met is not to be encouraged even if it allows managers to meet reporting goals (Roychowdhury, 2006). Although RAM is often cited as relating to increasing firm earnings, Graham, Harvey, & Rajgopal (2005) find that managers may use it to meet personal targets even though this may reduce firm value.

In addition to AM and RAM, studies have identified another earnings management tool which is classification shifting (Malikov, Manson, & Coakley, 2018). This consists of intentionally misclassifying items within the income statement. Studies have reported that firms intentionally move core expense items (i.e. cost of goods sold, selling and administrative) into other items (McVay, 2006) or non-recurring items (Haw, Ho, & Li (2011); Athanasakou, Strong, & Walker (2011)) to increase core revenues without altering the bottom line. Malikov, Manson, & Coakley (2018) argue that, within the International Financial Reporting Standards (IFRS) parameters, firms now intentionally move non-operating income items into operating income items to inflate core income. This stems from (a) investors belief that items are more value-relevant the higher they appear on the income statement and (b) the closer items are

to the sales revenue figure the better they can predict future earnings. This is merely the result of the vagueness reflected in certain IFRS standards such as revenues related to ordinary activities in IFRS15 (i.e. IFRS15 define revenue as income arising from an entity's ordinary activities).

Another mean for EM is through related-party transactions (RPT). IAS 24 defines RPT as the transfer of resources, services or obligations between related parties. Because revenue is value-relevant and captures investors' attention, firms have incentives to manipulate that figure. Marchini, Mazza, & Medioli (2018) argue that in line with the agency theory, firms could use RPT, specifically revenue RPT to manage earnings. They further suggest that groups represent the ideal setting for the use of RPT for EM as transactions between parent and subsidiaries are often hard to monitor.

Earnings could also be managed through unbilled receivables. Kwon & Lee (2019) define unbilled receivables as "*the estimated revenue exceeding billings, and representing revenue that has not yet been billed. Unbilled receivables differ from receivables in that they are amounts of money that have been charged but not yet recovered. They are a constructed receivable, and they appear as outstanding receivables already reflected in sales figures*". Inherent to the construction and shipbuilding industries, these could be used to hide sub-optimal performance. Kwon & Lee (2019) find a positive association between unbilled receivables and EM.

International Accounting Scandals

Earnings management and fraud have been the centre of criticism for companies since the early 2000's when the Enron scandal broke. In this section, a discussion of high profile cases of EM that occurred in developed as well as developing countries is presented. The examples discussed are not exhaustive but provide a picture of the large-scale problems that can occur when managers use their discretion to hide the financial condition of the company.

Examples of Scandals in Developed Countries

Prominent examples of EM in the media have typically spilled into fraud, given that smaller levels within the confines of Generally Accepted Accounting Principles would most likely not be detected. The most significant case in the history of the developed world is undoubtedly the case of Enron in 2001. Enron was created from the merger of Houston Natural Gas and InterNorth in 1985 and its annual financial statements up to 2001 at the time of its bankruptcy showed significant profits. However, these earnings figures turned out to be false and the scandal ultimately led to the demise of the accounting firm, Arthur Andersen, for its role in the fraud and its attempt to hide evidence when the scandal broke. The fraud related mainly to using 'mark-to-market' accounting for its energy trading business, where the company booked unrealized trading gains based on the estimated market value of long-term future contracts in energy commodities (Thomas, 2002). The scale of this manipulation was quite significant with more than half of the company's \$1.41 billion pre-tax profit for 2000 being from these unrealized trading gains. They also used related-party transactions to hide the company's debt off its financial statements.

Soon after, the case of Worldcom in 2002 came to light. The telecommunications company was booking interconnection expenses with other telecommunications companies as capital, rather than expensing them, to boost earnings. The company was also recording artificial revenues (Stern & Noguchi, 2002).

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Other large-scale accounting fraud cases in the US include Waste Management in 1998, Tyco in 2002, HealthSouth and Freddie Mac in 2003, American International Group (AIG) in 2005, Lehman Brothers and Bernie Madoff in 2008.¹

In the UK, the earliest case of accounting fraud investigated was that of Polly Peck International in 1990. The company was established in the early 1970s and grew substantially in the next decades becoming in the late 1980s the only European company to be listed on the Tokyo Stock Exchange (Bates, 2010). Following the company's collapse in 1990, it was discovered that the founder and chief executive officer of the company, Asil Nadir, had siphoned large sums of cash for his own purposes and falsified accounting records to hide the theft. He was sued by the company's administrators for £378m, facing 13 charges of theft and false accounting. He was jailed in 2012 and repatriated to Turkey in 2016, to complete his sentence, where he was released following a one-night stay in jail there (Reuters, 2016).

More recently, Tesco admitted in 2014 overstating profits by £263 million by inappropriately recognizing income from suppliers (Felsted & Oakley, 2014). This figure was later revised to £326 million and the company was fined £129 by the Serious Fraud Office in 2017 and was also required to pay compensation to its investors (Ruddick & Kollwe, 2017).

Furthermore, in October 2018, it came to light that the café chain 'Patisserie Valerie' in the UK had significantly misreported its financial statements in previous years. Work carried out by forensic accountants revealed that 'the misstatement of its accounts was extensive, involving very significant manipulation of the balance sheet and profit and loss accounts.' (Butler, 2019).

Other European countries that also faced large accounting fraud scandals include Italy with the Parmalat case in 2003.

Examples of Scandals in Developing Countries

Accounting fraud and EM is not limited to the US and UK where the capital market drivers are stronger. In fact, one would expect more manipulation to occur in countries that have less governance regulations and weaker regulatory environments. However, cases of manipulation in developing countries are not that common. The reason could be that the manipulation or fraud goes unnoticed. Alternatively, there may be less incentives to manipulate due to different structures of executive compensation, stock market or regulatory mechanisms. There are, however, a handful of manipulation examples in developing countries. One of the prominent cases is that of Satyam in 2009. Satyam was an Indian computer sciences company which was founded and run by Ramalinga Raju, who was sentenced to seven years in prison in 2015 (Hindustan Times, 2015). The case involved the company creating false invoices to inflate cash balances that appeared to double the value of the company's assets from 2005 to 2009. The total value of the manipulation was around \$1 Billion.

Several accounting irregularities in China have also come to light in the past years including China Public Procurement which announced in 2010 a contract worth 300 billion yuan (\$48.1 billion) with a non-existent customer (Rovnick, 2013). Another example is Honetex International, a Taiwanese-owned Chinese fabric maker, that inflated its sales and cash figures for the years leading up to its listing in 2009.

Summary and Future Work

This chapter provides an overview of issues surrounding earnings management, in addition to accounting fraud or irregularities. These involve modifying accounting records for either opportunistic purposes or

for signalling private information to stakeholders. The incentives that drive this behavior are diverse and include incentives embedded in executive compensation, such as including earnings as a performance measure in bonus compensation. Stock market incentives are also significant, and these could be from investors' aversion to drops in earnings or not meeting analyst forecasts. It could also be related to managers' desire to increase the price of initial public offerings or secondary equity offerings. Finally, there are political and regulatory incentives such as for managers of regulated firms to avoid the scrutiny of the government.

in the above sections, the alternative techniques to manage earnings using the flexibility in accounting principles embedded in the Generally Accepted Accounting Principles, through accrual manipulation were discussed. However, sometimes this can spill into fraud by including false figures. More recently, there is evidence of real activities manipulation such as pushing more sales in a period by offering discounts to customers, overproduction, or reducing spending on discretionary items such as research and development.

Finally, cases of earnings management in the developed and developing countries are presented. The cases highlighted are extreme cases that include fraudulent activities and therefore resulted in fines or jail time to those involved.

From the discussion above, it is clear that there is currently a good understanding of incentives of EM and evidence of this is prevalent in the literature. However, there still remains several issues to be explored, which can be extensions to the current body of work. For example, evidence of EM in other types of organizations such as charities and the public sector is not widely researched, with a few exceptions such as Eldenburg, Gunny, Hee & Soderstrom (2011) and Ferreira, Carvalho & Pinho (2013). Furthermore, most research uses agency theory and/or managerial power as the underlying theory that explains management behavior around EM. However, other theories discussed such as socioemotional wealth theory and the upper echelons theory can be a useful backdrop for future research on EM by moving the focus away from the CEO and financial incentives, into a broader set of individuals (top management or beyond) as well as other incentives (such as CEO turnover, reputation, or maintaining the rating of the firm). Finally, whereas there is a multitude of research that examines incentives and motivations for EM, there is limited research on the mechanisms that inhibit this behavior, beyond corporate governance issues (e.g. Bajra & Cadez, 2018; Fan, Jiang, Zhang, & Zhou, 2019), accounting systems and enforcement (e.g., Sundvik, 2019), and ethics (e.g., Gowthorpe & Amat, 2005).

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ENDNOTE

¹ <https://www.accounting-degree.org/scandals/>

Chapter 17

Externally Financed Growth and Quality Accounting Information: Evidence From Brazil

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ABSTRACT

This study investigates the association between quality accounting information (QAI) and externally financed growth (EFG), taking a sample of 214 firms in Brazilian stock exchange from 1998 to 2015. EFG is estimated from the sales percentage approach to financial planning. QAI is estimated according to the accruals quality model proposed by Dechow and Dichev and modified by McNichols. The hypothesis that signaling efficient accounting information marginally influences and positively EFG is tested by multiple linear regression with estimation by OLS and could not be rejected. It is inferred that QAI is a significant attribute in contributing to the firm's access to the external financing channel. This study broadens the discussions about the themes in the Brazilian scenario, shedding light on the importance of the practice of the dissemination of quality information for the growth of firms in the Brazilian context.

INTRODUCTION

The literature on corporate finance emphasizes the relevance of informational asymmetry in influencing firm growth through its impact on the efficiency of its investments (Stein, 2003). Myers and Majluf (1984), in this sense, argue that more information asymmetry between managers of firms and their capital providers can increase the cost of external financing sources of firms.

This distortion may limit firms' access to low-cost external financing, as well as their ability to pursue potentially lucrative projects (Demirguc-Kunt & Maksimovic, 1998). In addition, the presence of greater informational asymmetry among managers and suppliers of capital of firms can also limit their

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investments to the level of their internal cash flows (Fazzari, Hubbard, & Petersen 1988), which may reflect lower growth (Albring, Huang, Pereira, & Xu 2013).

Under these conditions the accounting information is presented as an informational signal with the capacity to reduce the informational asymmetry among the agents around the firm's operation and, as a consequence, also reduce the cost of external financing sources of firms, if offered with quality attributes, based on empirical evidence (Lambert, Leuz, & Verrechia, 2007, Silva & Nardi, 2017). The evidence suggests that signaling of higher quality accounting information reduces the cost of external financing for firms.

It must be acknowledged that quality accounting information is a broad concept of multiple dimensions (Burgstahler, Hail, & Leuz, 2006), and that there is no consensual metric in accounting literature to define it (Potin, Bortolon, & Sarlo Neto, 2016). Ball and Shivakumar (2005) define such quality as the usefulness of such information for investors, creditors, managers and all other contracting parties with the firm.

In this paper, quality accounting information is defined as the extent to which accrual accounting contribute the measurement of the underlying economic performance (Nivolaev, 2014). The use of accruals by accounting is intended to create a measure that best reflects the performance of the firm (Dechow & Dichev, 2002), such a measure the earnings determined by the accounting system.

These informational signals can improve firms 'access to low-cost external financing by reducing informational asymmetry, as well as increasing firms' ability to finance their growth opportunities, since they would be obtaining low-cost external financing, according to Khurana, Pereira and Martin (2006).

In this sense, firms that would report high quality accounting information, therefore, would have a greater possibility of growth than firms that do not practice such reporting, since, in addition to their internal resources, they would also access sources of external financing at low-cost and would have greater capacity to finance their opportunities growth. On the other hand, firms signaling low-quality accounting information will access higher-cost external financing in the face of greater informational asymmetry, which would force these firms to renounce potential profitable projects and, therefore, would present more restricted growth (Myers & Majluf, 1984).

In the international context, research (Albring *et al.*, 2013; Hyytinen & Pajarinen, 2005) has shown evidence of a positive relationship between firm growth and the quality accounting information reported by its managers. According to these studies, firms that signal higher quality accounting information have higher growth rates.

In the Brazilian context, in limited research, no research was found that proposed to investigate such relationship. It is possible point to the study by Carvalho and Kalatzis (2018), that have examined the relationship between the quality accounting information and investment decisions in the context of Latin American countries (including Brazil); showed that low-quality accounting information increases the dependence of firms' investment decisions on the levels of their internal cash flows. Thus, the need for funds to finance possible growth opportunities may contribute to firms reporting higher quality accounting information to raise funds through external financing channels in the Brazilian scenario.

Considering the above discussion, this research examines whether signaling of quality accounting information influence growth of firms listed in Brazil stock exchange. More specifically, the objective is to analyze whether signaling of quality accounting information impact externally financed growth considering those firms, with externally financed growth being estimated from the percentage of sales for financial planning, according to Demircuc-Kunt and Maksimovic (1998), and the quality accounting

information being estimated according to Dechow and Dichev model (2002) modified by McNichols (2002).

