



Integrated Reporting

Evidence on corporate governance, earnings quality, agency cost, firm's performance, value relevance and multiple-based valuation models.

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June 2018

To my grandfather Athanasios

ACKNOWLEDGEMENTS

I would like to thank my supervisor Professor George Emmanuel Iatridis whose invaluable guidance helped me to successfully complete this Phd Thesis. His support and encouragement taught me to never give up.

Moreover, many thanks to Chris Magnis, my family and my friends for their continuous encouragement throughout this work.

And with special thank and acknowledgments to my fiancée Vaso...

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Table with Abbreviations	
Abbreviation	Text
A4S	Prince's Accounting for Sustainability Project
CDF	Cumulative Distribution Function
ESG	Environmental, Social and Governance
GAAP	Generally Accepted Accounting Principles
GRI	Global Reporting Initiative
ICAEW	Institute of Chartered Accountants in England and Wales
IIRC	International Integrated Reporting Council
IIRF	International Integrated Reporting Framework
IoD	Institute of Directors
IoDSA	Institute of Directors in Southern Africa
IPO	Initial Public Offering
IR	Integrated Reporting
IRC	Integrated Reporting Committee
IRRCi	Investor Responsibility Research Center Institute
LPM	Logit and Probit Models
MLE	Maximum Likelihood Estimation
SAC	Singapore Accountancy Commission
SEC	US Securities and Exchange Commission

Abstract

This thesis focuses on the field of Integrated Reporting (IR) to examine evidence on corporate governance, earnings quality, agency cost and firm market valuation. The primary objective is to investigate the level of accounting information provided by firms. First, I observe that IR disclosure quality is associated positively with corporate governance variables and conclude that a higher number of independent and non-executive board members on the nomination committee tend to display higher IR disclosure quality. Second, aligned with earning quality literature, I indicate that firms which present high IR quality information tend to adopt milder earnings management techniques. The [Jones \(1991\)](#) model is used to estimate the discretionary accruals in order to test earnings quality. Third, to measure agency cost, I create a variable by multiplying Tobin's Q ratio with weighted operating cash flows ([Lang et al., 1993](#); [Healy and Palepu, 2001](#)). I conclude that higher IR quality information decreases agency costs. Fourth, I identify the association between firm performance and IR disclosure quality. Fifth, I examine the way in which the quality of IR disclosure improves the value relevance of summary accounting information (i.e., the market value of equity). Finally, this study explores how the use of integrated analysis can create value, testing the behavior of a multiple-based valuation model (P/E). The sample is consisted of 82 international firms and examines the period from 2011 to 2015. I create an IR disclosure score index based on a checklist, with weighting being assigned to the respective chapters of the King III report and the King III code, and I interpret the IR disclosure quality by applying two different estimated indexes. I predict that firm performance, as measured using Tobin's Q index, is positively associated with IR disclosure quality. My findings suggest a change in value relevance with permanent characteristics, which supports the long-term goal of the International Integrated Reporting Council (IIRC). In essence, keeping other factors constant, high IR disclosure quality is linked with an increase in market valuation. Investigating the impact of IR on a multiple valuation model, I demonstrate that a high level of IR

disclosure information tends to prompt a higher valuation P/E index for firms compared to a lower level of IR disclosure quality. Moreover, I test the relation between a multiple-based valuation model and earnings management. The models test two different proxies that capture a range of earnings management activities (discretionary accruals and earnings smoothness), implying that firms with high earnings quality display high value. This study concludes that from the point when the IR Framework, 2013 was introduced, firms disclosed more than only financial information and began to outperform.

Keywords: Integrated Reporting, corporate governance, earnings quality, agency cost, value relevance, multiple-based valuation model, firms' performance, accounting disclosure quality.

JEL Classification: G32; G34; M40; M41; M42

1. Introduction

The goal of financial reporting is to provide an accurate portrait of the present and future performance of firms. However, the traditional financial reporting model sometimes fail to illustrate the economic implications of business innovations in a timely manner (Healy and Palepu, 2001). Parallel and financial reporting-independent sustainability reporting has been introduced to examine a different set of corporate impact effects. Many firms consider non-financial information something special. They report the minimum accounting information that the King III report and some shareholders demand. Many arguments favor companies; therefore, financial markets do not focus on Environmental, Social and Governance (ESG) investments and instead continue to manage their investments, regarding profits as the only target (Juravle and Lewis, 2008). The fact that ESG information is presented separately in sustainability reports has led to criticism that non-financial information is not considered with the same priority and relevance as financial information. Investors may be confused and fail to understand the benefits of the separate reporting frameworks. Until recently, financial and sustainability reporting had developed separately, leading many firms to attempt to explain their strategies for value creation and the disclosure level of their accounting information in two different languages, formats, and reports (Eccles and Krzus, 2010, pp.2-3). On August 2, 2010, The Prince's Accounting for Sustainability Project (A4S) and the Global Reporting Initiative (GRI) announced the formation of the IIRC (IIRC, 2011) and explored whether financial and sustainability reporting could be merged.

IR involves reporting both financial and non-financial ESG information in a single document. The goal is to improve annual reports and to supply more detailed financial information about current and future prospects (Anderson et al., 2004; De Villiers et al., 2017). According to the IIRC's framework, the primary objective of IR is to 'improve the quality of information available to providers of financial capital to enable more efficient and productive allocation of capital' (IIRC, 2013a, p. 2). Moreover, according to Bernardi and Stark (2015), IR develops and identifies with environmental

and sustainability reporting by capturing the interconnections between the financial and non-financial drivers of performance.

A large part of the literature has been dedicated to the implementation of IR, e.g., [Atkins et al. \(2015\)](#), [Atkins and Maroun \(2015\)](#), [Serafeim \(2015\)](#) and [Stent and Dowler \(2015\)](#). [Van Bommel \(2014\)](#) and [Flower \(2015\)](#) argue that the impact of IR may vary because of the different economic and social structures and perceptions. Nevertheless, [Barth et al. \(2015\)](#) and [Bernardi and Stark \(2015\)](#) report positive economic consequences associated with IR. [Eccles and Serafeim \(2011\)](#) and [Adams \(2015\)](#) argue that IR may enhance the quality of disclosures that relate to environmental protection. [Knauer and Serafeim \(2014\)](#) and [Serafeim \(2015\)](#) find that IR appeals positively to long-term investors. [Atkins and Maroun \(2015\)](#) show that institutional investors believe that annual reports with IR display higher accounting quality and status. [Barth et al. \(2015\)](#) report that IR exhibits a positive association with firm value. [Baboukardos and Rimmel \(2016\)](#) find that earnings variables increase after IR is adopted.

The preparation of an integrated report would be expected to direct managerial decisions to more long-term objectives than to short-sighted or self-defined financial targets. The motivation of this thesis lies behind questions such as the extent to which IR leads to lower levels of earnings manipulation or tax evasion or whether users of integrated reports, such as investors and financial analysts, modify their capital allocation decisions based on the value relevance and the quality of integrated reports (see [De Villiers et al., 2017](#)). Moreover, it attempts to verify the IIRC's statement that IR provides a clearer picture of the business's management, with the strategy of helping management control various risks and identify investment opportunities more clearly ([IIRC, 2015](#)).

A sample of 82 international firms is used, focusing on the period 2011-2015. Based on the respective chapters of the King III Report and King III Code ([IoD, 2009](#)) and the content elements in the IR Framework, 2013, a firm-specific integrated disclosure score

index is constructed that captures its degree of compliance with IR disclosures. Using a sample of international listed firms, it is first found that the use of corporate governance mechanisms is positively associated with IR disclosures. Various board characteristics are used such as independence, duality, and diversity ([Prado-Lorenzo and Garcia-Sanchez, 2010](#)) and tests the effect between corporate governance variables at the IR disclosure quality level. It is observed that the quality of accounting information increases. This finding challenges firms to include a high number of independent and non-executive board members on their board and nomination committees ([Donnelly and Mulcahy, 2008](#)). It is concluded that firms with a high number of independent directors and boards have high environmental performance ([De Villiers et al., 2011](#)).

Second, it is confirmed that firms with high IR quality are less likely to engage in aggressive earnings management. Discretionary accruals are used as a proxy for earnings management because they can be used as surrogates for earnings quality and earnings management (e.g., [Jones, 1991](#); [Subramanyam, 1996](#); [DeFond and Subramanyam, 1998](#); [Kothari et al., 2004](#)). Accruals are the best instrument for earnings management compared to cash earnings because accruals can be difficult to manage and cannot be easily manipulated ([Schipper, 1989](#); [Burilovich and Kattelus, 1997](#)). The results of this thesis are consistent with the findings of [Chevis et al. \(2007\)](#) and [Iatridis \(2011\)](#), who present a negative and significant association between discretionary accruals, profitability, operating cash flows, liquidity levels and the proportion of common shares owned by institutional shareholders.

Third, an additional analysis indicates that firms with high IR disclosure quality exhibit lower agency costs than those with low IR disclosure quality. The IIRC verifies that the short-term structure of the existing financial reporting framework does not help managers make long-term predictions and organize their decisions about future strategies ([KPMG, 2015](#)). After IR implementation, incidents in which management often omits structural data, particularly those related to ESG information ([KPMG,](#)

2015), are eliminated. It is proven that firms engage less in earnings management and exhibit high levels of leverage. Moreover, in firms with high IR disclosure quality and with low agency costs, it is found that the CEO is also the chairman of the board compared to firms with high agency costs and low IR disclosure quality, in which the CEO is a non-executive director. The findings of this thesis complement the analysis by Haniffa and Cooke (2002), who conclude that management decides what information should be disclosed. IR makes boards responsible for the disclosure level of accounting information (financial and non-financial) in annual reports; therefore, disclosure may be a function of the structure, characteristics and constituents of boards. This has an impact on the agency relationship, in which shareholders and investors require more information to be disclosed by management.

It is found that firm valuation is positively associated with IR disclosures. The first view advocates that if IR is beneficial to shareholders, then firm valuation should be positively related to IR. Supporters suggest that IR improves the quality level of accounting information that is available to providers of financial capital, creating a more efficient allocation of capital. IR leads to better engagement between investors and management, providing a better articulation of the linkages among the firm's performance and value creation, thereby depicting the mission and vision of IR, the firm's strategies and the corporate governance techniques. IR directs firms to provide information about their performance by establishing measurement and monitoring systems to provide information for decision making. Moreover, IR focuses on a firm's strategy, which identifies how it intends to maximize opportunities and mitigate or manage risks. When IR disclosure quality increases processing costs, information provided to investors is reduced; hence, this should improve the speed and the amount of firm-specific information being incorporated into asset prices (Healy and Palepu, 2001; Sims, 2006; Veldkamp, 2006; IIRC, 2015; De Villiers et al., 2017).

Conversely, the second view suggests that IR can be detrimental to shareholders. When firms decide to disclose proprietary information, it appears as disclosure costs, thereby

leading firms to disclose less ([Verrecchia 1983, 1990](#)). Based on this aspect, if IR provides incentives for firms to disclose proprietary information, then firm valuation will be negatively related to IR. Similar to the context of Lee and Yeo (2016), two factors can increase disclosure costs when firms apply IR. The first factor is related to the increase in proprietary information relevant to the firm's strategy, business model analysis, opportunities and risks. The second relates to the increase in direct compliance costs such as the use of extra monitoring procedures by management. This monitoring is achieved by recruiting a significant number of independent managers and directors and by establishing independent committees. To sum up, firms present a negative valuation when they adopt organizational processes that are costly and of little benefit to them in order to comply with IR.

This thesis focuses on the alignment between financial and non-financial information provided by firms and examines the level of accounting information provided by firms that enrich their annual reports with IR components. It examines how the level of IR disclosure quality improves the view of firm performance and the value relevance of summary accounting information (i.e., the book value of equity and earnings). IR disclosure quality is interpreted by applying two different estimated indexes, which are symbolized as DS and DDS. DS is an IR disclosure score index derived from the scale of the total received scores of each firm to the maximum score (28 observations based on the [KING III checklist](#)). DDS is a dummy index equal to 1 if a firm has received an IR disclosure score equal to or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. If IR can be used effectively to interpret the advantages of the King III report principles and to explain to investors how an organization creates value over time, it is expected that the positive association between value creation and IR disclosure quality (both in DS and DDS) will be stronger in smaller firms and with differentiation between the CEO and chairman. Consistent with the prediction of this thesis, it is found that firms with a high IR disclosure quality tend to display high market value per share. The findings of this thesis suggests that higher

market valuation appears in firms with high levels of leverage, profitability and liquidity. Stakeholders can better evaluate large firms with a high proportion of fixed assets to total assets in comparison with firms without these characteristics.

Finally, the thesis examines how integrated analysis can create value, testing the behavior of a multiple-based valuation model. Certain results are found that support IR and the theory of this thesis is that the level of IR disclosures based on the King III report principles and IIRC framework is a mediating variable in determining the effectiveness of IR in capital markets context. The results of this thesis also provide support for the idea that specific aspects of IR disclosures based on the King III report principles and IIRC framework are more important than others for certain sets of firms in understanding future performance. The P/E multiple is used as the dependent variable of this thesis. To test the robustness of the thesis analysis, it is changed P/E multiple with P/BV. Moreover, the relationship between a multiple-based valuation model and earnings management is tested. The models test two different proxies that capture a range of earnings management activities, such as the magnitude of total accruals, the smoothness of earnings relative to cash flows and the association between accounting accruals and operating cash flows, implying that firms with high earnings quality display high value.

The motivation for adopting IR stemming from the analysis of these results, is to simplify and integrate the information regarding the firm's business, in an effort to communicate in a complete and transparent way its capacity to create value in the present and the future. Therefore, the analysis confirms that a new era of reporting will be characterized by the adoption of IR, supported and accompanied by integrated thinking ([IIRC, 2015](#)).

The main motivation that emerges from this analysis corresponds to explain how IR implementation is linked and completes the basic accounting theories such as stakeholder theory, stewardship theory, resource dependence theory, and agency theory.

The motivation of this thesis is to highlight that the use of IR empowers and evolves stakeholder theory. Stakeholder theory is the basis for the fourth, fifth and sixth research hypotheses, in which the relation between the IR disclosure quality and firm market valuation is tested. Stakeholder theory is not restricted to explaining the accountability of the board to shareholders only, but also to other interested parts. Advocates of stakeholder theory argue that this theory colors the firm's portrait, providing both social and economic values and that consideration of ethics and morality, which is important for the estimation of a firm's value ([Freeman, 1983, p. 248](#)). The IIRC Framework states that stakeholders need to be informed about capital and non-capital investments, for example, expenditures for property, plant, and equipment, intellectual property, and people. Moreover, it explains to stakeholders how investments create a competitive advantage for the firms and organizations, to the elasticity of the business model. Finally, stakeholders should be provided with an analysis of the positive and negative impacts on financial capital (funds available through operations, debt or equity financing), manufactured capital (plant, property, equipment), intellectual capital (patents, copyrights, licenses), human capital (the organization's people-their capabilities, experience, drive to innovate), social capital (shared organizational values, relationships with customers, suppliers, communities), and natural capital (air, water, land) including significant effects on the capitals up and down the value chain ([IIRC, 2013a, Framework: 2.14 and 4.31](#); [Kruz, 2017](#)).

Moreover, all of the research hypotheses are based on and verify stewardship theory. IR is aligned with stewardship theory. According to stewardship theory, there is satisfaction for investors, as well as to other participants of the firm, stemming from the manager's goal of maximizing the firm's objectives ([Clarke, 2004](#)). Stewardship theory offers support to the idea that CEO duality contributes to timely decision-making, effective execution of plans and efficient monitoring, leading the firm to better performance ([Huang et al., 2012](#); [Arosa et al., 2013](#); [García-Ramos and García-Olalla, 2014](#); [Villanueva-Villar et al., 2016](#)). The findings of this thesis suggest that stronger

corporate governance mechanisms lead to higher performance. It is observed that firms in which the CEO is simultaneously chairman of the board of directors, present higher performance in comparison with firms in which the CEO and the chairman of the board are independent persons. Firms with a high proportion of independent and non-executive board members on nomination and audit committee tend to display higher IR disclosure quality (Zahra and Stanton 1988; Core et al., 1999; Haniffa et al., 2005; Huafang and Jianguo, 2007; Donnelly and Mulcahy 2008)

This thesis is aligned with resource dependence theory, where boards are considered to control inter-organizational dependencies and act as a strategic resource for securing critical resources for the firm (Pfeffer and Salancik, 1978). The first three research hypotheses highlighted the role of independent directors and non-executive board members as a linking mechanism between the firm and its environment that may support the managers in the achievement of the various goals of the organization (Johnson et al., 1996; Arosa et al., 2013; Villanueva-Villar et al., 2016).

All the research hypotheses are based on and verify agency theory. IR empowers and confirms the implication of agency theory, in terms of corporate governance, that outside directors should defend shareholders' interests through appropriate monitoring mechanisms that protect the shareholders from the self-interest of the management. In this way, having a large number of outside directors on the board could have a positive impact on performance through service monitoring (Fama and Jensen, 1983; Arosa et al., 2013).

A last motivation that emerges from this study corresponds to market requirements regarding the need for an increasing amount of information, that is not only financial but, more importantly, is able to communicate how the company can create value in the present and in the future; the objective of the IIRC is to integrate information and to represent the value created by the company enters the business logic and manifests itself both internally and externally through the publication of the IR document (IIRC, 2015).

The remaining sections of this thesis are as follows. In Section 2, a literature review is presented. It introduces the IR concept and reviews in two different sub chapters the evidence of IR in corporate governance, earnings quality and agency costs and evidence of IR in firm valuation. Section 3 presents the research hypotheses employed. Section 4 describes the design of the sample selection and develops the models. Section 5 discusses the empirical results, and section 6 checks the robustness of the thesis results. Finally, section 7 presents the conclusions and the contribution of this thesis.

2. Literature Review

2.1. Introduction

Financial Markets move on information and develop rapidly. The more forward-looking and detailed information organizations provide, the better markets operate ([Ernst and Young, 2014](#)). Although firms are producing more sustainability reports and corporate social responsibility reports, they do not provide financial information and non-financial information in an integrated manner that helps shareholders to become informed ([IIRC, 2011](#)). There is a need for organizations to explain their business models and define the way that they create value over the short, medium and long-term. Parallel and independent to financial reporting, a new framework focuses on non-financial information and data, creating motivation for long-term investments related to ESG and financial factors. Moreover, the fact that there is no standard format for IR shifts the responsibility to stakeholders to make more secure investment decisions and to determine and link sustainability and economic values using the internet ([Eccles and Saltzman, 2011](#)).

According to the King III report, IR exhibits “a holistic and integrated representation of the company’s performance in terms of both its finance and its sustainability” ([IRCSA, 2011](#)). The implementation of IR gives investors a clearer view of organizational strategy and has the power to instill confidence in long-term business model viability. IR clarifies a company’s management strategy, which enables management to control various risks and identify investment opportunities more clearly ([IIRC, 2015](#)). Firms using IR empower the value of their brand and reputation by providing information relevant to the working conditions of both employees and workers in their supply chain, to the relationships with the communities in which plants and other facilities are located and to the structure of compensation plans ([Krzus, 2011](#)).

The IIRC suggests that the short-term structure of the existing financial reporting framework does not help managers to make long-term predictions and organize their

decisions about future strategies. Management often omits structural data, particularly that related to ESG information (KPMG, 2011). The mission of the IIRC is “to create a globally accepted IR Framework, 2013 which brings together financial and ESG information in a clear, concise, consistent and comparable format”¹ to “help business to take more sustainable decisions and enable investors and other stakeholders to understand how an organization is really performing”². Both financial and non-financial data are included in a single document. This document demonstrates how effective sustainability reporting contributes to the positive financial performance of a firm and vice versa and identifies the conciliatory decisions that the firm should make to balance its financial and non-financial performance. Although all listed firms are required to provide an annual report on their financial performance, reports related to non-financial information are not obligatory in the majority of countries. When firms apply IR, they provide both financial and non-financial information (Ioannou and Serafeim, 2010).

IR does not place undue emphasis on short-term financial performance. This type of reporting allows management to supervise business on a day-to-day basis (Eccles and Krzus, 2010, p.252; IIRC,2013c; Potter and Soderstrom, 2014) and explains how the firm considers and integrates its strategies (Abeysekera, 2013).The IIRC notes that IR demonstrates the linkages between an organization’s strategy, governance and financial performance and the social, environmental and economic context within which it operates. IR addresses not only investors but also other stakeholders such as customers, suppliers and banks (Krzus, 2011).Its main purpose is not to help business make more sustainable decisions, but rather to encourage an alternative way of thinking about profit maximization and long-term corporate success. In addition, IR enables investors and

¹<http://www.theiirc.org/the-iirc/>,accessed December 2017

²<http://www.theiirc.org/about/>,accessed December 2017

other stakeholders to understand how an organization is actually performing ([IIRC, 2013c; Adams, 2015](#)).

IR is a new reporting framework that proposes the integration of financial and non-financial information in a single report ([De Villiers et al., 2017](#)). IR topic has generated under serious scrutiny lately and most discussions focused on the need to regulate this field. Its goal is to contribute to the improvement of reporting quality of accounting information for reporting firms. IIRC is the main governing body which manages the IR procedure and promotes its application ([Oprisor, 2015](#)).

IR is a concept that has been created to better articulate the broader range of measures that contribute to long-term value and the role organizations play in society. Central to this is the proposition that value is increasingly shaped by factors additional to financial performance, such as reliance on the environment, social reputation, human capital skills and others. This value creation concept is the backbone of integrated reporting and, is believed to be the direction for the future of corporate reporting. While integrated reports benefit a broad range of stakeholders, they're principally aimed at long-term investors. Integrated reporting starts from the position that any value created as a result of a sustainable strategy - regardless of whether it becomes a tangible or intangible asset - will translate, at least partially, into performance. Market value will therefore be impacted ([Ernst and Young, 2014](#)).

In this part, firstly the definition of IR, the purpose of IR and the incentives that IR generates are presented. A subsection is devoted to the business model and the new capital analysis. The financial and non-financial reporting principles and characteristics that IR is based on are demonstrated. Three theoretical perspectives of accounting theory are analyzed ; the agency theory, the stewardship theory and the stakeholder theory. Then, a review of the basic accounting pieces of this thesis is implemented. A literature review of the linkage between IR and corporate governance, earnings management, agency costs and firms valuation is examined.

2.2. Overview

IR is a concept that has been generated to better articulate the broader range of measures that contribute to long-term value and the role organizations and firms play in society ([Ernst and Young, 2014](#)). It is a "process that results in communication, most visibly a periodic "integrated report", about value creation over time. An integrated report is a concise communication about how an organization's strategy, governance, performance and prospects lead to the creation of value over the short, medium and long term."([IIRC, 2013a](#))

An integrated report has as a primary purpose to increase the quality of disclosure information to providers of financial capital. It achieves this using broader and more relevant accounting information that can assist in effective capital allocation decisions. IR recognizes investors as a part of this system. However, the current research into IR focuses on investors ([IIRC, 2015](#)). The integrated presentation of a firm's performance is achieved by providing financial and non financial information. IR focuses on firm performance, makes clear the way of the value relevant information fits into firm's operations, and orientates the firm in making more long-term investments ([IIRC, 2013a](#)).