BACKGROUND

In the contractual model firm, managers are the agents that hold the highest level of information about the firm concerning the other contracting agents, an event that characterizes what is known as informational asymmetry. Myers and Majluf (1984) argue that informational asymmetry can increase the firms' external financing costs, forcing them to forgo potential profitable projects. These authors also point out that, given the presence of informational asymmetry, the growth of firms will be restricted to the use of their internal resources.

On the presence of informational asymmetry, capital suppliers will demand from firms higher returns, which implies a higher cost of capital for firms (Segunpta, 1998). This may prevent firms from raising the capital required to finance all their projects with positive net present values (NPV) (Kang *et al.*, 2017). In this sense, the firms' growth will be limited to their internal resources. Such distortion, therefore, may hinder firms' growth through their negative impact on firms' investment efficiency, according to Stein (2003).

Among the possible attributes capable of reducing the informational asymmetry among agents around the firm, Spence (1973) points the signaling information to the market by the firms. According to Spence (2002), the signaling model is aimed at reducing informational asymmetry between contracting parties, in which one party provides informational signals about its quality.

Supported in Spence (1973, 2002), managers could report accounting information with informational efficiency as signaling of the decision to reduce information asymmetry, reflected in the reporting of useful and relevant information to firms' capital providers, to obtain funds at lower costs and to finance their growth opportunities.

Lambert *et al.* (2007) provide evidence that signaling efficient accounting information contributes to reducing the cost of external financing sources. The authors developed a similar model to the Capital Asset Pricing Model (CAPM) to examine the effect of the quality accounting information on firms' cost of capital. The findings indicated that the higher quality of the informational signal emitted by the firm's accounting reduces the cost of capital. Silva and Nardi (2017), in a similar way, investigated the relationship between the quality of accounting information and the capital cost of firms, however, in the context of the Brazilian capital market, reported that higher quality accounting information reduces the cost of capital firms in that market.

Under this framework, firms signaling higher quality accounting information would be those that would exhibit growth made possible by external financing, in addition to the growth made possible by their internal sources, since they would have access to low-cost external financing. On the other hand, firms reporting lower quality accounting information would be those that would exhibit growth restricted to their internal financing sources, since they would access higher-cost sources of external financing.

It is important to note that such a benefit resulting from signaling efficient accounting information (access to low-cost external financing) should not be the same for all firms (Khurana *et al.*, 2006). For instance, firms with sufficient internal resources to finance their investment opportunities are less likely to benefit from efficient accounting reporting policy, while firms with limited internal resources to fi-

nance their investment opportunities may benefit from such policy, if it improves its capacity to pursue potentially profitable projects because of its access to lower-cost external financing (Khurana et al., 2006).

Thus, according to Khurana *et al.* (2006), the empirical evaluation of this research requires differentiating internally financed growth rates from those financed externally, since the effect of signaling quality accounting information is more likely through the channel external financing.

Considering what has been argued above, if the signaling of higher quality accounting information is effective in reinforcing firms' access to external funds, then it is possible to anticipate that such signaling may improve the ability of firms to invest in potentially profitable projects for their growth. The following are presented research that provides evidence to confirm this prediction.

Albring *et al.* (2013), investigating the US capital market from 1997 to 2005, presented evidence of the effects of the quality accounting information on the externally financed growth of firms. The quality accounting information was estimated based on the restatement of financial statements, measured by a dummy variable, assuming 1 when the restatement was made by the firms, and 0 otherwise. Externally financed growth was estimated from the percentage-of-sales approach to financial planning, according to Demirguc-Kunt and Maksimovic (1998, 2002). The findings pointed to a negative relationship between the republication of financial statements and externally financed growth, suggesting that restatement firms exhibit lower externally financed growth rates.

Kang et al. (2017) also examined this relationship in the North American market, however in the period 1987-2008. The quality of the accounting information was estimated by the presence of the attribute conditional conservatism, measured by the models of Khan and Watts (2009), Callen, Segal, and Hope (2010) modified by Biddle, Ma and Song (2011) and Givoly and Hain (2000). Externally funded growth was estimated from the percentage-of-sales approach to financial planning, according to Demirguc-Kunt and Maksimovic (1998). The evidence points to a positive relationship between conditional conservatism and externally financed growth, indicating that higher quality accounting information, according to the conditional conservatism attribute, helps firms access external financing to finance their growth.

In addition to the signaling model, capital providers (whether shareholders or debtholders) would represent relevant stakeholder groups to the firms, which would have the power to affect the decisions regarding the disclosure policy of the firms. About this, Buhr (2002) argue that the firms may respond to the most powerful stakeholders only, and not equally to all stakeholders.

Under the stakeholder theory arguments, managers would respond to the pressure of these groups by reporting useful information that allows them to accurately assess the firm's economic situation. Such a situation similar to signaling theory would also represent a reduction in asymmetry between the agents, reflecting a reduction in the cost of capital provided to the firm.

In the Brazilian context, in limited research, no study was addressed for the purpose to investigate the relationship between quality accounting information and firms' growth. However, it is worth noting research by Carvalho and Kalatzis (2018). The authors investigated the relationship between quality accounting information and investment decisions and financial constraints in sample firms in Latin America in the period 1992-2009 with quality accounting information being estimated by Sloan's model (1996), with methodology based on Core, Guay, and Verdi (2008), and financial constraints and efficient investment decisions being estimated by Lamont, Polk and Saá-Requejo (2001) and Richardson (2006) models, respectively. The findings point out a positive relationship between the quality accounting information and firms' investment rates, as well as indicating that low-quality accounting information can increase the dependence of investments on the free cash flow generated by the firms.

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The influence of the quality accounting information on the externally financed firms' growth, therefore, would be due to the reduction of the informational asymmetry among the agents around the firm's operation. This effect would reflect a reduction in the firm's cost of external financing and, as a result, greater access to these firms to the external financing channel and the possibility of financing their growth opportunities.

Thus, firms with higher quality accounting information are expected to exhibit higher rates of externally financed growth when compared to firms with lower quality. Considering this argument, the hypothesis that the signaling of quality accounting information by firms in the Brazilian capital market positively influences their externally financed growth is assumed, *ceteris paribus*.

STUDY DESIGN

The research sample includes publicly traded companies with shares listed in Brazil stock exchange (Brasil, Bolsa, Balcão - B3). The final sample consists of 228 companies (2,677 firm year observations) with available data to calculate the variables of the models and not belonging to the financial industry, whose accounting system differs from the usual practice of firms in other sectors (Pincus, Rajgopal, & Venkatachalam, 2007).

The investigation covered events in the period 1998-2015. The choice of the period taken into consideration capture possible effects from growth of the Brazilian capital market between the years 2002 and 2013, as highlighted by Medeiro (2014). It was also taken into account the issue related to the stabilization period of the Brazilian economy to define the investigated period.

Variables in this study were Winsorized at the top and bottom 5% of its distribution to reduce the effect of extreme values on our estimates, following, e.g., Barth, Landsman, and Lang (2008) and Liu and Skerrat (2014). This procedure includes replacing records with values below or above certain limits (lower and upper) by the value pointed out in these limits, as Sarlo Neto, Bassi, and Almeida (2011) point out.

The data was collected from (i) in the Economática® database, (ii) institutional portals of B3, and the Brazilian Securities and Exchange Commission (CVM) and the SInC (Corporate Information System) software.

The proxy for externally financed growth was estimated from the sales percentage approach to financial planning, as propounded by Demircuc-Kunt and Maksimovic (1998, 2002), which estimates the maximum rate of growth that can be financed internally. Under certain assumptions (Higgins, 1977; Demircuc-Kunt & Maksimovic, 1998), the financial planning model implies that financed need of a firm at time t can be expressed as follows:

$$EFN_t = [g_t \times A_t] - [(1 + g_t) \times (E_t \times b_t)]. \quad (1)$$

where EFN is the measure of external financing need; g the growth rate in sales of a firm; A the assets of a firm; b the proportion of the firm's earnings that are retained for reinvestment; E is the Earnings after interest and taxes; and subscript t is the time period t .

The right-hand side of equation (1) represents the difference between the investment required for a firm growing at g and the internally available capital for investment. Assuming EFN to be zero, it is

computed three measures of constrained growth (g), denoted internally financed growth rate (IFGR) and short-term financed growth rate (SFGR).

IFGR, the most conservative estimate, represents the maximum growth rate that can be obtained if a firm relies on its internal resources and payout ratio is assumed constant. IFGR, the most conservative estimate, represents the maximum rate that can be obtained if a firm relies on its internal resources and its payout ratio is assumed constant. To estimate CFI, it is set EFN to zero and compute the variable g using Equation (1). The growth rate reduces to:

$$IFGR_t = (ROA_t \times b_t) / (1 - ROA_t \times b_t). \quad (2)$$

where ROA is the ratio of earnings after interest and taxes to assets.

The estimated growth, SFGR, represents the maximum growth rate obtained through internal cash flows and short-term debt, which is obtained by setting b in Equation (2) to 1, implying the payout rate is zero. As a result, the firm's implicit growth rate is:

$$SFGR_t = ROLTC_t / (1 - ROLTC_t). \quad (3)$$

where $ROLTC$ is the ratio of earnings after interest and taxes to long-term capital.

It's important to mention that firms with negative results are not likely to have funds available to finance its growth; It is set IFGR and SFGR equal to zero when firms experience a loss during a specific year, following Albring *et al.* (2013).

Next, it is calculated two measures for the externally financed growth proxy for each firm in a specific year (Demirguc-Kunt & Maksimovic, 1998). The difference between each firm's realized sales growth rate and the firm's predicted internally financed growth rate (IFGR) is denoted E_IFGR . This measure reflects the growth rate that exceeds the maximum growth allowed by using only internal resources, thus the growth made possible by external sources such as short- and long-term debt and share issuance (Kang *et al.*, 2017).

The second measure corresponds to the difference between the firm's realized sales growth rate and the firm's predicted short-term financed growth rate (SFGR), denoted E_SFGR . This measure reflects the growth rate that exceeds the maximum growth made possible by using internal resources and short-term debt, thus the growth made possible by using long-term debt or issuing shares (Kang *et al.*, 2017). It is considered firms with E_IFGR and E_SFGR equal to zero when these variables present negative values, following Albring *et al.* (2013).

The third measure of externally financed growth is constructed, based on Kang *et al.* (2017), which seeks to capture the growth made possible only by short-term financing. It is estimated the difference between the variable E_IFGR and E_SFGR for each firm, denoted $OSFG$, which is not associated with long-term debt and share issuance (Kang *et al.*, 2017).

The proxy for Quality Accounting Information (QI) is estimated according to the accruals quality model proposed by Dechow and Dichev (2002) modified by McNichols (2002). First, it is estimated the regression model (4), as follows:

$$ACC_t = \beta_0 + \beta_1 * CF_{t-1} + \beta_2 * CF_t + \beta_3 * CF_{t+1} + \beta_4 * \Delta REV_t + \beta_5 * PPE_t + V_{it} \quad (4)$$

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where ACC_t is the current accruals scaled by the total assets of $t-1$; CF_{t-1} is the operating cash flow in the period $t-1$; CF_t is the operating cash flow in the period t ; CF_{t+1} = Operating cash flow in the period t ; ΔREV_t = current-year change in sales t ; PPE_t = current-year level of property, plant, and equipment; v_t = error term of model; all variables are scaled by total assets of the previous year.

Accruals are measured using the proxy of the working capital requirement, following Dechow and Dichev (2002), according to Equation (5):

$$ACC_t = [(\Delta CA_t - \Delta FA_t) - (\Delta CL_t - \Delta FL_t)] / TA_{t-1} \quad (5)$$

where ACC_t is the current accruals scaled by the total assets of $t-1$; $(\Delta CA_t - \Delta FA_t)$ is the increase in current operating assets in the period; $(\Delta CL_t - \Delta FL_t)$ is the increase in current operating liabilities in the period; TA_{t-1} = Total assets of $t-1$.

In order to obtain operating cash flows, it is calculated the difference between the EBIT – scaled by the total assets of $t-1$ – and current accruals for the period estimated in accordance with Equation (5).

After determining the residues contained in model 4, it is estimated the standard deviation of these residues for each firm in the sample, which is the indicator of Quality Accounting Information, denoted QI , according to the formulation expressed in relation (6):

$$QI = \sigma(v_t) i^* (-1) \quad (6)$$

where $\sigma(v_t) i^*$ is the standard deviation of firm's residuals estimated by regression (4).

To facilitate the understanding of this variable, following García-Teruel, Martínez-Solano, and Sánchez-Ballesta (2014), QI values are multiplying by (-1), implying that higher QI values denote higher quality accounting information, while lower values will indicate lower informational quality.

Under the assumption of quality accounting information, it is expected that such quality will increase in the magnitude of QI , in which higher values of these variables denote accounting information of higher quality. It is expected that firms with higher indicators of quality accounting information show higher rates of externally financed growth when compared to firms that have a lower quality indicator of accounting information.