Prior research has revealed that investors need information beyond purely financial data. The advantages to investors of using broader non financial information are numerous and have been examined in several studies that survey investor attitudes to such information. The advantages illustrated include (amongst others) an improved relationship between the firm and investor, a greater insight into an organization's business model, strategy and long-term outlook, as well as a greater understanding of the stocks and flows of capital ([IIRC, 2013a](#); [IIRC, 2015](#)).

Investors have also observed that using such information eliminates gaps and informs decision making. They also mark that the use of a mixed set of financial and non financial information leads to a better understanding of the drivers of the firm's

performance and value creation. The advantages recognized at the firm level could also help investors. For example, studies suggest that firms who use IR techniques outperform those that don't and also attract more long-term investors. (IIRC, 2015; Krzus, 2017).

The type of information that investors search for contains a general explanation of the business model, the way the firm generates cash, and creates value, a well-articulated strategy and anticipated future opportunities and vulnerabilities. Investors are using IR information in many ways, including to help manage investment risk, make expectation about industry dynamics and the regulatory environment, confirm an investment thesis and assess a firm's forward looking information (IIRC, 2015).

The goal of IR is to produce complete financial and sustainability reports. An IIRC framework has been published, but some questions remain about how it should be applied. Questions are made whether there is a need of a new report, or a need of one report (Eccles and Krzus, 2010). Moreover it is tried to answer the question if this report is useful for investors, and for other stakeholders (Flower, 2015).

2.3. Definition

However, there is not yet a common definition of IR. Three different definitions are provided in order to make this concept more understandable. The IIRC defines IR as follows:

“IR demonstrates the linkages between an organization's strategy, governance and financial performance and the social, environmental and economic context within which it operates. By reinforcing these connections, IR can help business to take more sustainable decisions and enable investors and other stakeholders to understand how an organization is really performing.” (IIRC, 2013b)

The next definition is stated in the draft framework on IR for listed companies in South Africa and is defined as follows:

“a holistic and integrated representation of the company’s performance in terms of both its finance and its sustainability .” ([IIRC, 2011](#))

Another definition of IR derives from GRI:

“An integrated report presents information about an organization’s financial performance with information about its ESG performance in an integrated way.” ([GRI, 2011a](#))

IR is in its first stages and is still under development in practice. Nevertheless, it can be used in all industries, in private and public firms and in all types of organizations and its application is intended to improve communication between companies and capital markets. By combining financial and non-financial information the firm’s strategy and performance is revealed and highlights the interdependencies of the information ([KPMG, 2011](#)) which can be a useful mechanism for companies ([Adams and Frost, 2008](#)).

2.4. The call for IR

Capitalism relies on the efficient allocation of capital to reward investors with returns over the short, medium and long turn periods. Firms have a basic goal to manage the financial capital provided by investors and also to create and maintain the value generated from other non-financial capital sources, such as people, trademarks/copyrights and natural resources. The 2007, financial crisis tested the western model of capitalism because of its high dependence on short term financial factors over other the long term. It highlighted the need for Corporate reporting to merge financial stability and non financial information, in order to increase the level of accounting disclosure quality. IR is required to create a concise report to underpin both of these problems that

appeared during the financial crisis by communicating to providers of financial capital the information that they need.

IR connects a wide range of factors and then determines the value of an organization or firm. There is some financial data which is easy to estimate in financial statements, such as property and cash, while many, such as intellectual capital, competition and energy security, are not. IR illustrates the broad and longer-term consequences of the organization or firms' decisions in order to create value. IR goals to create a framework in which an organization or a firm can communicate in a clear, and articulate way about the allocation of resources and relationships, in order to create short-, medium-, and long-term value, helping investors to allocate resources most efficiently (IIRC, 2013a).

IR aligns with a long-term strategy and provides basically medium and long-term metrics and targets. IR goals to interpret the milestones, targets, and KPIs (such as new products and services, new markets, customer satisfaction, cost management, and how well the assets operate in order to create value) which will be used to highlight whether goals and objectives have been achieved over the medium- and long-term (IIRC, 2013a, Framework:4.28). Moreover, IR emphasizes to inform investors with sector- and company-specific quantitative indicators in order to estimate correctly the firm's targets, to manage risks, and to leverage opportunities (IIRC, 2013a, Framework: 4.31). IR illustrates the importance level of the selected indicators, their implications, the methodology and the basic assumptions used in composing them (IIRC, 2013a, Framework:4.31). IR tries to interpret how changes in the external environment could influence metrics and targets and the achievement of medium- and long-term strategic objectives (IIRC, 2013a, Framework: 4.37). Also, IR illustrates how the improvement in the external environment could include the availability, quality, and affordability of resources that are used by the organization and firms. An example is that of the continued availability of skilled labor or natural resources (IIRC, 2013a, Framework:4.37). Finally, IR explains the evolution between past and current

performance and between current performance and the firm's medium- and long-term strategy (IIRC, 2013a, Framework: 4.31; Kruz, 2017).

2.5. The purpose of IR

The primary purpose of an integrated report is to explain to providers of financial capital how an organization/firm creates value over time (Atkins and Maroun, 2015; Stent and Dowler, 2015). As part of achieving this purpose, an integrated report should “provide insight into the nature and quality of the organization's relationships with its key stakeholders, including how and to what extent the organization understands, takes into account and responds to their legitimate needs and interest” (IIRC, 2013b, para 3.10). Nevertheless, the primary purpose of an integrated report is to explain to providers of financial capital how an organization creates value over time. An integrated report benefits all stakeholders interested in an organization's ability to create value over time, including employees, customers, suppliers, business partners, local communities, legislators, regulators and policy-makers. (IIRC, 2013b, p.4).

The IIRC Framework takes a principles-based approach. Its goal is to achieve an appropriate balance between flexibility and prescription that recognizes the wide variation in individual circumstances of different firms and organizations, while enabling a sufficient degree of comparability across firms and organizations to meet relevant information needs. It does not obligate to be used specific key performance indicators, measurement methods, or the disclosure of individual matters, but states a small number of requirements that are to be applied before an integrated report can be said to be in accordance with the Framework (IIRC, 2013b, p.4). It uses the Internet to provide more detailed results to all of their stakeholders to improve their level of dialogue and engagement with them (Eccles and Saltzman, 2011). An integrated report may be prepared in response to existing compliance requirements, and may be either an independent new report or be included as a distinguishable, prominent and accessible part of another report, mainly in an annual report. It should include a statement of the governance committee of each firm or organization that accepts the integration of the

report. This statement should be explained and comply with IIRC Framework ([IIRC, 2013b, p.4](#)).

This facilitates investors in making more secure investment decisions and to determine and link sustainability and economic value. It does not give undue emphasis to short-term financial performance. By aligning financial and non financial information, it gives the responsibility to management to supervise business on a day to day basis ([Eccles et al., 2014](#)). This proves how IR adds tremendous value to the company and all of its stakeholders, including shareholders, and also ultimately contributes to a sustainable society ([Eccles and Krzus, 2010, p.252](#); [IIRC, 2013](#); [Potter and Soderstrom, 2014](#)).

The IIRC statement mentions that the existing financial reporting framework focuses on the wrong things over the wrong time frame. Its short-term structure does not help managers to make long-term predictions and organize their decisions about future strategies. Management often omits structural data, especially that related to ESG information ([KPMG, 2010](#)). The IIRC Framework aims to achieve three goals. First IR should try to enhance accountability and stewardship for the broad base of capitals (financial, manufactured, intellectual, human, social and relationship, and natural) and to promote understanding of their interdependencies. Second IR aims to support integrated thinking, decision-making and actions that focus on the creation of value over the short, medium and long term. Finally, it targets the promotion of a more cohesive and efficient approach to corporate reporting, that draws on different reporting strands and communicates the full range of factors that materially affect the ability of an organization to create value over time ([IIRC, 2013b, p.4](#)). [Cheng et al. \(2014\)](#) to their research advocate all the above goals.

2.6. Advocacy and Critique

It is used the critical framework of [Alvesson and Deetz \(2000\)](#) that encounters insight, critique and transformative redefinition. This framework has been applied in the

accounting literature in order to criticize an interventionist research project (Dumay, 2010), and on interviews as a research method (Qu and Dumay, 2011). In this framework, the notion of ‘insight’ is introduced, which can be defined as the interpretive goals of local understanding closely connected to real situations (Alvesson and Deetz, 2000; Dumay, 2010).

The IIRC has widely presented its objectives and has analyzed the way the integrated report can provide an alternative to traditional financial reporting. Initially, embraced, the taken-for-granted concepts of IR have now highlight of sustainability accounting (Flower, 2015). However, the IIRC seems not to consider the interests of wealth criteria in the sustainability accounting. While most categories of capital are defined and clear, such as financial capital, which is the firm’s “pool of funds” (IIRC, 2013a, paragraph 2.17) and manufactured capital, which comprises material objects created by man, only a single reference is made to sustainability in the IIRC Framework. This reference is illustrated to a separate sustainability report and is not part of the integrated report (IIRC, 2013a, paragraph 1.13). It is more likely that this separate report would be kept up with the GRI’s Guidelines (Flower, 2015). This development seems unusual because the principal motivation of the bodies that created the IIRC (the GRI and Accounting for Sustainability (A4S)) was to improve the reporting of sustainability.

The main purpose of IR theory is to propose that an integrated report should indicate how value is created as estimated by the increase, less the decrease in the value of the six capitals (McCaffry and Topazio, 2015; IIRC, 2015). Flower (2015) argues that IIRC has abandoned sustainability accounting. He concludes that the IIRC’s concept of value is “value for investors” and not “value for society”. Specifically, his article gives possible alternative interpretations of the word “value”, which is the critical point of his analysis. The term “value to society” is related to the social and environmental accounting, the term “value to stakeholders” is related to stakeholder theory and the “value to present and future generations” is related to sustainability. Moreover, the term

“providers of financial capital in paragraph 1.7 of IIRC framework focuses on the term “value to investors”.

According to Flower (2015, p. 6), the main purpose of the integrated report is, in fact, to analyze the value creation procedure for the providers of financial capital. The IIRC Framework confirms that firms managers, who prepare the integrated reports interested in the benefits that arise from the six capital use (in the form of dividends and other return of capital), as it is referred in paragraph 2.4. of IIRC framework and specifically to “financial returns to the providers of financial capital”.

Moreover, Flower (2015) states that IR will not become the reporting norm because it lacks regulatory enforcement. The only situation in which the IIRC can convince international regulators to make IR compulsory and become the reporting norm. This is occurs with IFRS and GAAP. Further, Flower (2015) concludes that the IIRC places no obligation on firms to report harm inflicted on entities outside the firm (such as the environment) where there is no subsequent impact on the firm. He highlights the fact that the proposals of IIRC will make little contribution to corporate reporting practice, because of their lack of force.

During the time it is generated the need for improvements of financial reporting (Milne and Gray, 2013), and user always find the ways to obtain the information that they need (Jenkins, 1994). Flower (2015) criticizes the behavior of the accountants and of multination firms, which use the IR notion as a tool to control the agenda of wealth creation for investors. He argues that the IIRC has been the victim of “regulatory capture”. The IIRC council is constituted mostly of accountants. Dumay (2016) mentions that the call for changes to reporting background are to the benefit of the accountants rather than a genuine attempt to reform the shortcomings of financial reporting.

There is a growing body of experimental research on the application of IR that tackles the different aspects related to corporate governance, earnings management, agency cost

theory, firm's performance and valuation, which has inspired the present thesis. With regard to the research hypotheses of this thesis, prior research findings focus on the effects of integrating financial and non-financial information and on the effects of assuring non-financial information. It is supported that IR encouraging a long-term and sustainable orientation will benefit both firms and stakeholders. IR preparers promote integrated thinking as a practice, which helps investors to make better internal decisions with lower reputational and regulation risk, and greater corporate transparency. IR helps firms to develop financial stability and to contribute to a more sustainable society (Eccles and Krzus, 2010; Eccles and Saltzman, 2011; Krzus, 2011; Reimsbach et al., 2017).