The regression (7) is estimated to capture the effect of the quality accounting information on the firm's externally financed growth, as follows:

$$EFG = \beta_0 + \beta_1 QI + \beta_2 DIV / TA + \beta_3 NI / NS + \beta_4 NS / NFA + \beta_5 LOG_TA + \beta_6 Qtobin + \beta_7 LTD / TA + \varepsilon_{it} \quad (7)$$

where EFG is the measure to capture growth made possible by external financing, having as proxies the mean of each of the variables E_IFGR , E_SFGR and $OSFG$; QI is the quality accounting information, estimated by Equation (6); DIV/TA is the Total Dividends/Total Assets; NI/NS is the Earnings after interest and taxes/Net Sales; NS/NFA is the the Net Sales/Net Fixed Assets; LOG_TA is the Natural Log of Total Assets; $Qtobin$ is the Tobin's Q defined as the sum of the Market Value of Equity plus Assets minus the Book Value of Equity deflated by Total Assets; LTD/TA is the Long-term Debt/Total Assets.

The variables DIV/TA , NI/NS , NS/NFA , LOG_TA , and LTD/TA were included to control the extent of availability of internal/external funds, as well as the variable $Qtobin$ to control growth opportuni-

ties (Abring *et al.*, 2013). It is expected, according to Albring *et al.* (2013) and Kang *et al.* (2017), the following relationships of control variables with externally financed growth measures: (i) negative and significant coefficients for DIV/TA and LOG_TA - larger firms paying dividends are less likely to be dependent on external financing; (ii) positive and significant coefficients for Qtobin and LTD/TA - firms with growth opportunities and with greater long-term capital participation are more likely to show dependence on external financing; no prediction is defined for NI/NS and NS/NFA variables, according to Kang *et al.* (2017). The means of these variables were used in the model (7).

The coefficients of regressions (4) and (7) were estimated by multiple linear regression with estimation by Generalized Method of Moments-System (GMM-SYS) and Ordinary Least Squares (OLS), respectively. The GMM-SYS provides greater efficiency, considering its robustness of estimation in the presence of endogeneity and serial auto correlation by the use of instrumental variables sequentially exogenous (Barros, Castro, Silveira, & Bergmann, 2010).

The regression (4) was processed with variance correction for finite samples, to correct possible heteroscedasticity of the residuals, according to Windmeijer (2005), while the regression (7) was processed with robust correction of White, to make the residuals homoscedastic. The Hansen Test, which was not significant, was confirmed that the instruments used to estimate the model (4) are exogenous, and therefore the GMM-SYS estimation efficiency. The existence of multicollinearity among the independent variables was examined with correlation analysis, and problems of the autocorrelation of the residuals was analyzed through the Arellano and Bond tests; both problems were absent, according to the tests performed (not reported). Finally, the residuals did not present a normal distribution, such a non-critical condition and could be relaxed due to the size of the sample, according to Gujarati and Porter (2011), considering property of estimators with normal asymptotic distribution, as the sample size increases.

PRESENTATION AND DISCUSSION OF RESULTS

Descriptive statistics are provided in Table 1. The Table 1 reveals that average firm exceeding its IFGR; it is relevant to observe that of the 14% of the average growth made possible by external financing, about 12% represents growth financed by long-term debt and equity issuance, with short-term debt-financed by about 2%. The growth variables show low dispersion due to their low coefficients of variation.

The average of the quality accounting information indicator (QI) is 0.046 (absolute value), which is higher than the average quality (0.028) reported by Dechow and Dichev (2002) for firms in the US capital market, signaling that firms in the Brazil signal lower-quality accounting information than firms in that market.

The distribution of the other variables (control) is highly dispersed, except for firm size (LOG_TA), growth opportunities (Qtobin) and leverage (LTD/TA) of firms, with low coefficient of variation.

Pearson's correlation coefficients are provided in Table 2 and illustrate the relations between growth measures made possible by external financing and each of the independent variables considered in the research.

Table 2 reveals a positive and significant association between QI and the growth made possible by short-term debt (OSFG). This provides indications that firms that signal higher quality accounting information also exhibits growth financed by short-term debt, consistent with Albring *et al.* (2013) and Kang *et al.* (2017).

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Table 1. Descriptive Statistics

| Variable | Mean | Median | Standard Deviation | Minimum | Maximum |
|----------|--------|--------|--------------------|---------|---------|
| E_IFGR | 0,142 | 0,126 | 0,076 | 0,123 | 0,432 |
| E_SFGR | 0,119 | 0,100 | 0,078 | 0,000 | 0,432 |
| OSFG | 0,023 | 0,017 | 0,021 | 0,000 | 0,071 |
| QI | -0,046 | -0,039 | 0,030 | -0,173 | -0,001 |
| DIV/TA | 0,023 | 0,015 | 0,027 | 0,000 | 0,124 |
| NI/NS | 0,446 | 0,069 | 1,437 | -1,631 | 6,785 |
| NS/NFA | 8,855 | 3,206 | 12,414 | 0,188 | 60,662 |
| LOG_TA | 13,631 | 13,965 | 1,735 | 10,324 | 16,887 |
| Qtobin | 1,238 | 1,034 | 1,147 | -0,065 | 5,442 |
| LTD/TA | 0,304 | 0,253 | 0,237 | 0,000 | 0,992 |

Notes: Variables: E_IFGR is the growth rate that exceeds the maximum growth allowed by using only internal resources; E_SFGR is the growth rate that exceeds the maximum growth made possible by using internal resources and short-term debt; OSFG is the growth made possible only by short-term financing; QI is the quality accounting information, estimated by Equation (6); DIV/TA is the Total Dividends/ Total Assets; NI/NS is the Earnings after interest and taxes/Net Sales; NS/NFA is the the Net Sales/Net Fixed Assets; LOG_TA is the Natural Log of Total Assets; Qtobin is the Tobin's Q defined as the sum of the Market Value of Equity plus Assets minus the Book Value of Equity deflated by Total Assets; LTD/TA is the Long-term Debt/Total Assets.

Source: (Research data, 2020).

Table 2. Correlation between measures of externally financed growth, quality accounting information and control variables

| Variable | Expected | Pearson's correlation coefficients | | |
|----------|----------|------------------------------------|----------|---------|
| | | E_IFGR | E_SFGR | OSFG |
| QI | + | 0,04 | -0,04 | 0,24*** |
| DIV/TA | - | -0,09 | -0,26*** | 0,71*** |
| NI/NS | ? | 0,16** | 0,16** | 0,02 |
| NS/NFA | ? | 0,02 | -0,02 | 0,10 |
| Qtobin | + | 0,07 | -0,07 | 0,52*** |
| LTD/TA | + | 0,11 | 0,12* | -0,05 |
| LOG_TA | - | 0,18** | 0,11 | 0,24*** |

Notes: Variables: E_IFGR is the growth rate that exceeds the maximum growth allowed by using only internal resources; E_SFGR is the growth rate that exceeds the maximum growth made possible by using internal resources and short-term debt; OSFG is the growth made possible only by short-term financing; QI is the quality accounting information, estimated by Equation (6); DIV/TA is the Total Dividends/ Total Assets; NI/NS is the Earnings after interest and taxes/Net Sales; NS/NFA is the the Net Sales/Net Fixed Assets; LOG_TA is the Natural Log of Total Assets; Qtobin is the Tobin's Q defined as the sum of the Market Value of Equity plus Assets minus the Book Value of Equity deflated by Total Assets; LTD/TA is the Long-term Debt/Total Assets.

Source: (Research data, 2020).

Qtobin and LTD/TA, according to Table 2, are associated in the expected and significant direction, considering at least one of the growth measures made possible by external financing. Consistent with Albring *et al.* (2013) and Kang *et al.* (2017), DIV/TA is negatively associated with E_SFGR, suggesting that firms that distribute dividends have excess cash and, therefore, are less dependent on external

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financing, according to. However, DIV / TA presented a positive association and contrary to what was expected with the OSFG; this finding indicates that firms that show growth made possible by short-term debt also distribute more dividends, which is contrary to the expectation of less dependence of these firms on external financing.

The Table 2 also reveals that NI/NS and growth measures made possible by external financing, with the exception of OSFG, are positively correlated. The same signal of association is presenting between the variable LOG_TA and the measures of externally financed growth. This finding following Albring et al. (2013) and Kang et al. (2017), who was indicated that larger firms would be less dependent on external funds to finance its growth opportunities. Finally, the NS/NFA variable was not associated with any of the externally financed growth measures.

Table 3 presents the results to test influence of the quality accounting information - measured by QI - in the measures that capture the growth made possible by external financing (E_IFGR, E_SFGR and OSFG). The table shows that three models are significant and have reasonable explanatory power, by the analysis of Statistic F and R² of the respective regressions.

Table 3. Externally Financed Growth and Quality Accounting Information

| | | Coefficients | | |
|-----------------|-----------------|---------------------------|---------------|-------------|
| | | Dependent Variable | | |
| Variável | Expected | E_IFGR | E_SFGR | OSFG |
| QI | + | -0,03 | -0,24 | 0,20*** |
| DIV/TA | - | -0,62*** | -1,04*** | 0,41 *** |
| NI/NS | - | 0,01** | 0,01*** | -0,00*** |
| NS/NFA | - | 0,00 | -0,00 | 0,00* |
| Qtobin | + | 0,01 | 0,00 | 0,00** |
| LTD/TA | + | 0,04* | 0,03 | 0,01 |
| LOG_TA | - | 0,01** | 0,01** | -0,00* |
| Intercep | ? | 0,03 | -0,01 | 0,03*** |
| F-statistic | | 3,38*** | 5,70*** | 6,32*** |
| R ² | | 9,93% | 16,53% | 33,15% |

Notes. N = 214 observations.

Variables: E_IFGR is the growth rate that exceeds the maximum growth allowed by using only internal resources; E_SFGR is the growth rate that exceeds the maximum growth made possible by using internal resources and short-term debt; OSFG is the growth made possible only by short-term financing; QI is the quality accounting information, estimated by Equation (6); DIV/TA is the Total Dividends/Total Assets; NI/NS is the Earnings after interest and taxes/Net Sales; NS/NFA is the the Net Sales/Net Fixed Assets; LOG_TA is the Natural Log of Total Assets; Qtobin is the Tobin's Q defined as the sum of the Market Value of Equity plus Assets minus the Book Value of Equity deflated by Total Assets; LTD/TA is the Long-term Debt/Total Assets.

*, ** and *** significant at 10%, 5% e 1%, respectively.

Source: (Research data, 2020).

Table 3 reports that QI has a positive impact and only statistically significant on OSFG, suggesting that higher quality accounting information contributes to firm's access to financing channel by short-term debt. This finding supports the view that probability that a firm grows at a rate requiring external financing is greater for firms that signal higher quality accounting information, consistent with Albring et al. (2013) and Kang et al. (2017).

Externally Financed Growth and Quality Accounting Information

On the other hand, the other measures of externally financed growth - E_IFGR and E_SFGR - were not positively impacted by the quality accounting information. These findings suggest that growth financed by long-term debt and equity issuance, reflected in E_SFGR variable, does not seem to be affected by the quality of the information signals issued by the firms.

Moreover, the negative coefficient on QI in the model of the dependent variable E_SFGR suggests that firms with lower quality of their informational signals experience higher growth made possible by long-term debt financing and issuance of shares, although this assertion is limited by the non-significance of that coefficient. This effect seems to influence the relationship between QI and the variable E_IFGR, since this variable considers the growth financed by external sources indiscriminately, be it short- and long-term debt or share issuance; in this case, the negative relationship between QI and E_SFGR seems to prevail when considering growth financed by external sources indiscriminately.

Finally, Table 3 reports that control variables - DIV/TA, NI/NS, NS/NFA, QTOBIN, LTD/TA and LOG_TA - behaved in general according to evidence and discussion already reported in Table 2.

Based on these findings, overall, it does not reject the hypothesis that signaling of quality accounting information by firms in the Brazilian capital market positively influences their externally financed growth, which allows inferring that the quality accounting information is associated with firm's growth, specifically that growth made possible by external sources.

SOLUTIONS AND RECOMMENDATIONS

The findings confirm the quality accounting information as an attribute capable of influencing the growth of firms through their external financing channels. Firms with the highest quality of information are those that show the greatest growth. However, the relevant effect of information quality was captured only in the growth made possible by short-term financing.

Thus, reporting higher quality information seems to allow firms to access the short-term external financing channel and obtain growth. In this sense, it is recommended that firm managers take into consideration the determination of accounting policies that favor the production of useful and relevant information for their external capital providers, since they could obtain capital at a lower cost and, therefore, finance their growth opportunities.

On the other hand, the quality accounting information did not prove relevant in affecting the growth made possible by long-term financing. It is likely that the supplying of capital by Brazilian development institutions, without the proper pressure for quality information, will contribute to this fact, so that firms will access the long-term external financing channel without any concern in providing useful and relevant information. In this sense, Coelho (2007) argues about the high influence of state financing on the largest companies in Brazil, which would lead them not to satisfy the minimum informational demands of agents.

FUTURE RESEARCH DIRECTIONS

It is reported as the main limitation of the study the fact of considering only the measure proposed by Dechow and Dichev (2002) for quality accounting information. Thus, future research could adopt other proxies, such as earnings persistence, earnings management, in order to confirm the positive influence

of information report with attributes of informational quality on the growth made possible by external financing. Furthermore, other measures for growth made possible by external financing, beyond those proposed by Demircuc-Kunt and Maksimovic (1998, 2002)'s approach, would be utilized in future research.

Moreover, this research was only intended to analyze the effect of the quality of accounting information on the firms' external financing channel, a fact that leads to the suggestion of future research analyzing the effect also on the growth made possible by internal financing.

Another direction that can be taken refers to the expansion of this research to other emerging countries similar to Brazil, to confirm whether the captured effect also applies to them. Although the Brazilian institutional environment does not provide incentives for firms to provide higher quality information, consistent with Passos and Coelho (2019), this study aligns itself with studies (Carvalho & Kalatzis, 2018; Passos & Coelho, 2019) that have signaled attributes capable of creating incentives for managers to make such an offer. Therefore, environments similar to Brazil can provide more insights in this direction.

Finally, it was argued in this study that quality accounting information can affect firms' growth by reducing their cost of capital. This relationship, on the other hand, has not been directly tested, thus it is suggested that future researches examine the joint interaction of these attributes.

CONCLUSION

This study examines whether signaling of quality accounting information impact externally financed growth of sample firms listed in Brazil stock exchange. The research is based on the argument that signaling higher quality accounting information can help firms improve their access to the external financing channel by reducing the informational asymmetry among its agents.

The externally financed growth is estimated from the sales percentage approach to financial planning, according to Demircuc-Kunt and Maksimovic (1998, 2002), which measured three growth measures made possible by external financing, consistent with Albring *et al.* (2013) and Kang *et al.* (2017). Quality accounting information is estimated according to the model proposed by Dechow and Dichev (2002) modified by McNichols (2002).

The hypothesis that the signaling of quality accounting information by firms in the Brazilian capital market positively influences their externally financed growth was not rejected, since the findings show that quality accounting information affects firm's growth through the external financing channel, specifically through short-term debt financing. Thus, the findings allow to conclude that quality accounting information is relevant attribute to firms access to the financing channel external.

The research advances, both in the international literature and in the national literature, to provide evidence of the effect of quality accounting information on externally financed growth, considering a different quality measure of those considered by Albring *et al.* (2013) and Kang *et al.* (2017). In this sense, the authors' findings regarding the positive effect of quality information on firm growth are reinforced.

The study is relevant for capturing little documented effect in the Brazilian context, namely, the influence of quality accounting information on the growth of firms. In this sense, this research aims to provide evidence to make the issue clearer to the Brazilian context.

Also, the results contribute to the growing literature on corporate finance and growth at the international level, by providing evidence that complements the studies of Albring *et al.* (2013) and Kang, Lobo, and Wolfe (2017), signaling the effect of another measure of informational quality on externally financed growth. The former provide evidence that accounting restatements are associates with lower

firms' growth, while latter pointed out that accounting conservatism is associated with higher firms' growth, of which it is important to highlight that both attributes represent quality measures of accounting information. This research seeks, therefore, to complement those evidence, presenting evidence related to the positive impact on the growth of firms derived another quality measure relevant to agents, that is, the quality of the accruals reported by firm managers.

The research also contributes to a better understanding of the practical implications of reporting quality accounting information, since the evidence presented point to signaling efficient information by firms facilitates their access to short-term debt, which enables them to obtain capital at a lower cost and, therefore, to finance their growth opportunities.

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KEY TERMS AND DEFINITIONS

Accruals: Recognition of changes in assets (liabilities), resulting from revenues (expenses) received (paid) in a period other than the one in which they are effective (incurred).

Brazilian Stock Exchange: Brazilian Stock Exchange on which the shares of the companies are traded. Currently, the Brazilian Stock Exchange is called Brasil, Bolsa, Balcão (B3).

Contractual Model Firm: Theoretical model in which the firm is seen as a nexus of contracts.

Cost of External Financing: Return required by the firms’ external financing sources (debt and equity).

External Financing: Capital from external sources (debtholders and shareholders) the firms to finance their investment opportunities in addition to their internal resources (retained earnings).

Firms’ Investment Efficiency: Firms’ decision to take all and only projects with positive NPV under the scenario of no market frictions.

Informational Asymmetry: A situation where, in a given transaction, there are at least two parties, one of which has more information than the other.

Signaling Efficient: Emission of informational signals with required attributes of quality by the agents.

Chapter 18

Benford Law and Earnings Analysis: International Comparison

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ABSTRACT

The literature suggests that firms are actively managing the smoothing of their reported positive net incomes. The observed frequency of second digits abnormally exceeds the level predicted by Benford's Law, which results in a higher frequency of the number zero and an abnormally low occurrence of the number nine in the second digit of the reported income numbers. A reversal pattern occurs for reported net losses. This phenomenon is typically peculiar to countries with weak governance and firms under pressure to meet analysts' expectations. This chapter examines 10 years of reported net incomes by 5,040 firms (44,636 firm-years) in 10 countries ranked as having the best corporate governance quality. The analysis reveals that firms in these countries were not spared from opportunistically rounding their earning numbers. In fact, this rounding behavior is more prevalent when net losses were reported and this rounding phenomenon co-varied with some institutional factors; in particular, the rule of law and government effectiveness has significantly influenced the rounding behavior.

INTRODUCTION

The governance literature suggests that governance-related factors such as hard and soft regulations, internal controls over financial reporting, and audit quality have impact on earnings quality (de Lima, Góis, De Luca, & de Sousa, 2018; Houqe, Ahmed, & van Zijl, 2017; Doyle, Brown, Pott, & Wömpener,

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2014; Chan, Farrell, & Lee, 2008; Ge & McVays, 2007; Klein, 2002). Most of the earnings quality research either focuses on a single country (e.g., Rezaee, Zhang, Dou, & Gao, 2018; Katmon & AlFarooque, 2017; Brown, Pott, & Wömpener, 2014; Guan, Lin, & Fang, 2008) or on failing companies or countries with weak governance structure (e.g., Lewellyn & Bao, 2017; Latif, Latif, & Abdullah, 2017; Alali & Romero, 2013; Chan et al., 2008). This evidence suggests that poor earnings quality is expected in countries with weak governance and for firms experiencing a financial downturn. Conversely, it is assumed that the earnings' quality of companies in countries with good governance is expected to be high. However, there are limited comparative studies that focus on countries with a good governance structure to prove this general assumption. Thus, this chapter aims to address this gap.

Framed by a psychological theory of cognitive reference points (Rosch, 1975; Gabor & Granger, 1966; Carslaw, 1988;), this chapter uses Benford's Law (thereafter, BL) (Benford, 1938)'s digital analysis to examine the earnings quality of countries ranked in the top ten in terms of governance. The concept of cognitive reference points explains the tendency of humans to round an observed number to the nearest reference point (Lin et al., 2018; Jordan et al., 2017; Dang et al., 2017; Kinnunen & Koskela, 2003; Van Caneghem, 2002; Hill, 1995; Carslaw, 1988). People tend to assign the largest weight to the first digit, then to the second and so on. This psychological approach in assessing numbers may influence users of financial statements in their decision-making. For example, a loss of \$1,900,000 is perceived as much smaller than a loss of \$2,000,000, whereas a profit of \$2,000,000 is perceived as significantly more substantial than a profit of \$1,900,000. These cognitive reference points (Rosch, 1975) may tempt managers to round earning numbers upward for reporting a profit and downward for reporting a loss.

The rounding of earnings upward and downward is a worldwide phenomenon. Using BL on accounting data from 18 selected countries, Kinnunen and Koskela (2003) (hereafter, KK) refer to this rounding up phenomenon as cosmetic earnings management (CEM). Recent studies confirm KK assertions (Lin et al., 2018; Lacina, Lee, & Kim, 2018; Lewellyn & Bao, 2017; Stojavonic & Boroweicki, 2015) (hereafter, SB). In their study, KK only looked at the first and second digit positions of earning numbers. Other recent studies found evidence that besides than first and second digit also serves as a reference point (Lacina et al., 2018; Stojanovic & Boroweicki, 2015; Skousen, Guan, & Wetzel, 2004) but only KK and SB included multiple countries in their samples. No studies have yet explicitly examined the countries ranked as top ten in terms of governance on their earnings quality. The premise is that regardless of the governance quality, the emphasis on the reported earnings makes them susceptible to income manipulation. Therefore, this chapter examines the reported net incomes and net losses in countries ranked as the top ten for governance by the Legatum Prosperity Index™ 2016. Since they were rated highly in the prosperity index, it is expected that their oversight environment would limit such practices. Thus, by doing a comparative study, this chapter would be able to examine the variations in institutional settings that might influence such practices, which would otherwise be held constant in a single-country environment (Lewellyn & Bao, 2017; DeFond, 2010).

LITERATURE REVIEW, THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

Virtually all managerial activities have a potential effect on earnings, and in that sense constitute earnings management (PCAOB, 2000). According to DeChow and Skinner (2000, p. 248) understanding management's incentive is key to understanding the desire to engage in earnings management. Some

earnings management activities involve a legitimate discretionary choice of when to enter into transactions that require accounting recognition. For example, advertising expenses, which generally should be expensed when incurred, may be accelerated in a specific quarter if the entity is exceeding its earnings target or deferred if it is failing to meet that target. On the other hand, earnings management also involves measuring transactions in the wrong accounting period or recording fictitious transactions that constitute fraud. There is no consensus on which type of legitimate earnings management activities affects the quality of earnings. However, earnings management that constitutes fraud is distinctly different from earnings management that is perceived as reducing the quality of earnings. Within the earnings quality literature, research that links to fraud is relatively small (Brazel, Lucianetti and Schaefer, 2017; Yeh, Yao and Chen, 2015; DeFond, 2010). Fraud-related research is typically informed by the fraud triangle, pressures- opportunities - rationalization as the motivating factors behind the act of income manipulation (Albrecht, et al., 2019; Cressey, 1953).

The literature on earnings management and earnings quality discusses the effects of various factors that incentivize managers to engage in the opportunistic management of firms' earnings and the impact of such behavior on earnings quality. The theoretical literature identifies the *causes*, *effects*, and *results* of earnings management. For instance, the agency theory explains the existence of incentives (*causes*) for management to use earnings management (Jensen & Meckling, 1976). These incentives are not fixed and continue to evolve due to the separation of ownership and control, which will always provide managers with opportunities to give a misrepresentation of the earnings figure, either in positive or negative manners (*effects*), without the knowledge of shareholders. On the other hand, the prospect theory suggests that people are less likely to gamble on gains but more willing to bet on losses. The prospect theory postulates that corporate executives may develop a strategy and use earnings manipulation as a tool to manage income when facing gains or losses in capital markets (*results*). Likewise, the positive accounting theory predicts that self-interest drives all individual actions and the choices of accounting methods and their implications (Watts & Zimmerman, 1990). One of the main motivating factors frequently cited in the literature for earnings management is meeting capital market expectations (Chu, Dechow, Hui, & Wang, 2017; DeFond, 2010; Das & Zhang, 2003). Firms have the tendency to reach particular thresholds (Welker, Ye, & Zhang, 2017; Thomas, 1989) to maintain their reputations (Lin et al., 2018), improve valuation images (Lennox, Wang, & Wu, 2018; Alali & Romero, 2013), and meet contractual earning figures (Huang, Rowchowdhury, & Sletten, 2018; Alali & Romero, 2013). These studies provide evidence that companies enhance income numbers to suit their context.

From management's perspective, if a wrong signal sent to investors it could potentially harm the management's credibility and the share value in the stock market. Thus, what started as a seemingly innocent case of earnings management, over time, could lead to misleading financial statements (Albrecht et al., 2019). This can cause serious problems in the market and the economy because they often result in large losses for investors, litigation and lack of trust in the market (Albrecht, Albrecht, Albrecht, & Zimelman, 2019). For example, the crisis of confidence in the United States' capital market during the years 2000 to 2002, had caused a \$15 trillion decline in the market value of all public company stock (Albrecht et al., 2019, p.349). In fact, foreign investors might lose confidence in the integrity of the country's economy and move elsewhere. It is not only the country's economy that will suffer; the GDP would also be affected. This fraudulent behavior is magnified in times of economic uncertainties (Donegan & Gagon, 2008). Even in prosperous countries, organizations that experience an economic downturn that leads to financial strain may not have the ability to meet projected financial goals and financial analysts'

expectations. In enduring such pressures, a small window of opportunity is all that it takes to rationalize the actions of managing and smoothing reported earnings through income manipulation.