Prior studies have concluded on a positive level of non-financial assurance on the perceived reliability of the respective information which is provided to investors (Brown- Liburd and Zamora, 2015; Hodge et al., 2009; Pflugrath et al., 2011). This effect, however, appears to be context-specific and more pronounced when non financial-related information quality is positive (Brown-Liburd and Zamora, 2015; Coram et al., 2009). As a result, such increased perceived reliability and credibility can even translate into higher stock price estimates (Coram et al., 2009). Empirical research on IR, however, is still very scarce. As shown in empirical research by Arnold et al., (2012), an anchoring bias influences the assessment of non-financial information that is provided in an integrated report may help to avoid distorted valuations, thus serving as a debiasing tool. Reimsbach et al., (2017) focuses on the processing of non-financial information, which is presented initially in separate parts of financial statements and then in integrated reports. Then, they add and estimate the influence of assuring this non-financial information to their analysis, emphasizing how these two important aspects of non-financial disclosure interact.

Ghosh and Wu (2012) and Alwert et al., (2009) conclude that both financial and non-financial information are used by analysts when make financial judgements. Other studies examine the impact of information derived from sustainability reports and

conclude that the qualitative and quantitative nature of the given information (Rikhardsson and Holm, 2008; Van der Laan Smith et al., 2010), the level of disclosure quality of information of each firm (Reimsbach and Hahn, 2015) and the type of media used to provide the information (Cho et al., 2009) can vary according to cross-national characteristics (Van der Laan Smith et al., 2010).

Based on Sztompka's (1999) theory on trust in social relationships, Chaidali and Jones (2017) investigate the sources of trust as cited by the IIRC and its partners, to enroll preparers into adopting IR adoption and how preparers reacted to the latter. Their analysis especially focuses on the interview preparers who create corporate reports, such as the integrated report. They observe that the preparers are often suspicious of the motives of the IIRC professionals and express concerns about the performance, structure and appearance of the integrated report. Preparers tend to believe that the composition of the IIRC Board impairs the credibility of the integrated report and negatively influences their trust in this initiative.

Furthermore, Chaidali and Jones (2017) conclude that the preparers are concerned about the credibility of a single report and seem uncertain of the benefits or the beneficiaries of IR. Finally, they state that preparers report problems arising from a lack of adequate and clear guidance, high preparation costs, the format, and the length of the report. As a result preparers believe these undermine the IR's credibility. Chaidali and Jones (2017) study supports the IR theory and contributes to the ongoing debate on the importance of trust in the marketing of new professional initiatives. It reveals that there shaping of the IR's principles was a result of the IIRC's endeavour to expand its accounting expertise territory within a fragile nexus of trust relationships.

As an answer to Chaidali and Jones (2017) research, Reimsbach et al., (2017) study the affect of voluntary disclosure quality of IR on acquisitions and measure by how the choice of reporting format interacts with the voluntary assurance of non-financial information. Using a sample of professional investors, they highlight the importance of

assurance in the the context of voluntary disclosure and the relevant interaction with the reporting format. They conclude that assurance of integrated information positively affects the professional investors' evaluation of a firm's performance. This improves the financial and non-financial information and leads to higher investment-related judgments. On the other hand, the assurance level is weakened in the the case of integrated reporting compared to separate reporting. Hence, they interpret this effect as a cognitive bias in decision-making when assured financial performance and non assured non-financial performance are presented in the same report.

The existence of IR provides strategic information, which is important in terms of acquiring competitive funding. This benefits the not-for-profit sector ([Adams and Simnett, 2011](#)). The lack of a globally accepted standard for measuring and reporting non-financial information and the variability of the relevance, applicability and adoption of IR across jurisdictions comes to deal with the IR advent ([Adams and Simnett, 2011](#); [Eccles and Saltzman, 2011](#); [Eccles and Serafeim, 2011](#)). Therefore, integrated reports are not always comparable, potentially reducing their usefulness to investment analysts. Nevertheless, [Eccles and Serafeim \(2011\)](#) argue that IR is urgently needed to address issues such as natural resource limitations and financial stability and encourage regulatory bodies to mandate IR.

2.7. Prior research classified by country

The need for the continuous publishing of reports to inform stakeholders has generated the advent of IR, in which both financial information and non-financial information are illustrated in one single report. An integrated report not only focuses on illustrating accounting information but also attempts to explain how the firm rethinks and integrates its strategies ([Abeysekera, 2013](#)). In 2000, GRI guidelines firstly introduced and linked with sustainability reporting. Its target is to create a widely accepted reporting system which includes economic, environmental and social information. GRI standard disclosures guide included major topics related to strategy and analysis, organizational

profile, report parameters (e.g. scope and content), governance, commitments and engagements, management approach and performance indicators. Also, GRI standard disclosures guide covered detailed disclosures on how and what economic, environmental and social data should be reported (GRI, 2011). Moreover, the International Corporate Governance Network, which is set up and financed by the world's largest investment funds, has provided non-financial information to investors. In 2014 it stated that "the Board should provide an integrated report that puts historical performance into context and portrays the risks, opportunities and prospects for the company in the future, helping shareholders understand a company's strategic objectives and its progress toward meeting them." (KPMG and Rerolle, 2015).

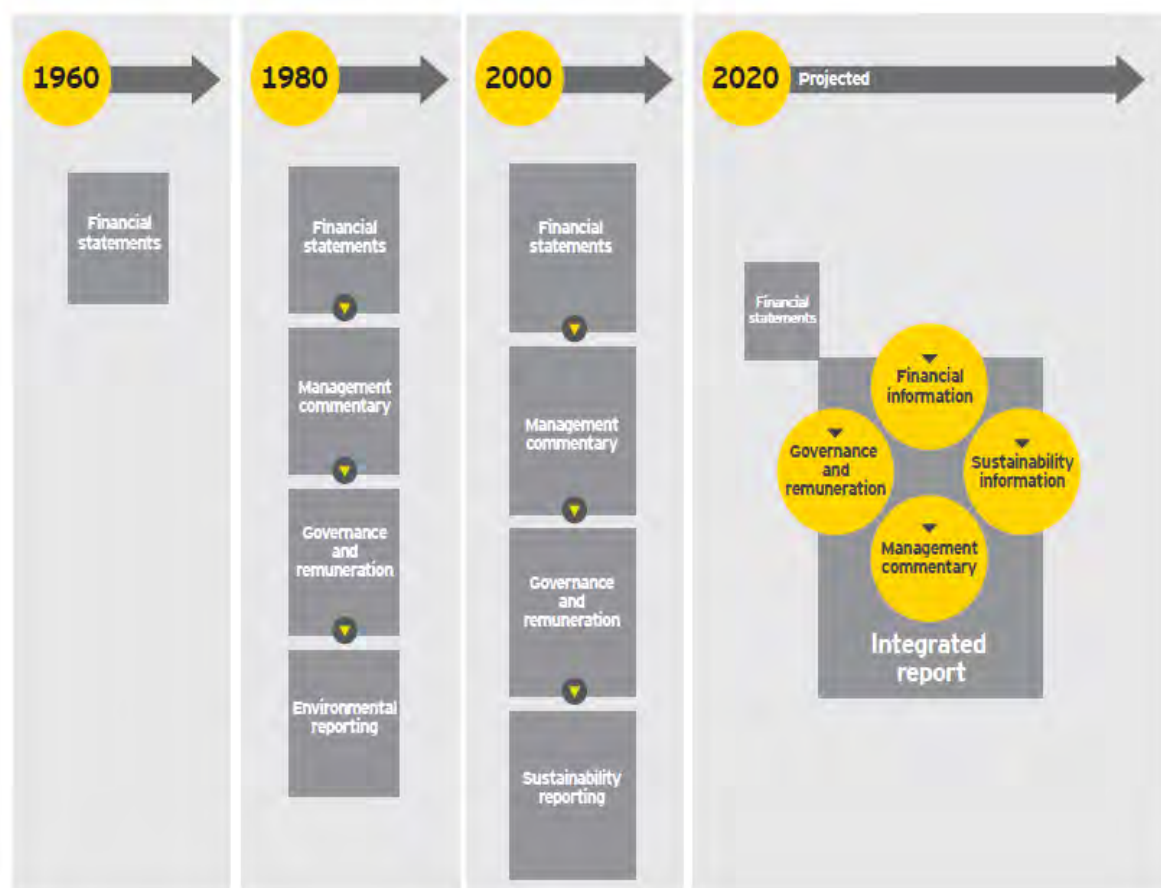
During 2010, new books and reports were released, analyzing the new integrated reporting framework. The most known and the first introduced was the e-book "Landscape of Integrated Reporting edited by Eccles R., Cheng B. and Saltzman D., in which ~~was~~ included articles that analyzed, discussed and set different perspectives on integrated reporting. It ~~was~~ developed the ways in which ESG information and financial performance could be aligned and how synergies could be created between them (Eccles et al., 2010). This book did not provide any empirical implementations. The book "One Report: Integrated Reporting for a Sustainable Strategy", edited by Eccles R. and Krzus M., focused on the emerging trend of integrated reporting as a top priority for companies, investors, regulators, auditors and civil society. It provided compelling case studies from some of the world's leading companies, applying IR and addressing how companies should move toward One Report and how it could become a keystone of a sustainable strategy for both the company and society. Finally Big 4 auditing firms such as KPMG and PwC created reports on integrated reporting, mentioning a number of arguments, challenges, implementation problems and opinions for improvement.

Since IR is a new notion that illustrates financial and non financial information in a single report, individual reporting organizations are not developed yet satisfactorily. Nevertheless, in some countries IR has been developed. South Africa is the first

pioneering nation which applies IR. In the next section, some key developments in some other countries such as the United Kingdom, Netherlands, France, Spain, Germany, Australia, Singapore, Japan and the USA will be analysed.

South Africa is the first country to make IR mandatory. Firms listed on the Johannesburg Stock Exchange are required to adopt IR principles based on the IIRC framework, which focuses on ESG issues and on King III report's principles. Listed firms should issue an integrated report or explain the reasons why they have not published such a report. Hence, the most listed firms choose to issue an integrated report.

Figure 1: Evolution of corporate reporting



Source: Adapted from IIRC, Towards Integrated Reporting: Communicating Value in the 21st Century, September 2011

In 2011, IIRC of South Africa published a discussion paper titled “The Framework for Integrated Reporting and the Integrate Report” ([IIRC, 2013b](#)). This paper investigated a sample of approximately 100 firms from different sectors and countries all over the world and published integrated reports from the financial year in 2010. These firms, considering the draft framework as a rule, created their own integrated report and provided feedback for revising the framework ([IIRC, 2011](#)). In 2014, IRCSA was endorsed the IIRC’s investor value creation highlighted IIRC Framework ([IIRC, 2015](#)).

The implementation of IR is not mandatory in all the other countries. Other countries such as the United Kingdom, the Netherlands, France, Spain, Germany, Australia, Singapore, Japan and the USA apply IR voluntarily. However, the compliance level with IR principles between the countries is different. Some countries conform more to sustainability reporting practices and regulations that define King III report and IIRC framework ([ACCA, 2016](#); [Eccles et al., 2010](#)).

The United Kingdom was one of the first countries that applied voluntary IR and can be regarded as one of the global leaders in corporate reporting ([KPMG, 2013](#)). Moreover, [PWC \(2013a\)](#) making a survey of the annual reports of FTSE 100 firms exhibits the opportunities which are generated by the demands of integration between strategic focus, accountability and reporting in light of recent developments in regulatory changes, that arise from the Sustainability Guidelines of GRI S4, King III report and IIRC framework. The results of the KPMG survey concluded that the majority of FTSE 100 firms have begun to address some of the fundamental issues of IR, but this is at broad level. For example, almost all of the firms analyze their aims, strategy, priority and progress and about 40% provide information about the actions taken to deliver on these strategies. Moreover, fewer firms disclose information about social and environmental impacts that may be provoked by each production procedure. More specifically, 31% of firms make predictions about how the future availability of

natural, material and manufactured resources can create value and the pollution of nature which may be created (PWC, 2013a).