Having the privileged positions inside organization, the management tends to make the obvious choice of manipulating the incomes (or losses) (Lin et al., 2018; Mindak, Sen, & Stephan, 2016; Mahony, 2014; Cohen, Ding, & Lesage, 2010; Johnson, Ryan, & Tian 2009; Das & Zhang, 2003). On the face of it, this criminogenic behavior pattern could be rationalized as a one-time event. However, the behavior could become more prevalent in the future as pressure builds and operations repeatedly fail to produce the required results (Albrecht et al., 2016). Income manipulation using key numbers and cognitive reference points has been extended from psychological studies by Rosch (1975) and Gabor and Granger (1966). They found that humans use numbers that are factors of ten as yardsticks in their perception and judgment of other numbers. The theory postulates that when a person observes a number, he or she tends to round it up or down towards the nearest point in assessing its magnitude. As such, when one observes the numbers 3,987 or 4,012, there is a tendency to assess its magnitude as 4,000. In this regard, the person rounds it upward or downward to reach the nearest point, the cognitive reference point. From the accounting perspective, the first digit (most-left) figures of income numbers are enhanced to exceed the key reference point (Carslaw, 1988). According to Carslaw, if this phenomenon exists, there will be an abnormal distribution of the second-from-the-left digits of income numbers by producing an abnormally low occurrence of high digits in the second place of numbers and a compensating abnormally high frequency of lower digits in order that the number just exceeds the major reference point (Carslaw, 1988, p. 322).

Healy and Wahlen (1999) suggest that this rounding phenomenon in managing earning numbers can be assessed by examining the distribution of the reported earnings. Hill (1988) and other recent studies have shown that when people create numbers they do not conform to Benford's Law (hereafter, BL) of digit distribution (Kumar, Goyal, & Mitra, 2018; Mehta & Bhavani, 2017; Nigrini, 2012; Amiram, Bozanic, & Rouen, 2015; Durtschi, Hillison, & Pacini, 2004). Therefore, BL promises a better tool in detecting this activity. The assumptions are that, firstly, management does have the incentive to manipulate earning numbers and secondly, the effect on the digits of those numbers is predictable. That is, the management tends to choose upward manipulation when reporting profits if compared when reporting losses (Nigrini, 2015).

An earlier study of Carslaw (1988) on the earning numbers of New Zealand companies has amplified research using Benford's Law (hereafter, BL) as a tool to detect earnings manipulation globally. This includes research in the European countries (Stojavonic & Borowiecki, 2015), the U.S. (Thomas, 1989; Craig, 1992; Nigrini, 2005, 2015; Das & Zhang, 2003; Aerts, Van Campenhout, & Van Caneghem, 2008; Wilson, 2012; Alali & Romero, 2013; Jordan et al., 2017; Quick & Wolz, 2003), and the Asian countries, China (Dang et al., 2017), Japan (Mehta & Bhavani, 2017; Skousen et al., 2004; He & Guan, 2013), Korea (Lacina et al., 2018; Guo, 1995), Taiwan (Lin et al., 2018; Guan, Lin, & Fang, 2008) and India (Kumar et al., 2018). Similar results were also reported for not-for-profit organizations (Omer & Yetman, 2003; Jegers, 2013; Van Caneghem, 2016) and municipalities (Haynes, 2012). Kinnunen and Koskela (2003) found similar patterns in a cross-country study. Hence, previous studies support BL as a diagnostic tool that is useful in detecting some anomalies in financial statement data.

Benford (1938) postulated that the expected proportions or the occurrence of a number as the second digit (SD) could be approximated by the following equation:

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$$prob(SD) = \sum_{FD=1}^9 \left[\text{Log}_{10}(FD + SD + 1/10) - \text{Log}_{10}(FD + SD/10) \right] \quad (1)$$

Where:

SD = the second digit of a number (SD = 0, 1, 2, 3, ..., or 9); and

FD = the first digit of a number (FD = 1, 2, 3, ..., or 9).

Therefore, the expected proportion of a given number x as the first digit (FD) and the number y as the second digit (SD) can be estimated by using the same equation (1). The numbers in the third, fourth, fifth digits and so on can be similarly derived. Therefore, the following hypotheses have been developed:

Hypothesis One: There will be an abnormally higher than expected occurrence of zero digits and an abnormally lower than expected occurrence of nine digits in the second position for positive net incomes.

Hypothesis Two: There will be an abnormally lower than expected occurrence of zero digits and an abnormally higher than expected occurrence of nine digits in the second position for negative net incomes.

To perform a significance test of the observed deviations from the expected proportions, this chapter uses a normally distributed Z-statistic (Fleiss, 1981):

$$z = \frac{|p - p_0| - 1/2n}{\sqrt{p_0(1 - p_0)/n}} \quad (2)$$

Where p and p_0 are observed and expected proportions, respectively. The sample size is represented by n . The second term in the numerator is a correction term and would be applied only when it is smaller than $|p - p_0|$ (Thomas, 1989). These Z-statistics are significant at the 0.1, 0.05, and 0.01 levels if they exceed the critical values of 1.64, 1.96 and 2.57 respectively. Following Thomas (1989) and Skousen et al. (2004), the magnitudes of observed deviations from expected proportions are used for discussion and inter-sample comparison.

Several studies have found that institutional settings play an important role in influencing earnings management (e.g., Lewellyn & Bao, 2017; Niskanen & Keloharju, 2000; Leuz, Nanda, & Wysocki, 2003; Brown et al., 2014). Leuz et al. (2003) and de Lima et al. (2018) found that earnings management is more pervasive in economies with relatively high concentrated ownership, weak investor protection, and less developed stock markets. Niskanen and Keloharju (2000) provide evidence of CEM due to the taxation environment in Finland. They conclude that Finnish accounting law is very liberal and therefore creates many opportunities for firms to engage in earnings management. Braun and Rodriguez (2008) used Gray's (1988) accounting values to explain earnings management in a sample of 31 countries. Han, Kang, Salter, & Yoo (2010) found similar results in Asia-Pacific economies. According to Gray (1988), there is a preference for a cautious approach to measurement to cope with the uncertainty of future events as opposed to a more optimistic, laissez-faire, risk-taking approach. The higher a country ranks in terms of Hofstede's (1980) individualism and masculinity, the more likely it is to rank highly in terms of conservatism, a preference for confidentiality, and restriction of disclosure of information about the business only to those who are closely involved with its management and financing. The higher a country ranks in terms of uncertainty avoidance and power distance and the lower it ranks in terms of individualism and masculinity, the more likely it is to rank highly in terms of secrecy. According

to Gray (1988), five Nordic countries, (Denmark, Finland, the Netherlands, Norway, and Sweden) as well as two Anglo countries (Canada and New Zealand) have low levels of conservatism and secrecy compared to the relatively high levels of conservatism and secrecy in two Germanic countries (Germany and Switzerland). Thus, in line with these studies, this chapter expects that these accounting values to be associated with CEM tendencies in the sample countries.

In addition to country-level cultural influence, Paredes and Wheatley (2017) and Leuz et al. (2003) found a negative relationship between investor protection and earnings management. Nabar and Boonlert-U-Thai (2007) examined the relationship between Hofstede's (1980) cultural variables and Leuz et al.'s (2003) measures of earnings management, and they report a positive relationship between earnings discretion and the cultural variables of uncertainty avoidance and masculinity. In contrast, KK do not find significant relationships between CEM and the degree of shareholder protection or the alignment of financial and tax accounting, but they report that the power distance index has a significant positive correlation with CEM measures. Thus, in line with these studies, it is expected these institutional factors are associated with CEM tendencies in the sample countries. Following recent studies such as Economoto, Kimura, and Yamaguchi (2015), Lewellyn and Bao (2017) and Han et al., (2010), this chapter includes factors such as shareholder protection, national culture dimensions, accounting values, economic growth, control of corruption, government effectiveness, regulation quality, and the rule of law and political system maturity. Thus, this chapter hypothesizes that:

Hypothesis Three: The managerial tendency to round income numbers is associated with the countries' institutional factors.

To test the association between the degree of CEM and institutional factors across the sample countries, this chapter follows the CEM measures used by KK (2003, p. 52) for each country:

$$\begin{aligned}
 CEM1 &= \frac{f_{SDP0}^{Observed}}{n_p} - \text{Prob}(SDP0) \\
 CEM2 &= \frac{f_{SDP0}^{Observed}}{n_p} - \text{Prob}(SDP0) + \text{Prob}(SDP9) - \frac{f_{SDP9}^{Observed}}{n_p} \\
 CEM3 &= \frac{f_{SDP0}^{Observed}}{n_p} - \text{Prob}(SDP0) + \text{Prob}(SDP9) - \frac{f_{SDP9}^{Observed}}{n_p} \\
 &\quad + \frac{f_{SDN9}^{Observed}}{n_N} - \text{Prob}(SDP9) + \text{Prob}(SDP0) - \frac{f_{SDN0}^{Observed}}{n_N}
 \end{aligned} \tag{3}$$

Where:

$SDP0$ and $SDP9$ = second digits zero and nine, respectively, for positive net income numbers (net profits);

$SDN9$ and $SDN0$ = second digits nine and zero, respectively, for negative net income numbers (net losses);

np = the sample size of positive net income observations; and

nN = the sample size of negative net income observations.

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KK assert that these CEM measures indicate the breadth of CEM. They explain that CEM1 considers only the proportional (percentage unit) surplus of zeros as the second digit in positive net income numbers. CEM2 takes into account the deficit of nines in positive net income numbers. CEM3 considers negative net income numbers by adding to CEM2 the surplus of nines and the deficit of zeros as second digits of net losses.

RESEARCH METHOD

Benford's Law Distribution

BL distribution, posited by Benford (1938), shows that numbers consistently fell into a pattern with low digits, e.g., digit 1 and digit 2 occurring more frequently in the first position than larger digits, e.g., digit 8 and digit 9. Table 1 shows BL expected frequencies of the first and second digits. This anomaly was first documented by Newcomb (1881), but it was Hill (1995) who noted that BL, similar to the normal distribution, is an empirically observable phenomenon and applied it to accounting, stock market, and census data. Thomas (1989) asserts that almost all data are drawn from different distributions and, even when they are combined from different sources, they often conform to BL very well.

Table 1. The Expected Digit Frequencies of Benford's Law in the First and Second Digits

| Digit | First digit (%) | Second digit (%) |
|-------|-----------------|------------------|
| 0 | | 11.968 |
| 1 | 30.103 | 11.389 |
| 2 | 17.609 | 10.882 |
| 3 | 12.494 | 10.433 |
| 4 | 9.691 | 10.031 |
| 5 | 7.918 | 9.668 |
| 6 | 6.695 | 9.337 |
| 7 | 5.799 | 9.035 |
| 8 | 5.115 | 8.757 |
| 9 | 4.576 | 8.500 |

Digital analysis is useful as a detection tool because human-generated numbers usually do not match BL (Albrecht et al., 2019). For example, using BL digital analysis Johnson (2009) found that certain company characteristics are red flags for earning management. Healy and Wahlen (1999) suggest that the rounding phenomenon in managing earning numbers can be assessed by examining the distribution of the reported earnings. Hill (1988) and other recent studies have shown that when people create numbers they do not conform to Benford's Law (hereafter, BL) of digit distribution (Kumar, Goyal and Mitra, 2018; Mehta and Bhavani, 2017; Nigrini, 2012; Amiram, Bozanic, & Rouen, 2015; Durtschi, Hillison, & Pacini, 2004). The assumptions are that, firstly, management does have the incentive to manipulate

earning numbers and secondly, the effect on the digits of those numbers is predictable. That is the management tends to choose upward manipulation when reporting profits if compared when reporting losses (Nigrini, 2015).

Like previous studies, this chapter predicts a higher than expected occurrence of zero digits in the second position for positive net incomes in sample countries. This pattern is expected to reverse when net losses are reported (e.g Kumar et al., 2018; Lin, et al., 2018; Jordan et al., 2017; Stojanovic & Jan Boroweicki, 2015; Skousen et al., 2004; Kinnunen & Koskela, 2003; Van Caneghem, 2002; Thomas, 1989; Carslaw, 1988). As shown in Table 1, even in the absence of any intentional rounding of earnings behavior, it is expected for more zeros (11.97%) than nines (8.50%) as second digits of net income numbers. KK asserts that the application of BL makes the digit tests more conservative because the rejection of the null hypothesis of no CEM is less likely than under a uniform distribution of second digits. Thus, this chapter compares actual frequencies (in percentage) for the first and second digits with their expected occurrence as per BL (see Table 1 above) similar to prior studies (Lin, et al., 2018; Jordan, et al, 2017; Dang, et al., 2017, Stojanovic & Boroweicki, 2015; Kinnunen & Koskela, 2003; Thomas, 1989; Carslaw, 1988). However,-the results should be viewed with caution as BL estimates are only approximate, and nonconforming to BL might indicate operating inefficiencies rather than fraud (Etteridge & Srivasta, 1999).

Sample

The sample is the top ten countries in governance in 2016 as ranked by the Legatum Prosperity Index. The index has been developed by the Legatum Institute, an international think tank based in London and a registered U.K. charity. The index measures and tracks the performance of 149 countries of the world by evaluating long-term changes in prosperity and pinpoints the drivers of progress such as governance, business environment, economic quality, and social capital (Legatum, 2017b). In this chapter, the focus is on the governance aspect in which the sub-index measures a country's performance in three areas: effective governance, democracy and political participation, and the rule of law.