However, there is a misunderstanding in the way that the critical elements of reporting are related to each other. Specifically, there is lack of available information about the business model and its relationship to other reporting areas, such as sustainability, risks and strategy, which was limited (PWC, 2013a). The Institute of Chartered Accountants of England and Wales presented IR as having “the potential to act as a catalyst for major improvements in business reporting” (ICAEW, 2013), adding that in the United Kingdom many firms are already illustrating the principles of IR into their existing reporting documents and mainly in their annual reports (ICAEW, 2013).

In the Netherlands, PWC's (2013c) survey of the top 50 listed non financial firms ~~and~~ researched their annual reports and found that their IR disclosure quality was low. They focused on specific categories. These categories relate to the main risks and opportunities, and the ways in which resources are allocated in order to implement their strategic goals and the definition and measurement of performance (PWC, 2013c). First, the results indicate that only 3% of the top 50 listed non financial firms include in their reports IR information about the the impact and probability of the identified risks. As a result these firms provide little insight into the dynamics of their risk profiles. Second, it concludes that while firms mention the level of importance of IR in their strategy (almost 90% of the firms disclose information about their strategic plans and 54 % of the survey sample analyse their strategic plans and document the ways how these strategic priorities were aligned to overall goals) the level of disclosure quality is low and is not clear about how resources are going to be allocated to implement the stated strategic plans. Finally, the PWC (2013c) survey concludes that the mixture of financial and non financial information in a concise report helps investors because the level of information provided is increased. It is observed that Dutch top 50 listed firms tend to avoid reporting in their reports the financial, environmental and social impact

and other important performance indicators, such as customer satisfaction with their strategic choices (PWC, 2013c).

PWC reviewed Spanish IBEX 35 firms to test the characteristics of IR. They focused on the IR content, quality and the level of integration. They investigated whether the economic profile of the Spanish IBEX 35 firms improved from the day of implementation to the next, updating their economic, environmental and social disclosure level of information (PWC, 2013b). The results of this study concluded that 80% of IBEX 35 firms disclose a satisfactory degree of information about the growth prospects of the markets in which they operated. Moreover, all of the IBEX 35 firms reported on key business risks. 94% of the firms gave information relating to the business model. Specifically, they provided references to key capabilities and the key resources they depended upon to give a competitive advantage. Finally, 11% of IBEX 35 firms appeared an integrated strategy and sustainability. Another study of PWC compared the reporting practices between IBEX 35 firms and UK FTSE 250 and FTSE 100 and concluded that IR practices of Spanish- and United Kingdom –listed firms were broadly similar (PWC, 2014).

In Australia, ACCA and Net Balance Foundation measured the level of public reporting of firms within the ASX 50, to investigate how these firms have conformed with IR practices (ACCA, 2012). The technique was applied based on six key categories that are contained in the integration agenda. Analytically, these categories are the mission and strategy, management approach, performance tracking, risk management, stakeholder engagement and the format of public reporting. The results of their survey found that some of ASX 50 firms made progress and disclose non financial information related to their strategy, management processes and public reporting. Moreover, these firms appear to have a relatively transparent and comprehensive approach to stakeholder management and used a variety of reporting formats (including CSR reports, integrated reports and annual reports) and a mixture of communication platforms, such as web sites and newsletters, in order to satisfy the various information

needs of stakeholders. However, most ASX 50 firms preferred not to disclose non-financial risks or to mention the financial implications of these risks. Their study found that, in Australia, there was low interest in non-financial matters among investors (except climate change risk). On the other hand, there was high interest in terms of environmental disclosure. Individual investors wanted extensive information about environmental disclosure, with many of them voicing the need for the introduction of mandating corporate environmental disclosures ([De Villiers and Van Staden, 2010](#)).

[Higgins et al. \(2014\)](#) surveyed Australian business organisations which voluntarily adopted IR from the first moment of IR implementation. They carried out an in depth analysis of the institutionalization of IR. They conducted interviews in 15 Australian firms that were first to adopt IR and concluded that the basic reason for the existence of 15 different integrated reports is because each firm involves different materiality judgements and has different implications for the manager's responsibilities.

The Singapore Accountancy Commission (SAC) was in favor of the Integrated Reporting Framework, arguing that IR would create a more stable, comprehensive and cohesive picture of firms with greater information transparency. The increase of information transparency and the balanced interests among stakeholders would create a beneficial way of providing information to stakeholders because it discloses financial and non financial information in a single report. The SAC the IR adoption with the development of Singapore's business environment, by attracting overseas investors (institutional investors in particular) ([SAC, 2016](#)). The SAC undertook several projects. In 2013, it undertook a project which had a goal to promoting integrated reporting in Singapore and the Southeast Asian region. This project presented IR as an educational document, the basic goal of which was to raise the awareness of stakeholders and firms about the advantages of IR. Moreover, it aimed to provide instructions about IR adoption and gave solutions about the merging of annual and integrated reports. It cited information about issues such as integrated reporting

assurance. At the end of 2014, the SAC published its own annual report based on the principles of the IIRC framework ([SAC, 2016](#)).

Japan has created a mixture of corporate governance and accounting practices over the years, which includes specific cultural and environmental factors ([Yamagami and Kokubu, 1991](#)). The Japanese corporate governance model emphasizes on stakeholders rather than shareholders ([Yonekura et al., 2012](#)). As a result stakeholders, and particularly employees, are an important part of the Japanese model and promote the firm's purpose for long term value creation ([Yonekura et al., 2012](#)). This proved after the Great East Japan Earthquake 2011 that forced firms to make social and environmental activities in order to bring the communities back to the previous normal situation ([Mizobata et al., 2014](#)). In July 2012, the Japan Ministry of the Economy, Trade and Industry set up a Corporate Reporting laboratory, whose basic role was to emphasize long-term investment and to create a frame in order to generate corporate value, and to encourage dialogue between organizations and shareholders. Some of the several research projects created by the laboratory were Task Force on IR, Corporate value a Working Group on Corporate Governance Dialogue and a Task Force on Corporate Awareness of Corporate Governance ([The Ministry of Economy Trade and Industry of Japan, 2013](#)). The transition from Corporate reporting to IR was analysed in the research paper titled *Expert Committee on Desirable Market Economy System*, which was developed by the Council on Economic and Fiscal Policy of Japan. The Committee tried to highlight the shape of a market economy system under which sustainable growth with an environmental footprint can be implemented, not with a short-term horizon but with medium and long term horizons ([Expert Committee on Desirable Market Economy System, 2013, p. 1](#)). On the first page of the expert committee report it states that the aim of IR is to diversify information in a single report in order to help investors to analyze and evaluate firms. Such information contains environmental activities, relationships with local communities, long-term business plans and financial information. IR describes in an effective way the entire firm's

activities and strategies. If investors understand the value created by the firm, as a result of IR implementation, they can contribute to the medium- and long-term growth of a firm ([Expert Committee on Desirable Market Economy System, 2013, p. 17](#)). In 2013 another survey in Japan carried out by the Japan Investor Relations Association, found that a significant number of Japanese firms have already created an integrated report or are planning to create an integrated report ([JSIF, 2013](#)).

In Germany, in 2016, PWC carried out a study titled “Integrated reporting in Germany: The DAX 30 Benchmark Survey 2015”. It was a survey of firms reporting in terms of the IIRC framework. The results of this analysis showed a decrease of the pace with which DAX 30 firms were adopting IR, as compared to the first years of implantationsp of IR. This analysis pointed out that the implementation of the IIRC framework, by the DAX 30 firms, was at a “tipping point” and observed that firms had difficulties in finding out what information should appear, in order to improve their reporting and hence to pass this tipping point. However, there were some firms which made substantial efforts to conform to IIRC principles and integrated thinking. These firms tried to show how non-financial topics had directly affected their strategy, the management of their firm and their performance and value creation. In 2014 a mandatory German Accounting Standard 20 (GAS 20) was introduced and boosted the non financial reporting in the German market. Significant efforts and progress were made bythe DAX 30 firms with regard to the appearance of non-financial information, to report on key performance indicators, risks, strategies, and forecasts. This led to an overall of up to 10%, in 2014, compared to the reporting period in 2013. However, in 2015 the reporting level of non-financial information of DAX 30 firms remained constant at the levels of 2014, presenting a slightly positive shift in the range of 1%. ([PWC, 2015](#))

Moreover, [PWC \(2015\)](#) found several new trends which embody IIRC elements in the DAX 30 firm’s reports. First, they did not notice or noticed merely marginal developments relevant to the content elements “organizational overview and external

environment”, “governance” and “outlook”. While individual components were subject to variations, these balanced each other out to yield little change overall. Second it observed a positive attitude to the content elements of “business model”, “risk and opportunities” and “strategy and recourse allocation”. The developments in reporting on risk and opportunities were a result of the compliance efforts regarding GAS 20. DAX 30 firms observed a slightly increased quality in reporting on business model and strategy, which suggested continued trials on the part of individual firms with the IR agenda. Finally, it concluded that there was a slight decrease in the firm’s performance. This was proved because slightly fewer reports were classified as effective “communication” as compared to 2014 (PWC, 2015). The general message that concluded the PWC (2015) survey was that the current flattering trend in the quality of reporting developments in corporate reporting, may only be implemented if IR does not focus basically on the “report” as such, but goes beyond “reporting”. Firms, should start thinking about what is proper to create value. Reporting will then follow the value creation narrative of the firm (PWC, 2015).

In 2012, France adopted the Grenelle II Act, which requires the reporting of ESG issues by all firms (IIRC, 2013b). An article was written by Jean-Florent Rerolle, a Partner of KPMG, in 2015, which illustrates the situation of IR in France. It mentioned that the majority of French firms had known about IR and were at least considering what it could mean for them over the next few years (KPMG, 2015). However, France is still lagging behind with only few IR reports in 2015. Only three firms prepared their reports (Engie, Vivendi and Eurazeo) according to IR principles. These three reports were diversified reflecting the range of possible approaches to IR French firms have the goal of attracting foreign investors and especially Anglo-Saxon funds. They should consider aligning their share price with their intrinsic value, depending on their ability to inform shareholders about their financial position, short-, medium-, and long-term value creation strategy.

French firms make three basic mistakes. The first is related to the basic objective of IR. The title of the original IIRC Framework in France was “Communicating value in the 21st century”. Investors found the word “value” ambiguous and misleading. Some ideologists see IR as a way to denounce “shareholder value”, which they illustrate different to the “true” value supposed to be distributed to the firm’s investors. This generates two sides. On one side the good shareholders concern with a long-term value creation strategy, and on the other hand, the other side, the greedy shareholders, who look for short-term profits ([IIRC, 2015a](#)).

Actually, if it is focused on real facts, it is considered that this is a highly prejudiced aspect. Contrary to the financial literature, the share price represents the long term firm value. Traders focus on short-term goals and strategies which affect daily share prices. They collect information based on timeliness and try to predict how the market can react on a short-term basis. When share prices deviate from the fundamental value of the firm, long-term investors show up. They invest less than traders but when they decide to build a position after a careful due diligence review, they earn 7 to 30 times more than traders in a period of 10 to 15 days. Thus, the profile of these investors is based on long-term expectations ([IIRC, 2015a](#); [KPMG, 2015](#)).