Data

The net income data were obtained from the Thomson Reuters database from 2007 to 2016. Following Skousen et al. (2004), all net income numbers were downloaded in the local currencies. For the empirical analysis, this chapter follows KK's and SB's approach of pooling that net income data across the sample countries, but it also examines the net income data – profit and losses – separately for each country. Their assumption is that the net income numbers have importance in all countries, and therefore are potential targets for cosmetic earnings. Table 2 shows the distribution of net income numbers: positive (net profit) and negative (net loss). The sample consists of 5,040 firms and 44,638 annual net income observations (19,835 positive and 24,803 negative net incomes).

Other country-level data included shareholder protection from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998); individual country's accounting cultural values – Professionalism vs. Statutory control, Uniformity vs. Flexibility, Conservatism vs. Optimism, and Secrecy vs. Transparency from Gray (1988) Hofstede's (1988) national culture dimensions of Power Distance and Masculinity; GDP per capita from the World Bank, and lastly the country level institutional indicators – control of corruption,

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Table 2. Descriptive Statistics by Country for 2007 – 2016

| Country | Rank | No of Firms | Net Income 2007-2016 | | | | | | | |
|-----------------|------|-------------|----------------------|------------|----------------|------------------|----------------|----------|----------|--------|
| | | | Mean | Median | Std. Deviation | Minimum | Maximum | Count | | |
| | | | | | | | | Positive | Negative | Total |
| Finland | 1 | 139 | 63,334,265 | 5,660,500 | 322,528,397 | (1,488,000,000) | 6,746,000,000 | 932 | 294 | 1,226 |
| New Zealand | 2 | 140 | 45,262,456 | 6,258,500 | 146,894,180 | (304,921,000) | 1,783,000,000 | 812 | 390 | 1,202 |
| Norway | 3 | 224 | 62,205,868 | 3,559,276 | 473,590,547 | (4,760,587,700) | 10,816,057,949 | 1,199 | 737 | 1,936 |
| The Netherlands | 4 | 119 | 361,444,527 | 15,152,035 | 1,726,690,107 | (7,755,982,630) | 24,019,342,500 | 766 | 308 | 1,074 |
| Sweden | 5 | 581 | 583,167,985 | 6,162,000 | 3,021,299,219 | (36,726,000,000) | 50,688,000,000 | 2,750 | 1,911 | 4,661 |
| Switzerland | 6 | 234 | 295,823,987 | 28,796,000 | 1,806,935,543 | (23,250,500,000) | 38,312,900,000 | 1,803 | 424 | 2,227 |
| Denmark | 7 | 137 | 550,554,075 | 23,109,860 | 2,738,983,478 | (13,400,028,600) | 37,925,000,000 | 948 | 378 | 1,326 |
| Luxembourg | 8 | 20 | 131,889,727 | 14,267,816 | 283,420,918 | (229,695,390) | 1,303,021,140 | 126 | 40 | 166 |
| Canada | 9 | 2681 | 32,774,652 | -592,655 | 384,176,172 | (10,723,014,000) | 10,458,000,000 | 5,718 | 18,203 | 23,921 |
| Germany | 10 | 765 | 110,073,010 | 1,699,370 | 675,340,463 | (6,772,000,000) | 11,068,000,000 | 4,781 | 2,118 | 6,899 |
| N | | 5,040 | | | | | | 19,835 | 24,803 | 44,638 |

government effectiveness, regulation quality, and rule of law, voice, and accountability from the World Governance Indicators produced by Kaufmann and Kraay (Worldwide Governance Indicators, 2017).

Data are checked to determine whether they, when ordered (ranked from smallest to largest), form a geometric sequence. The data need to form a geometric sequence or a number of geometric sequences for the digit patterns in order to conform to BL (Nigrini, 2011). Further, income numbers of less than 10 were excluded as they might not have an explicit second digit (Nigrini, 2011, p. 99) for the second digit tests to be performed. Previous studies have shown that due to different incentives, the rounding phenomenon is more prevalent in firms reporting positive net incomes (rounding upward) and a reversed pattern is exercised by firms reporting net losses (rounding downward). As such, analysis is performed separately for positive and negative incomes.

RESULTS

In this section, this chapter reports the results of Benford's digital analysis for the pooled sample as well as individual countries for the firms reporting profits and losses over the sample period of 2007 to 2016. An example of a sample country (Finland) for firms reporting profits is shown in Appendix A.

Positive Income Errors

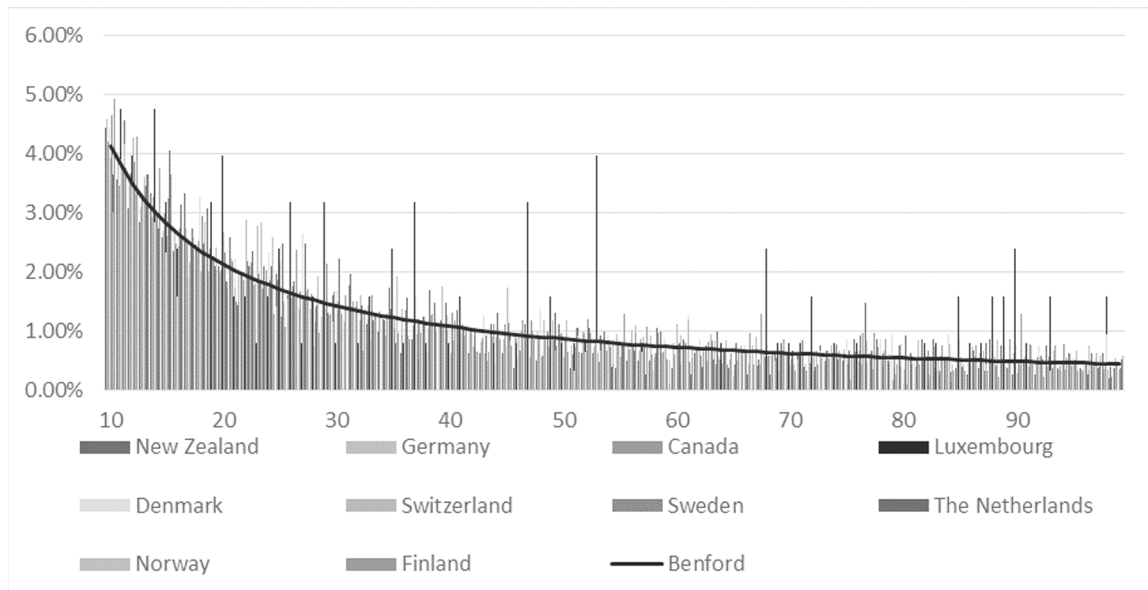
If firms engage in smoothing their positive net incomes, the actual frequency of zeros as the second digits should be abnormally higher than the level predicted by BL, with an abnormally low occurrence of the number nine. This means that the firms have the tendency to record, for example, 200,000 of profit instead of 199,999. Table 3 shows that for all the profit-reporting firms in the pooled sample, i.e., when net incomes are positive, more zeros (+0.20%) and fewer nines (-0.28%) were observed when compared to BL frequencies. This result supports hypothesis 1. For the firms reporting losses in the pooled sample, there were more observed zeros (+0.04%) and nines (+0.06%), thus hypothesis 2 is not supported. KK found reversed patterns in the frequencies of zeros and nines when earnings are negative.

Table 3. Percentage Unit Deviations of Second Digits in Positive and Negative Net Income Numbers (All Countries)

| Deviations of Actual from Expected Proportions from Benford Law for Positive (n=19,835) and Negative Net Incomes (n=24,803) | | | | | | | | | | |
|---|------|-------|------|-------|------|------|-------|-------|-------|-------|
| Second Digit | | | | | | | | | | |
| Net Incomes | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| <i>Positive</i> | 0.20 | 0.05 | 0.22 | -0.03 | 0.05 | 0.05 | -0.23 | 0.00 | -0.02 | -0.28 |
| <i>Z-statistic</i> | 0.87 | 0.19 | 1.01 | 0.13 | 0.21 | 0.21 | 1.10 | 0.00 | 0.11 | 1.41 |
| <i>Negative</i> | 0.04 | -0.27 | 0.11 | -0.06 | 0.23 | 0.28 | 0.05 | -0.30 | -0.15 | 0.06 |
| <i>Z-statistic</i> | 0.20 | 1.35 | 0.54 | 0.29 | 1.17 | 1.19 | 0.28 | 1.63 | 0.80 | 0.35 |

On the contrary, SB reported significantly fewer zeros and an excess of higher numbers. Overall, the digital analysis results for the pooled sample partially support KK’s suggestion that CEM is widespread among the developed countries. This chapter concurs that the neutralization effect due to the pooling of firm-level observation across the countries is possible. Therefore, this chapter also extends the analysis at an individual country level to better reflect micro and country-specific patterns. Ravallion (2001) and Lewellyn and Bao (2017) both asserted that an aggregate picture could be deceptive as it hides more than it reveals, which clouds country-specific patterns.

Figure 1. Positive Net Incomes First Two-Digit Numbers – Actual (bars) and Expected (line) from Benford’s Distribution



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Figure 2. Negative Net Incomes First Two Digit Two-Digit Numbers' Actual (bars) and Expected (line) from Benford's Distribution

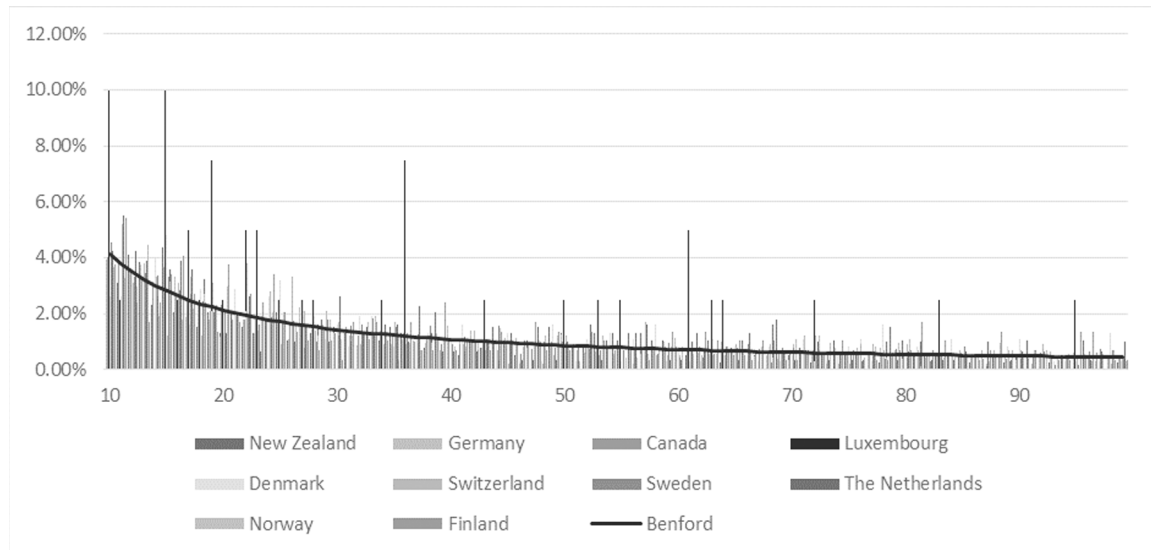


Figure 1 and Figure 2 show the trend of deviations of the first two digits two-digits of positive and negative net incomes of the pooled sample from Benford's distribution. The figures show that CEM is widespread and persistent among the firms reporting profits and losses in sample countries.

Table 4 shows that more zeros and fewer nines are observed in countries that are ranked higher in governance such as Finland, the Netherlands, and Sweden. Hence, being ranked among the top ten countries did not necessarily mean that the firms in these countries were not cosmetically managing their earnings (at least from 2007–2016). As shown in Table 4, the proportion of zeros (nines) in Finland, which was expected to be 11.97% (8.5%) of the sample, was actually 0.37% (-1.10%). Thus, more zeros and fewer nines support hypothesis 1, suggesting that firms reporting a profit in Finland may round up earnings when they are just below the reference points. Similar results were obtained for the Netherlands (+0.43%, -0.54%), Sweden (+0.83%, -0.14%), Denmark (+0.34%, -0.48%), and Germany (+0.79%, -0.57%). Canada, Germany, the Netherlands, Sweden, and Switzerland were also reported by KK as indicating CEM behavior, but only Switzerland's results were significant in their study.

KK also reported partial support for CEM in Denmark, Finland, and Norway. Similar findings were observed in this study for New Zealand, Switzerland, and Canada. Of these three countries, higher zeros were found in the second digit for firms reporting profits in New Zealand (+0.59%). Carslaw (1988) reported that deviations by New Zealand firms were +4.5% for zeros. The evidence on New Zealand firms implied that the level of CEM had improved for digit zeros. In the case of Luxembourg, the proportion of zeros was (-0.10), while a higher occurrence of nines was observed for the second digit (1.82%). Likewise, Norway showed an opposite pattern with lower zeros (-1.88%) and higher nines (+0.09%) respectively.