The second mistake considers IR as the result of merging the sustainability report and the annual report. Sustainability reporting using CSR function during the time tried to be cited in a chapter of an annual report. The trial to create a merged document, based on the idea that the “true” value is not shareholder value and extra non-financial characteristics, should be developed and applied. This approach reflects a misunderstanding of the mechanisms of value creation. Long-term financial value is consists of a complex mix of tangible and intangible resources, which are created by the firm in order to properly allocate its strategies and goals. For example, the goal is not to estimate and apply the classical CSR indicators, which for the most part have no real relationship with shareholder value, but to identify soft information representative of financial value creation, alongside hard information ([KPMG, 2015](#)).

The final mistake is based on the belief that a standardized approach should be put into place. It is true that value creation derives from the firm's transient competitive advantages, which are by definition unique. This uniqueness can be standardized, based on an assurance given by an independent auditor. The IIRC framework and King III report is an inspiration for firms. These three mistakes should be clarified by French firms, in order to give way to a more positive and realistic view of the integrated report. Firms must consider that IR is a new accounting method, which is intended primarily for investors and meets an essential need in terms of financial market information. They must understand that this is a matter of investor's relations, not sustainable development. The objective is to create and promote a more rigorous "equity story" (KPMG, 2015).

In France, IR can operate with success. First, the French financial community has considered that IR favors the alignment of the fundamental value and the share price. The results of French studies shows that IR adoption by French firms has changed their shareholders' ecology, creating a growing number of long-term investors and replacing short-term investors. This gives greater influence to the fundamental component of the share price. This is not related to the reduction of its short-term volatility, but in the medium and long term, the likelihood of a gap between fundamental value and the share price reduces. Moreover, IR reduces the information asymmetry when the weight of "soft information" is increased relative to that of the "hard information" (the latter explains only 10% of the price changes after the announcement of results). This results in a more reliable and concise analyst's forecasts. However, between soft information and hard information a balance should exist in order to give credibility to the IR process. When managers decide to replace hard information by soft information this can create a reaction of distrust in a financial community. This is occurs because the financial community ensures that the firm regularly meets its anticipated milestones. (IIRC, 2015a).

French firms have benefited from IR implementation. The results of the KPMG survey, in 2015, show that integrated thinking is not trivial and can change firms' culture by building bridges between the firms, identifying the relationship between non-financial performance and shareholder value and instilling the perspective of the investor in key decisions of the firm. To sum up, IR using integrated thinking improves the process of strategic thinking and helps better capital allocation. Moreover, the cultural change gives a positive impact on shareholder value, and if it is interpreted by the markets, it will be highly integrated into the expectations of investors. This is not such a simple approach. First, it requires the existence of a clear plan of how the firm can create value on a short-, medium and long-term horizon, identifying the basic parameters to measure the execution progress, and setting up an organization and tools to integrate shareholder perspective in basic capital allocation decisions and risk management ([KPMG, 2015](#)).

In the USA, sustainability reporting has been a much less widely developed practice than in Europe, South Africa or Australia. The US Environmental Protection Agency³ published an extra report to analyze value drivers in firms related to ESG capital. This report is published supplementary to annual reports ([IEC, 2008](#)). The basic goal was to present to stakeholders information related to environmental and social practices. In these reports not only the positive contribution of ESG practices are presented, such as job creation, community development and cures for diseases. It also includes ~~and~~ negative practices, such as the level of pollution of the environment, natural resource depletion and human rights abuses ([IRRC, 2013](#)). From the beginning of 1970s, the US Securities and Exchange Commission⁴ (SEC) began setting up regulations for

³ The United States Environmental Protection Agency (EPA or sometimes USEPA) is an agency of the federal government of the United States which was created for the purpose of protecting human health and the environment by writing and enforcing regulations based on laws passed by Congress. ([EPA, 2017](#))

⁴ The SEC is an independent agency of the United States federal government. The SEC holds primary responsibility for enforcing the federal securities laws, proposing securities rules, and regulating the

disclosing environmental liabilities and contingencies, as well as material impacts of environmental laws and regulations for US firms ([IEC, 2008](#)). Moreover, in 2010, the SEC cited key factors in order to determine the materiality of information related to the environment and specifically to climate change. These key factors contain, first, the heightened public interest in recent years (including academic, government, business, investors, analysts, or the public at large), second, the international accords and other efforts to address a topic of concern on a global basis, third, the federal regulations or state and local laws in the US and finally the business leaders' voluntary recognition of the current and potential effect of the category of information on firms' performance and operations ([SEC, 2010](#)). Furthermore, the SEC addressed instructions on many sustainability topics, in order to guide firms to disclose information relevant to board construction and diversity, safety rules in the mining sector, payments to the US government by the amount of the natural resources extracted by firms ([SEC, 2008](#)). Due to concerns around potential litigation, US firms have traditionally been reluctant to disclose future related information, one of the basic elements of IR. In the near future, it will be interesting to see how US firms deal with this issue as IR develops and becomes more widespread ([IEC, 2008](#)).

At a cross-national level, IR is receiving strong support from a series of market intermediaries, including the big 4 auditor firms (e.g. [Deloitte and Touche, 2011](#); [Ernst and Young, 2014](#); [KPMG, 2013](#); [PWC, 2013a](#)), national and international professional organizations (e.g. [ACCA, 2012](#); [Frost et al., 2012](#); [CIMA et al., 2013](#); [ICAEW, 2013](#)) and international regulatory bodies, such as the Sustainability Accounting Standards Board and International Accounting Standards Board (e.g. [IIRC and IFRS, 2013](#); [IIRC and SASB, 2013](#)). These insights present recent developments in IR and provide an

securities industry, the nation's stock and options exchanges, and other activities and organizations, including the electronic securities markets in the United States. ([SEC, 2013](#))

indication of the complexity involved in implementing integrated reporting practices at an international level.

The [IIRC \(2013\)](#) conducted a survey in the United States and found that in a sample of S&P 500 firms, nearly all produced at least one sustainability report and only seven of these firms produced an integrated report. In the same year, the IIRC published the International Integrated Reporting Framework (IIRF) to improve corporate reporting and to better integrate financial and non-financial information ([IIRC, 2013a](#); [Lee and Yeo, 2016](#); [De Villiers et al., 2017](#)). The IIRF is a principle-based document, does not set standards for integrated reporting or integrated thinking and will help long-term investors ([IIRC, 2013a](#); [Stent and Dowler, 2015](#)). It provides broad and long-term horizon information relevant to ESG and financial factors. Moreover, it uses the Internet to provide more detailed results to all stakeholders to improve their level of dialogue and engagement ([Eccles and Saltzman, 2011](#)). This allows investors to make more secure investment decisions and to determine and link sustainability and economic value. It does not give undue emphasis to short-term financial performance. By aligning financial and non-financial information, it makes management responsible for supervising the business on a day-to-day basis. This shows how IR adds tremendous value to the company and all of its stakeholders, including shareholders, and ultimately contributes to a sustainable society ([Eccles and Krzus, 2010, p.252](#); [IIRC, 2013a](#); [Potter and Soderstrom, 2014](#)). [Atkins et al. \(2015\)](#) suggest that private, social and environmental reporting is beginning to merge with private financial reporting. They believe that ESG information should be used as financial material. In a sample of 19 FTSE100 companies and 20 UK institutional investors, evidence, showing that IR implementation is emerging and is useful to both the corporate and institutional investment communities, is provided. [Stent and Dowler \(2015\)](#) examine the extent of differences between the disclosures of New Zealand's best reporting entities and IR principles and conclude that there is a slight difference.

The IIRC statement notes that the existing financial reporting framework focuses on the wrong elements over the wrong time frame. Its short-term structure does not help managers make long-term predictions and organize their decisions about future strategies. Management often omits structural data, particularly those related to ESG information ([KPMG, 2013](#)). Based on IIRC statements, [Atkins and Maroun \(2015\)](#) explore the initial reactions of the South African institutional investment community to the first sets of integrated reports being prepared by companies listed on the Johannesburg Securities Exchange. They focus on a shift in attitude toward ESG and integrated reporting, the initial views on the first sets of integrated reports and the obstacles to the preparation of high-quality reports. They conclude that IR is an improvement on the traditional annual report of listed South African companies. They emphasize non-financial measures and document efforts to integrate financial, environmental, social and governance metrics to provide a better understanding of organizational sustainability.

In the future, integrated reporting can eventually replace existing corporate reports. Organizations should be able to decide the manner in which it will be presented - for instance, as an overarching document to various other reports or as a single stand-alone document covering all material aspects ([Ernst and Young, 2014](#)). However, there are some gaps in connecting information reporting on uncertainties in the future outlook and information reporting against industrial or regional benchmarks. Hence, in their study, [Stent and Dowler \(2015\)](#) call for improvements in the fields above.

2.8. The business model

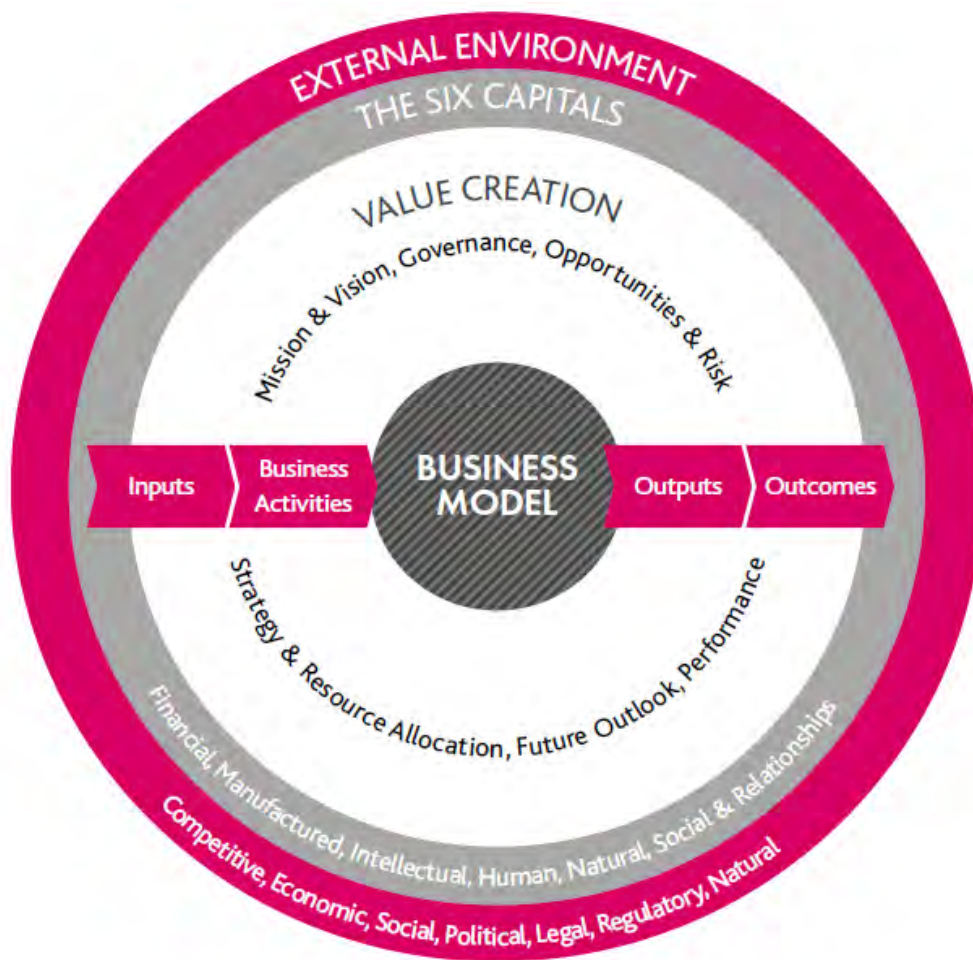
[IASB \(2010\)](#) mentioned that though the term ‘business model’ is not referenced explicitly, the following related aspects such as the firms’ objectives and strategies, the firms’ resources, risks and relationships, the firms’ performance measures and indicators and critical financial/non-financial resources. [Rajala \(2011\)](#) concludes that an entity’s resources/relationships (i.e., capitals) and revenue model are key

components of the business model. [Business Model Community \(2012\)](#) in their article titled “The business model – the missing link for twenty-first century companies?” illustrated the several approaches of business model reporting. They stated that the basic goal of a business model is to analyze the way the organization and firms that use IR are structured and how they deliver their products or services. It makes a link with business model strategy and is mentioned that the business model often uses two terms interchangeably. The first strategy is related to the way money is generated. The model for selling products underpins the business model description. The second strategy is related to value creation. Usually presented as a value chain, this approach shows how an organization or firm adds value during its operational process. [Business Model Community \(2012\)](#) in their article “Special Issue on Business Models” concludes that the business model provides the methodology of how an organization operates to ensure its sustainability and is associated to the value proposition of the firm, the internal and external organization and the firm’s resources and competencies. [Leisenring et al. \(2012\)](#) analyze how basing financial reporting on an entity's business model is, in effect, basing financial reporting on management's intent with respect to the use, transfer or other disposition of an asset or liability. Their study uses several examples of existing IFRS and US GAAP that allow or require intent-based accounting. Then, they interpret the meaning and consequences of basing the accounting for financial assets on management's purposes for realizing value from those assets. They examined the positive and negative features of intent-based accounting in the context of the FASB's and IASB's conceptual frameworks, specifically, the qualitative characteristics relevance and comparability and the objective of financial reporting, and apply that analysis to existing and proposed guidance for measuring financial assets. [ICAEW \(2010\)](#) in their study mention that the business model has the goal improving users’ understanding of the firm and how it makes money. The business model approach to financial reporting includes three considerations. First, financial reporting should provide a reality check on a firm’s business model and its execution. Second, the firm’s business model tries to transform inputs so as to create new assets or services as outputs.

It generated the expectation that historical cost would generally be the most useful basis of measurement. Third, the firm's business model is to buy and sell assets in the same market, with the intention of profiting from market price changes. It is expected that fair value would generally be the most useful basis of measurement.

Figure 2 analyses the business model and brings together all of the elements to be considered when preparing an integrated report. Capital markets are likely to reward firms that adopt the International Framework. It helps firms rethink and integrate their strategies and business models in line with stakeholder expectations. Furthermore, it leads to better engagement between the financial investment community and company management around material issues and the drivers for performance and value creation, making clearer linkages between strategy, financial performance and ESG factors (IIRC, 2015).

Figure 2: The business model, sitting at the heart of the firm , within the context of the external environment (CGMA,2013, p.6)



There are four same-centered circles. The circle in the middle is that of the business model. It is the heart of the firm. The firm needs information about its performance, which involves setting up measurement and monitoring systems to provide information for decision making. The next circle, which is the value creation, depicts the mission and vision of IR, the firm's strategies and the corporate governance techniques. It identifies the opportunities and risks relevant to the firm that applies IR. Also, firm's strategy identifies how it intends to maximize opportunities and mitigate or manage risks. It sets out strategic objectives and strategies to achieve them, which are implemented through resource allocation plans.

The third circle consists of the six capitals which are natural capital, social and relationship capital, intellectual capital, human capital, financial capital, and manufactured capital. Fund managers suggested could lead to better decisions about

how they allocate capital. This can be helpful for understanding stocks and flows of capital, leading to better capital allocation decisions (IIRC, 2015). The external and the last circle is that of the external environment. This circle is not static. It makes a regular review of each element and its interactions with other elements, leads to revision and improves all the elements. These interactions relate the external environment and the new capitals to create value over the short, medium and long term. This representation applies to both public and private sectors. The emphasis on different elements may be different but are still relevant to a profit or not for profit scenario (McCaffry and Topazio, 2015)

2.8.1 The new capital analysis

In this section the concept of multiple capitals adopted by IIRC is explored and how these elements relate to each other. The basic reason of developing insights, according to Alvesson and Deetz (2000) is to investigate local forms of phenomena. New capitals are six specific capitals that consists the business model and create the IR core. All of these six capitals create value. These capitals are financial capital, manufactured capital, intellectual capital, human capital, social and relationship capital, and natural capital. When these capitals are connected, they represent stores of value that are the basis of an organization's value creation. (De Villiers and Sharma, 2017)

All of the firms that apply IR are based on the new capital analysis with the goal of increasing the available information which is provided by them. These capitals can be increased, decreased or transformed as a result of its value-adding activities. The direct or indirect link and interdependence among these capitals should be mentioned in an integrated report because they influence the firms long term financial performance. Furthermore, there are and others external factors interacting with capitals. These are the economic climate, technological progress, social changes and environmental issues. Considering this perspective, a firm's ability to mitigate risks, adapt to change and

interact with its shifting surroundings is key. What's more, the capitals can become an internally generated intangible asset (Ernst and Young, 2014; IIRC, 2013b).

2.8.1.1 Natural capital

Natural capital operates as the basis for the entire economic and social system. It provides resources that often cannot be replaced, and which are essential for the functioning of the economy, as a whole. The resources are water or fossil fuels, renewable natural resources, such as solar energy or agricultural crops, and the capacity of the world's carbon sinks - i.e., the air, forests and oceans - to neutralize or isolate the waste created by economic activity. When it is determined whether a natural capital is material to an organization or firm, the relevant factors that affect this capital should be pointed out. These consist of the reliance on natural resources, the environmental impact of its productive process, and what the organization has to do to operate within the limits imposed by the environment (Ernst and Young, 2014; IIRC, 2013b).

2.8.1.2 Financial reporting on Intangibles (Social and relationship capital)

Social and Relationship Capital is comprised of intangibles (shared values, commitments and knowledge) that create the basis of the reputation and trust that each firm has developed. The relationships each firm has established through its engagement with its tenants, suppliers, employees, government and business partners are central to each firm, as are the contributions which are made to the long-term sustainability of the communities in which it operates (Ernst and Young, 2014; KPMG, 2015; IIRC, 2013b).

A problem faced by the accounting profession and makes it difficult to respond to the criticism of the way in which intellectual capital and other capital is measured (Power, 2001; Siegel and Borgia, 2007). The measurement and recognition of intangible assets are specific and unusual and often makes the development of a comprehensive accounting standard challenging. IAS 38 illustrates the methodology of this set of assets and attempts to impose a uniform set of rules on what had become an increasingly contentious issue. Form IAS 38 excludes internally generated intangibles by rules.

However, it permits the recognition of intangibles in other situations, like business combinations (De Villiers and Sharma, 2017).

In their study, Lev and Zambon (2003) state that the increasement of intangibles assets show two limits. First the limit of traditional external accounting's theoretical approach, which is based on transactions (the historical cost principle) and second the limit of the corresponding measurement tools, which operates as the firm's 'black box'. Power (2001) and Caddy (2000) reach similar conclusions.

Gowthorpe (2009) states that many of the solutions proposed to solve intellectual capital problems are related to the extended disclosures for inclusion in the annual report. As a result, intellectual capital models have based on intellectual assets in order to create the potential impact of intellectual liabilities. However, there has been limited recognition of the potential importance of intellectual liabilities of value creation in intellectual capital literature (Abeysekera, 2003; Caddy, 2000; De Santis and Giuliani, 2013; Stam, 2009; De Villiers and Sharma, 2017). Abeysekera (2003) in his analysis categorizes intellectual assets and liabilities in three categories, which are human competence, external assets/liabilities and internal assets/liabilities.

The IFRS has created management commentary guidelines that contains and analyses all manner of narrative reporting, which includes GRI, IR and intellectual capitals. Firms should indentify an entity's significant relationship with stakeholders, how these relationships are likely to affect the firm's performance and to create value, and how these relationships are managed (IFRS Practice Statement, 2010). Complulsory to this point, financial analysts should not wait for the latest narrative report (integrated or GRI report) before making a recommendation to buy or sell shares. The timeliness and value of these reports are not relevant to active investors (Dumay, 2016).

2.8.1.3 Intellectual capital

“Intellectual capital is the group of knowledge assets that are attributed to an organization and most significantly contribute to an improved competitive position of this organization by adding value to defined key stakeholders” (Marr and Schiuma, 2001). It includes the intangible assets which related to brand and reputation. It also contains resources such as patents, copyrights, intellectual property and organizational systems, procedures and protocols, which give firm significant competitive advantages. On the other hand, a negative brand equity attributed to major polluters or ill-reputed shareholder create significant disadvantage to firm (Ernst and Young, 2014).

Petty and Guthrie (2000) make a first step to study the intellectual capital literature. Their research tested how the level of interest in a new knowledge economy affects organizations and how intellectual capital reporting and accounting practices are developed (Guthrie et al., 2012). They separate the research field of intellectual capital reporting to two stages. The first stage focuses on raising awareness as to why it is important that intellectual capital be recognized and understood and to estimate by how competitive advantage is essential. The conclusion of the early studies argues that intellectual capital reporting is something significant and must be measured and reported (Chiucchi and Dumay, 2015). The second stage sets up intellectual capital reporting as a legitimate undertaking and gathers evidence to support its further research. In this stage, researchers investigate how the interaction between capital and labour markets reflects intellectual capital reporting and creates value at an organizational level (Guthrie et al., 2012; De Villiers and Sharma, 2017).

Guthrie et al. (2012) mention that intellectual capital reporting forms in the first and second stages of development because of a growing volume of published research in journals. There is a need to be created a third stage of intellectual capital reporting, characterized by research that takes a critical stance on intellectual capital reporting, in practice. To this third stage, Mouritsen and Roslender (2009), Roslender and Stevenson

(2009) and Guthrie et al. (2012) contribute a global bibliography. Moreover, Dumay (2014, p. 8) states that intellectual capital will most likely remain an accounting issue with the goal of making the intangible tangible.

Wealth creation is continually used to illustrate non-financial information in the form of intellectual and other capitals under the umbrella of IR (Dumay, 2016; Flower, 2015; De Villiers and Sharma, 2017). Dumay (2016), however, states that while reporting of intellectual capital may seem to be losing popularity with investors, managers are observing the advantages of managing intellectual capital internally. According to Tee Jeok Inn et al., (2015) and De Villiers and Sharma (2017) in their analysis of intellectual capital reporting, the basic reason for developing intellectual capital is to create value inside the firm, rather than to report it. The two most common used theories of intellectual capital and value creation are that of the market-to-book ratio theory in which intellectual capital is applied, and that of disclosing intellectual capital in which the firm's profitability is increased (Dumay, 2012).

Bismuth and Tojo (2008, p.242) develop the theory behind greater profitability. They mention that when the market is provided with adequate and appropriate information about intellectual assets, it leads investors to make better decisions and helps discipline management and boards, with positive economic consequences. When the non-financial information is consistent, material, reliable and comparable across firms, it informs investors so that they are able to forecast better future earnings and estimate better the risks associated with different investment opportunities. As a result, it is observed that there is a reduction in information asymmetry, in biased or unfounded earnings estimates, in unrealistic valuations and in unjustified share price volatility. On the other hand, it provokes an increase in market liquidity. There is evidence that improved information about intellectual assets and firms strategy improves the ability of firms to secure funding at a lower cost of capital.

Intellectual capital operates not only as an accounting instrument but also as a management issue, which is linked with long term success. Intellectual capital contributes better to human resource management by investing greater amount in the education and training of employees (Brennan and Connell, 2000). In Dumay's (2016, p. 174) analysis, it is mentioned that after the introduction of intellectual capital reporting, it was substituted by CSR reporting and other sustainability-focused frameworks, such as the Global Reporting Initiative (GRI, 2013).