In this study, for individual countries, the results support hypothesis 1 for half of the countries. The hypothesis is partially supported in three countries (New Zealand, Switzerland, and Canada) and is not supported in two countries (Norway and Luxembourg). SB note that the indication of earnings management in positive earnings numbers was found for Eastern Europe and Nordic countries. KK also report

similar evidence for firms reporting profits in Switzerland. In the KK study, the percentage unit deviation for Canada and Germany was statistically significant for digit zero but not for digit nine.

Table 4. Deviations of Actual from Expected Proportions of Each Number as Second Digit in Positive Net Income Numbers (N=19,835)

| | Rank | Dig.0 | Dig.1 | Dig.2 | Dig.3 | Dig.4 | Dig.5 | Dig.6 | Dig.7 | Dig.8 | Dig.9 |
|-----------------|------|-----------------|-----------------|------------------|-----------------|-----------------|-----------------|-------------------|-----------------|------------------|-----------------|
| Finland | 1 | 0.37 (0.29) | -1.20 (1.06) | 0.28 (0.24) | 0.19 (0.13) | -0.59 (0.54) | -0.12 (0.06) | 1.61 (1.63) | 0.94 (0.94) | -0.39 (0.36) | -1.10 (1.14) |
| New Zealand | 2 | 0.59 (0.47) | 0.06 (0.00) | -1.28 (1.11) | 0.16 (0.10) | 0.81 (0.70) | -0.55 (0.47) | -1.83 (1.72) | 0.94 (0.87) | -0.38 (0.32) | 1.48 (1.44) |
| Norway | 3 | -1.88 (1.96) | 0.79 (0.81) | -1.29 (1.39) | 0.99 (1.08) | 0.89 (0.98) | -0.58 (0.63) | 0.00 (0.00) | -0.36 (0.39) | 1.33 (1.58) | 0.09 (0.06) |
| The Netherlands | 4 | 0.43 (0.31) | 0.10 (0.03) | -1.48 (1.26) | -0.12 (0.05) | -0.89 (0.76) | 1.56 (1.40) | 0.45 (0.37) | 0.23 (0.16) | 0.25 (0.18) | -0.54 (0.47) |
| Sweden | 5 | 0.83 (1.31) | 0.10 (0.14) | 0.72 (1.18) | -0.11 (0.15) | 0.08 (0.10) | -0.47 (0.80) | -0.14 (0.21) | -0.20 (0.33) | -0.68 (1.24) | -0.14 (0.22) |
| Switzerland | 6 | -0.38 (0.46) | 0.20 (0.23) | 1.71 (2.29)** | 0.66 (0.88) | -0.38 (0.50) | 0.32 (0.41) | 0.09 (0.09) | -0.11 (0.12) | -1.21 (1.78)* | -0.90 (1.33) |
| Denmark | 7 | 0.34 (0.27) | 0.52 (0.65) | -0.14 (0.09) | -0.38 (0.33) | 0.13 (0.08) | 0.43 (0.39) | -2.33 (2.31)** | 1.02 (1.04) | 0.80 (0.81) | -0.48 (0.48) |
| Luxembourg | 8 | -0.10 (0.03) | -1.08 (0.24) | -1.38 (0.35) | -0.08 (0.03) | -1.27 (0.33) | -0.18 (0.07) | 0.22 (0.09) | 1.32 (0.36) | 0.72 (0.13) | 1.82 (0.57) |
| Canada | 9 | -0.11 (0.24) | -0.13 (0.28) | 0.28 (0.65) | -0.15 (0.35) | 0.39 (0.97) | 0.37 (0.93) | -0.58 (1.47) | -0.29 (0.74) | 0.30 (0.78) | -0.09 (0.21) |
| Germany | 10 | 0.79 (1.66) | 0.14 (0.27) | 0.33 (0.71) | -0.33 (0.72) | -0.26 (0.58) | -0.17 (0.38) | 0.14 (0.30) | -0.02 (0.02) | -0.03 (0.06) | -0.57 (1.39) |

(Z-STAT are shown in parenthesis, *, **, ***: significant at the 10%, 5% and 1% level)

Overall, the results support Hypothesis 1. The indications of the rounding phenomenon and smoothing of incomes are pervasive and persistent despite their position in the top ten rankings, which makes them part of the smooth operators. Wilson (2012) cautioned that even though the deviations from expected frequencies are not direct evidence of earnings manipulation and irregularities, this does not necessarily mean that earning manipulations do not occur, as shown in the sample.

Negative Earning Errors

For the firms reporting losses, a higher frequency of number nines and an abnormally low occurrence of number zeros are expected in the second digit of negative net income numbers. This means that the firms have the tendency to record, for example, 199,999 instead of 200,000 loses. This chapter observes dissimilar patterns across countries for firms reporting losses in Table 5, i.e., firms in New Zealand and Sweden had fewer zeros (more nines) than expected, while firms in Denmark, Luxembourg, and Canada had a reverse pattern. Overall, this chapter finds partial support for the hypothesis in five other countries.

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In three of these countries, Finland, the Netherlands, and Germany, firms reporting losses had fewer zeros, while this chapter observes more nines for firms reporting losses in the other two countries (Norway and Switzerland). This hypothesis was supported in previous studies, such as in Japan (Mehta & Bhavani, 2017; Skousen et al., 2004), Taiwan (Lin et al., 2018), Korea (Lacina et al., 2018; Guo, 1995), India (Kumar et al., 2018) and the U.S. (Thomas, 1989). SB found systematic deviations of negative earnings numbers, especially in Western and Eastern European countries. In KK's results of individual countries, this hypothesis was supported in 12 out of 18 countries and partially supported in Canada, Sweden, Belgium, and France. In their study, Norway behaved in a reversed pattern when net incomes were negative, that is Norway's firms recorded more zeros than the nines when losses were made. This is consistent with SB's study that Denmark, Luxembourg, and Canada's results were in the opposite direction.

When reporting losses, the deviations from the BL proportions were persistently occurring from digit to digit in Finland, the country that is ranked at the top in terms of governance. This was so pronounced that there was no clear pattern as to which digits had been rounded up more frequently than expected than other digits. This means that the firms in Finland are not fixated onto certain digits when losses were reported. SB's study reported systematic deviations in Western and Eastern European countries.

Table 5. Percentage Unit Deviations of Each Number as Second Digits in Negative Net Income Numbers (N=24,803)

| | Rank | Dig.0 | Dig.1 | Dig.2 | Dig.3 | Dig.4 | Dig.5 | Dig.6 | Dig.7 | Dig.8 | Dig. 9 |
|-----------------|------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Finland | 1 | -8.75 (4.53)*** | -7.31 (3.85)*** | -7.34 (3.95)*** | -7.32 (4.01)*** | -6.60 (3.67)*** | -6.56 (3.71)*** | -6.12 (3.51)*** | -6.35 (3.70)*** | -6.40 (3.78)*** | -5.71 (3.41)*** |
| New Zealand | 2 | -1.20 (0.65) | -0.88 (0.46) | -1.39 (0.80) | 0.59 (0.30) | -0.03 (0.02) | 2.13 (1.34) | -0.36 (0.16) | -0.83 (0.48) | -1.83 (1.19) | 3.81 (2.61)*** |
| Norway | 3 | 0.92 (0.71) | -2.03 (1.67) | 0.24 (0.15) | 2.46 (2.12) | -0.40 (0.29) | -0.17 (0.09) | -2.01 (1.81) | -0.76 (0.65) | 0.47 (0.38) | 1.27 (1.17) |
| The Netherlands | 4 | -0.28 (0.06) | 0.30 (0.08) | 1.46 (0.73) | -2.64 (1.42) | -0.94 (0.45) | -0.58 (0.25) | 0.08 (0.05) | 2.65 (1.52) | 1.63 (0.91) | -1.68 (0.96) |
| Sweden | 5 | -0.35 (0.44) | -0.14 (0.15) | -0.31 (0.40) | 0.19 (0.23) | 0.49 (0.67) | 0.90 (1.30) | 0.19 (0.24) | -0.77 (1.13) | -0.38 (0.55) | 0.19 (0.25) |
| Switzerland | 6 | 1.00 (0.56) | 1.35 (0.80) | 2.33 (1.46) | -1.47 (0.91) | -0.60 (0.33) | -3.54 (2.38) | 0.33 (0.15) | 2.05 (1.39) | -2.39 (1.65) | 0.93 (0.60) |
| Denmark | 7 | 0.34 (0.27) | 0.52 (0.45) | -0.41 (0.09) | -0.38 (0.74) | 0.13 (0.94) | 0.43 (0.70) | -2.23 (2.31) | 1.02 (1.04) | 0.80 (0.81) | -0.48 (0.48) |
| Luxembourg | 8 | 3.00 (0.34) | -3.90 (0.53) | -0.90 (0.18) | 4.60 (0.69) | -5.00 (0.79) | 7.80 (1.40) | 0.70 (0.15) | -1.50 (0.06) | -3.80 (0.57) | -1.00 (0.23) |
| Canada | 9 | 0.19 (0.80) | -0.19 (0.81) | 0.18 (0.78) | -0.11 (0.48) | 0.17 (0.75) | 0.13 (0.57) | 0.07 (0.33) | -0.25 (1.14) | -0.18 (0.85) | -0.02 (0.07) |
| Germany | 10 | -0.54 (0.74) | -0.81 (1.14) | -0.59 (0.84) | 0.14 (0.18) | 0.64 (0.94) | 1.14 (1.74) | 0.44 (0.65) | -0.49 (0.75) | 0.26 (0.39) | -0.19 (0.28) |

(Z-STAT are shown in parenthesis, *, **, ***: significant at the 10%, 5% and 1% level)

This chapter also compares the results for the countries examined by KK, for firms reporting profits and firms reporting losses. It is acknowledged that the gap between the two studies and various reforms on regulatory and corporate governance have been taking place around the world, which might have impacted directly or indirectly on the findings in relation to KK's findings. If that is the case, the results

should show significant improvement or fewer smooth operators in earnings management. The most recent one is the revised Dutch Corporate Governance Code on the 1st of January 2017 for the Netherlands.

The findings suggest that in relation to firms reporting the second digit profits as zeros, there have been noticeable improvements in almost all countries such as Canada, Denmark, Germany, the Netherlands, and Switzerland, except for Norway and Sweden. The CEM is still evident. Jonnergård and Larsson-Olaison (2016) claimed that despite corporate governance reforms mirroring the Anglo-American template, some of the Swedish national features have stubbornly persisted. The results also showed that the firms that reported fewer nines in the KK study reported further improvements, such as Canada (-0.41% to -0.09%), Germany (-0.85% to -0.57%), the Netherlands (-0.84% to 0.54%), Sweden (-1% to -0.14%), and Switzerland (-1.72% to -0.90%). Like the KK study, the deviations of nines were, in the majority, not significant.

Table 6. Country to Country Comparison of Percentage Unit Deviations of Zeros and Nines as Second Digits in Positive and Negative Net Income Numbers

| Country | Positive Net Incomes | | | | Negative Net Incomes | | | |
|-----------------|----------------------|-------------------|-------------------|-----------------|----------------------|--------------------|-----------------|--------------------|
| | KK study | This study | KK study | This study | KK study | This study | KK study | This study |
| | Dig.0 | Dig.0 | Dig.9 | Dig.9 | Dig.0 | Dig.0 | Dig.9 | Dig.9 |
| Canada | 1.90*** (0.01) | -0.11 (0.81) | -0.41 (0.53) | -0.09 (0.83) | 0.86 (0.45) | 0.19 (0.43) | 1.34 (0.17) | -0.02 (0.94) |
| Denmark | 1.43 (0.17) | 0.34 (0.78) | 1.63* (0.07) | -0.48 (0.64) | -3.20 (0.29) | -2.11 (0.21) | 0.27 (0.92) | -1.09 (0.50) |
| Finland | 0.95 (0.46) | 0.37 (0.76) | 0.27 (0.81) | -1.10 (0.25) | -6.61 (0.13) | -8.76*** (0.00) | 0.43 (0.91) | -5.71*** (0.00) |
| Germany | 1.41*** (0.01) | 0.79** (0.10) | -0.85* (0.08) | -0.57 (1.39) | -0.67 (0.54) | -0.54 (0.46) | 1.46 (0.12) | -0.19 (0.28) |
| The Netherlands | 1.71* (0.08) | 0.43 (0.75) | -0.84 (0.32) | -0.54 (0.64) | -0.46 (0.88) | -0.29 (0.94) | -1.42 (0.59) | -1.68 (0.34) |
| Norway | -0.16 (0.89) | -1.88** (0.05) | -0.05 (0.96) | 0.09 (0.95) | 0.18 (0.94) | -4.04 (0.47) | -1.02 (0.59) | -2.49 (0.24) |
| Sweden | 0.35 (0.72) | 0.83 (0.18) | -1.00 (0.24) | -0.14 (0.82) | 0.64 (0.76) | -0.35 (0.44) | 0.63 (0.73) | 0.19 (0.25) |
| Switzerland | 3.16*** (0.00) | -0.38 (0.46) | -1.72** (0.05) | -0.90 (1.33) | -0.66 (0.83) | 1.00 (0.56) | 1.07 (0.68) | 0.93 (0.60) |

(p-values are reported in parenthesis *, **, ***: Significant at the 10%, 5% and 1% Level)

For the firms reporting losses, Table 6 shows only the firms in Denmark, Germany, and the Netherlands showed improvements with lower negative deviations of digit zeros. This means that there is not much different from the BL expected distribution (see Table 1 above). In terms of digit nine, lower positive deviations were reported by firms in Sweden and Switzerland. As compared to KK, this study reported slightly higher significant deviations for Finland for both digit zero and nine when net losses were reported. Earlier, KK also reported that three European countries indicated earnings manipulation when net losses were reported (Denmark, Germany, and Switzerland), but none of them were statistically significant. As such, in relation to hypothesis 2, it was supported slightly in just one-third of the sampled

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countries. Previous studies such as Thomas (1989) and Skousen et al. (2004) suggested that rounding is not limited to cases with nines in the second digits. Table 4 showed similar patterns in all sampled countries in that they did round their positive income numbers with other digits as well.

The Influence of Economic and Cultural Factors

In this section, this chapter reports the results of correlation analysis carried out on three CEM measures and country-level economic development, cultural dimensions, accounting culture values, and institutional factors. This chapter follows the KK approach to use Spearman correlation instead of the Pearson correlation in order to compare the results with their study on 18 countries. Table 7 shows that Gray's (1988) accounting culture values of optimism and transparency are negatively correlated with the CEM measures. The findings are consistent with Lewellyn and Bao (2017) in that the lower a country ranks in uncertainty avoidance and the higher it ranks in terms of individualism and masculinity, the more likely it is to be transparent and optimistic in terms of measuring and reporting profits, i.e., uses more nines instead of zeros.

Table 7. Spearman Correlation Coefficients

| Accounting and Cultural values, Economic and Institutional factors | CEM Measurements | | | | | |
|---|------------------|--------------------|-----------------|--------------------|------------------|--------------------|
| | CEM1 | Sig. (2-tailed) | CEM2 | Sig. (2-tailed) | CEM3 | Sig. (2-tailed) |
| Professionalism vs. Statutory control | 0.225 | 0.606 | 0.167 | 0.668 | 0.245 | 0.732 |
| Uniformity vs. Flexibility | -0.252 | 0.548 | -0.072 | 0.866 | -0.092 | 0.814 |
| Conservatism vs. Optimism | -0.667* | 0.187 | -0.667** | 0.050 | -0.383 | 0.310 |
| Secrecy vs. Transparency | -0.766* | 0.070 | -0.826** | 0.015 | -0.611* | 0.100 |
| Power Distance | -0.108 | 0.799 | -0.067 | 0.864 | -0.156 | 0.713 |
| Masculinity | -0.095 | 0.823 | 0.048 | 0.932 | 0.119 | 0.732 |
| Investor Protection | 0.240 | 0.568 | -0.252 | 0.548 | 0.156 | 0.713 |
| GDP per capita | -0.635* | 0.091 | -0.467 | 0.243 | -0.814*** | 0.014 |
| Governance Rank | 0.048 | 0.922 | 0.429 | 0.289 | 0.548 | 0.160 |
| Control of Corruption | 0.368 | 0.332 | 0.095 | 0.798 | -0.117 | 0.765 |
| Government Effectiveness | -0.238* | 0.092 | -0.262** | 0.060 | -0.548* | 0.100 |
| Rule of Law | -0.217** | 0.050 | -0.619** | 0.102 | -0.690** | 0.058 |
| Voice and Accountability | -0.476 | 0.233 | -0.381 | 0.352 | -0.429 | 0.289 |

*, **, *** significant at the 10%, 5% and 1% level

This chapter does not find any support for the expectation that the degree of CEM is associated with certain cultural dimensions of a country. However, this chapter finds evidence of a negative correlation between institutional factors such as the rule of law and government effectiveness and three CEM measures. Thus, overall the results are in line with KK, who suggest that the role of institutional settings and regulation reforms are a determinant of a firm's tendencies toward small upward rounding in reported

earning numbers. In Germany, Brown et al. (2014) found that the 1998 German legislation on control and transparency has negative effects on income smoothing and loss avoidance behavior.

SUMMARY AND CONCLUSION

This chapter examines 44,638 earnings observations from 5,040 firms in 10 countries to determine whether their reported net incomes indicate earnings manipulation through rounding behavior. Based on financial statements from 2007 to 2016, it was found that companies in the top ten ranked countries in governance were opportunistically rounding their reported earnings. This rounding behavior was more prevalent for reported losses than profits. This chapter also found that this rounding phenomenon is correlated with some institutional factors; in particular, the rule of law and government effectiveness, which had significantly correlated with such rounding behavior of the companies. Thus, good governance countries were also not spared from being smooth operators of their earning numbers. The accounting values of optimism and transparency were negatively correlated with cosmetic earnings measures.

The contribution of the study is threefold. Firstly, the findings would be of interest to standard setters and policymakers for scrutiny purposes. The implication of discretion in accounting principles might permit managers to indulge in rounding up the earnings numbers. Second, findings also show that the investors must be aware of the possibility that the earning numbers might not be as what they should be. They might have been manipulated prior to reporting, even from companies situated in a country known to have a good governance system. Finally, by using a theory that originated from the psychological literature and the use of a fraud detection technique on accounting data, the findings enrich the literature on earnings quality/management, which predominantly is accounting based.

As the actual digit distribution is not observable and unattainable for research purposes in the absence of managerial manipulation, this chapter acknowledges that it cannot prove with absolute certainty that deviations from the expected distribution as indicated were either deliberate or unintended manipulations. Since the analysis examines the first and second digits in reporting net incomes and losses, it is possible that management may have also used the third, fourth, and fifth digits. Future research may examine the distributions of these additional digits. Brenner and Brenner (1982) propose that consumers place progressively less emphasis on the second, third, and fourth digits, and so on. Future research may also examine other relevant institutional factors that explain management's tendency to manage earnings. Jordan et al. (2017) found that CEM continues in the post-SOX era for the quintile of the smallest public companies. The influence of entity size and aggressive earnings management needs to be explored further.

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KEY TERMS AND DEFINITIONS

Accounting: The systematic process of identifying, recording, measuring, classifying, summarizing, interpreting, and communicating financial information.

Benford's Law: Probability distribution of likelihood of a numeral appearing a numeral likelihood of appearing in a set of numbers.

Cognitive Reference Point: Managers round earning numbers upward and downward depending on whether they are reporting profit or losses.

Financial Forensic: An investigation of financial related information to gather evidence for a prosecution.

Fraud: An intentional act of deceiving the others for unlawful benefits and gains.

Governance: A monitoring and decision-making process by the members of the governing body.

Manipulation: The skillful art of convincing or using others into believing or influencing their actions.

Net Income: Measures excess revenues over total expenses.

APPENDIX A. DISTRIBUTION OF FIRST, SECOND AND FIRST TWO DIGITS FOR POSITIVE NET INCOMES – FINLAND.

| First Digit | Second Digit | | | | | | | | | | |
|-------------|-----------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|--------------|----------------|----------------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Total |
| 1 | 0.80 | -0.02 | 0.82 | 0.43 | 0.76 | 0.85 | -0.06 | -0.12 | 0.01 | -0.19 | 3.27 |
| | 4.14 | 3.78 | 3.48 | 3.22 | 3.00 | 2.80 | 2.63 | 2.48 | 2.35 | 2.23 | 30.10 |
| | <i>1.138</i> | <i>0.038</i> | <i>1.270</i> | <i>0.650</i> | <i>1.263</i> | <i>1.464</i> | <i>0.008</i> | <i>0.134</i> | <i>0.025</i> | <i>0.280</i> | <i>2.138**</i> |
| 2 | -0.40 | -0.52 | 0.22 | -0.13 | -0.49 | -0.63 | 0.72 | 0.14 | -0.56 | -0.18 | -1.84 |
| | 2.12 | 2.02 | 1.93 | 1.85 | 1.77 | 1.70 | 1.64 | 1.58 | 1.52 | 1.47 | 17.61 |
| | <i>0.739</i> | <i>1.008</i> | <i>0.359</i> | <i>0.177</i> | <i>0.999</i> | <i>1.361</i> | <i>1.606</i> | <i>0.205</i> | <i>1.258</i> | <i>0.332</i> | <i>1.429</i> |
| 3 | -0.14 | 0.12 | -0.05 | -0.01 | 0.03 | -0.26 | -0.33 | -0.19 | 0.16 | -0.03 | -0.69 |
| | 1.42 | 1.38 | 1.34 | 1.30 | 1.26 | 1.22 | 1.19 | 1.16 | 1.13 | 1.10 | 12.49 |
| | <i>0.213</i> | <i>0.182</i> | <i>0.130</i> | <i>0.024</i> | <i>0.078</i> | <i>0.567</i> | <i>0.782</i> | <i>0.396</i> | <i>0.306</i> | <i>0.078</i> | <i>0.589</i> |
| 4 | 0.11 | 0.03 | -0.38 | -0.35 | -0.12 | -0.20 | 0.25 | -0.06 | -0.04 | -0.13 | -0.89 |
| | 1.07 | 1.05 | 1.02 | 1.00 | 0.98 | 0.95 | 0.93 | 0.91 | 0.90 | 0.88 | 9.69 |
| | <i>0.161</i> | <i>0.079</i> | <i>0.985</i> | <i>0.924</i> | <i>0.199</i> | <i>0.470</i> | <i>0.611</i> | <i>0.007</i> | <i>0.120</i> | <i>0.238</i> | <i>0.866</i> |
| 5 | -0.22 | -0.20 | 0.14 | 0.05 | -0.37 | 0.51 | 0.20 | 0.32 | 0.22 | -0.62 | 0.02 |
| | 0.86 | 0.84 | 0.83 | 0.81 | 0.80 | 0.78 | 0.77 | 0.76 | 0.74 | 0.73 | 7.92 |
| | <i>0.538</i> | <i>0.487</i> | <i>0.286</i> | <i>0.158</i> | <i>1.078</i> | <i>1.564</i> | <i>0.501</i> | <i>0.931</i> | <i>0.603</i> | <i>2.041**</i> | <i>0.025</i> |
| 6 | -0.29 | -0.17 | -0.05 | -0.25 | -0.24 | -0.02 | 0.31 | 0.64 | 0.01 | 0.23 | 0.17 |
| | 0.72 | 0.71 | 0.69 | 0.68 | 0.67 | 0.66 | 0.65 | 0.64 | 0.63 | 0.62 | 6.69 |
| | <i>0.850</i> | <i>0.423</i> | <i>0.188</i> | <i>0.745</i> | <i>0.711</i> | <i>0.073</i> | <i>0.981</i> | <i>2.255**</i> | <i>0.038</i> | <i>0.697</i> | <i>0.145</i> |
| 7 | -0.29 | -0.29 | -0.17 | -0.05 | -0.05 | -0.04 | 0.40 | 0.41 | 0.31 | -0.12 | 0.10 |
| | 0.62 | 0.61 | 0.60 | 0.59 | 0.58 | 0.58 | 0.57 | 0.56 | 0.55 | 0.55 | 5.80 |
| | <i>0.938</i> | <i>0.911</i> | <i>0.460</i> | <i>0.003</i> | <i>0.186</i> | <i>0.156</i> | <i>1.399</i> | <i>1.438</i> | <i>1.035</i> | <i>0.263</i> | <i>0.064</i> |
| 8 | 0.00 | -0.10 | 0.01 | 0.23 | -0.19 | -0.19 | 0.25 | -0.17 | -0.28 | 0.37 | -0.07 |
| | 0.54 | 0.53 | 0.53 | 0.52 | 0.51 | 0.51 | 0.50 | 0.50 | 0.49 | 0.49 | 5.12 |
| | <i>0.013</i> | <i>0.210</i> | <i>0.042</i> | <i>0.753</i> | <i>0.591</i> | <i>0.569</i> | <i>0.844</i> | <i>0.525</i> | <i>0.972</i> | <i>1.404</i> | <i>0.026</i> |
| 9 | 0.81 | -0.05 | -0.25 | 0.29 | 0.08 | -0.13 | -0.13 | -0.02 | -0.23 | -0.44 | -0.07 |
| | 0.48 | 0.47 | 0.47 | 0.46 | 0.46 | 0.45 | 0.45 | 0.45 | 0.44 | 0.44 | 4.58 |
| | <i>3.331***</i> | <i>0.202</i> | <i>0.899</i> | <i>1.046</i> | <i>0.105</i> | <i>0.359</i> | <i>0.340</i> | <i>0.074</i> | <i>0.796</i> | <i>1.773*</i> | <i>0.023</i> |
| Total | 0.37 | -1.20 | 0.28 | 0.19 | -0.59 | -0.12 | 1.61 | 0.94 | -0.39 | -1.10 | 0.00 |
| | 11.97 | 11.39 | 10.88 | 10.43 | 10.03 | 9.67 | 9.34 | 9.04 | 8.76 | 8.50 | 100.00 |

The first number in each cell represents the deviation from expected proportions. The other two numbers report the expected proportions and Z-statistics (in italics). *, **, ***: significant at the 10%, 5% and 1% level, respectively (two-tailed test).

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