Now IR has classified wealth creation as a necessary pilon of IR's core (IIRC, 2011b; Dumay, 2015; De Villiers and Sharma, 2017). For example, according to the IIRC "the view that communication about value creation should be the next step in the evolution of corporate reporting" (IIRC, 2013, p. 1) and "the primary purpose of an integrated report is to explain to providers of financial capital how an organization creates value over time" (IIRC, 2013, p.7).

2.8.1.4 Human capital

Human capital is a mix of chracteristics, such as the knowledge, talents, skills, abilities, experience, intelligence, training, judgment, and wisdom an individual and collective, and all the labor capital in a firm or in an organization have. Particularly, human capital is related to the skills and know-how of a firm's professionals, their ability to lead, cooperate or innovate. The correct management of the firm's teams and care for motivation, create a healthy and successful firm and helps it to create value. On the other hand, a high level of employee turnover or inadequate remuneration policies can harm reputations and impair a firm's ability to increase their value (Ernst and Young, 2014; IIRC, 2013b).

2.8.1.5 Financial capital

Financial capital is the basic criterion of firm's performance. It includes funds such as money and credit used through financing or generated by means of the firm's

productivity, in order to be invested. These funds can't be used to increase dividends or to give raises to management wages, but is used to create higher profits in the future. Financial capital is related extensively to the other capitals. Firms need to understand, estimate and show this interdependence in their integrated reports. Firms should clearly state how financial capital is converted into other forms of capital, how value is created and how these other forms of capital will generate financial returns over the short, medium and long term horizon ([Ernst and Young, 2014](#); [IIRC, 2013b](#)).

There are three sources of financial capital. The first is debt capital. A firm can increase its capital through the assumption of debt. Debt capital is created through financial institutions (i.e. bank loans) and insurance companies, or through public sources, such as federal loan programs. Firm's obligation is to pay back the interest, and eventually the principal. They don't have to share the profits (or losses). The second source of financial capital is equity. Equity capital focuses on investments that, unlike debt capital, do not need to be repaid. This can include private investment by the business owners. Most firms use their own cash in order to get started. Cash can be obtained by the sale of stock. Moreover, other sources of funds can be found from partners, venture capitalists, or angel investors⁵. This can decrease the level of some control, and ownership in exchange for sharing the profits. The most common example is that of Initial Public Offering (IPO), where a firm becomes really large and can acquire additional capital from issuing stocks, so that any stock investor can buy stocks from this firm. The last type of financial capital is specialty capital, which is the extra cash flow that derives from managing the firm's operation more efficiently. Vendor

⁵ An angel investor (also known as a business angel, informal investor, angel funder, private investor, or seed investor) is an affluent individual who provides capital for a business start-up, usually in exchange for convertible debt or ownership equity. A small but increasing number of angel investors invest online through equity crowdfunding or organize themselves into angel groups or angel networks to share research and pool their investment capital, as well as to provide advice to their portfolio companies ([Lee, 2006](#)).

financing exists when the suppliers of a firm confirm a delayed payment for their goods or services. Supply chain financing operates like a pay-day loan for businesses. Banks lend the firm the amount of an invoice (minus a fee), and confirm payment when the invoice is paid. The financial managers of the firm can also create extra capital through investing wisely ([Spillane et al., 2003](#); [IIRC, 2013b](#)).

2.8.1.6 Manufactured capital

Manufactured Capital comprises material goods or fixed assets, which contribute to the production process rather than being the output itself, such as buildings or technology equipment and tools. It may be owned by third parties such as firms, ports and other public infrastructure. When managers decide on efficient strategies, they reduce the use of resources and drive innovation. All infrastructure, technologies and processes make less use of natural resources and the maximum use of human innovation and skills. This can conclude with greater flexibility and sustainability ([Ernst and Young, 2014](#); [IIRC, 2013b](#)).

2.9. Financial and non-financial reporting principles and characteristics

Company annual reports have traditionally and primarily been forced to report information related to financial performance, to better inform investors and shareholders of the company's financial performance. To assure the accounting quality and reliability of financial reports, some GAAP has been created. Since 2004, IFRS developed by the IASB has become a widely accepted reporting framework ([Deloitte, 2014](#)). Today, 90 countries have fully conformed to IFRS requirements for domestic listed companies. The adoption of IFRS as an international standard can allow a uniform framework for environmental and sustainability accounting to emerge, typing information on environmental costs and benefits and sustainability to financial statements ([IFAC, 2011](#)).

Recent studies relate IFRS to IR. To achieve the concept of IR (in terms of economic globalization over) countries should be prepared to take advantage of the next capital market integration ([Mishkin, 2006](#)). Before integrated reporting was generated, Kaplan and Norton in 1996 and 2004 created an integrated framework and enriched it with financial and non-financial indicators. They introduced a number of variables, such as the level of knowledge and training of staff, customer service, financial performance and internal firm control, as the basic indicators for the estimation of the non-financial firms' performance. They threw light on the relation between intangible assets and process and value creation, proving that non-financial indicators can link a firm's short-term actions to its long-term strategic objectives. For instance, [Lajili and Z'eghal \(2005\)](#) illustrated that abnormal returns can be affected by human capital productivity, while [Lin et al. \(2006\)](#) focused on how the employees skill level, training and teamwork can increase the value of the firm. Lastly, customer satisfaction and customer retention are indicators that related positively to the firms' profitability and its value ([Ittner and Larcker, 1998](#); [Anderson et al., 2004](#)).

In contrast to rational views, [Mishkin, Stulz \(2005\)](#) argues that there are limits to the profits arising from financial integration and notes that in every country there are significant risks to diversifying internationally. In other words, profits cannot be unlimited. The evidence that is presented and related to the adoption of IFRS are short-term. The long-term effects of integration are unclear. The way in which the company shares its profits also remains unclear, which are the existing types of risks and how they can be calculated. The current research on IFRS rarely attempts to unravel the paradoxes of integration ([Anderson et al., 2004](#)).

Considering the integration of financial markets in the period of financial crisis and in the light of IFRS, it is remarked that the adoption of IFRS ignores the IR, the firm's harmonization with the commercial law, global connectivity and the state accounting system databases ([Daske et al., 2008](#)). Recent studies investigating the adoption of IFRS concluded that although there may be benefits from adopting them, their

implementation is very closely linked with the institutional arrangements of their countries, especially at the level of enforcement ([Daske et al., 2008](#); [Byard et al., 2011](#)). Differences between countries are significant enough to restrict the benefits resulting from the application of IFRS ([Ball, 2006](#); [Barth et al., 2012](#); [Brown et al., 2012](#)).

2.9.1 Financial reporting

The goal of financial reporting is to provide information about the firm's financial position under the IASB content. There are four key qualitative characteristics of financial accounting information, that align with the firm's financial position, and performance and set the way in which it should illustrate accounting information, provide guidance for interpretation and help readers of the annual report to detect the differences between annual reports ([Nandakumar et al., 2010, p.11-12](#)). Shareholders can be informed about the firm's financial numbers which are directly affected by the company's net income. Apart from shareholders, the financial data is studied by employees, customers, creditors (banks), competitors etc. It is crucial for these different users to derive information quickly and safe ([Wahlen et al, 2010, p.18](#)). These four key qualitative characteristics of financial accounting information are; Understandability, Relevance, Reliability, and Comparability ([Eccles et al., 2014](#)).

2.9.1.1 Understandability

Financial statements should present and account for transactions and events in an understandable manner. This is provided by a user who knows about the firm's financial and accounting information and its business activities. This information should be illustrated clearly and understandably, since users may be forced to make decisions based on undependable information ([Nandakumar et al. 2010, p.13](#); [Elliot and Elliot ,2011 p.104](#)).

2.9.1.2 Relevance

Relevance is a qualitative characteristic in accounting. The information is relevant when the user provides investors with timely and useful information, which has predictive value ([Wahlen et al, 2010, p.18](#)). Particularly, this implies that information should link the past, present and future firm's activities in order to help investors make their economic decisions and evaluate firm's events correctly. This creates predictive and confirmative power to the firm's accounting information. Finally, it is linked with the convention of materiality ([Eccles et al., 2014](#)). Under GAAP, materiality information is material if its omission or misstatement could influence the economic decision of users, taken on the basis of the financial statements ([Nandakumar et al, 2010, p.13](#)).

2.9.1.3 Reliability

Reliability is a qualitative characteristic in accounting. Accounting information should be verifiable and accurate. Moreover, a firm ought to provide an accurate picture of its financial position, in order to provide objective, true and fair accounting information ([Wahlen et al, 2010, p.171](#)).

2.9.1.4 Comparability

The notion of comparability focuses on the quality of accounting information that results from the comparison between the financial reporting of one company to the financial reporting of another company. In order for the reader of financial statements to manage this comparison, the accounting information provided between different firms should be based on standard accounting rules ([Elliot and Elliot, 2011 p.104](#)).

2.9.2 Non-financial reporting

The core of non-financial reporting includes the ESG performance ([Juravle and Lewis, 2008](#)). The concept of sustainability reporting contains a wide range of notions ([Stapleton and Woodward, 2009](#)). Since the GRI framework influences the structure of integrated reporting, the most important principles that organizations can use to

estimate and report their ESG performance will be briefly analyzed ([Eccles and Serafeim, 2012](#)). The four main principles of non-financial reporting are; Materiality, Stakeholder inclusiveness, Sustainability Context, and Completeness ([GRI, 2011](#))

2.9.2.1 Materiality

According to the GRI framework, materiality exists when a firm causes significant environmental, social and economic impacts on its surroundings. In contrast to financial reporting, materiality is rarely illustrated quantitatively. It is expressed by considering internal and external firm's criteria such as expression of stakeholder interests, risks, values and expectations ([Elliot and Elliot ,2011 p.201](#)). Materiality is analyzed in the IIRC Framework in Guiding Principle in section 3D. It describes the methodology used to recognize material issues and identifies the guidance used in the process, for example, Sustainable Value Matrix, Sustainability Accounting Standards Board, or GRI ([Eccles et al., 2014](#)). Moreover, it examines how the assessment of materiality addresses issues across the organization's entire supply chain and it mentions which issues have been given the highest priority and the process used for prioritization ([Kruz, 2017](#)).

2.9.2.2 Stakeholder inclusiveness

In order to develop the content and the scope of a report, it is crucial to consider the principle of stakeholder inclusiveness. Stakeholder requirements can affect the way that a firm makes its decisions and how it develops its services, products and operations. The GRI seeks to inform about stakeholders interests and reasonable expectations. ([Elliot and Elliot, 2011, pp. 841-842](#)). Stakeholder engagement is analyzed in the IIRC Framework in Guiding Principle in section 3C. In that section, first the strategy and methodology used for stakeholder engagement is analyzed. Second, the methodology used to prioritize stakeholders is analyzed. Third, the nature and quality of relationships with principal stakeholders is stated. Finally, how and to what extent the firm responds to stakeholder needs and expectations is described ([Kruz, 2017](#)).

2.9.2.3 Sustainability context

The principle of sustainability context relates the objectives, strategies and the performance of a firm with economic trends, society and environment facts. The IFAC framework indicates that the successful management of a sustainable organization requires attention to four perspectives. These perspectives are business strategy, internal management, financial investors and other stakeholders. As far as accountants are concerned, in an organization a business strategy perspective would typically be taken by finance directors, an internal management perspective by management accountants and financial controllers, and a financial investors'/other stakeholders' perspective by accountants preparing and auditing the published financial statements. (Elliot and Elliot, 2011, p.841-842; Eccles et al., 2014).

In order to create a long-term strategy, firms should disclose some strategic goals that are mandatory according to the IIRC framework. First, firms should recognize the strategic goals of organizations and which methodology is appropriate to reach to those goals and how they will be measured. For example, the indexes of ROIC, organic revenue growth, operating income should be estimated (IIRC, 2013a, Framework: 4.28; Kruz, 2017). Second, firms should adapt strategic goals in the context of macro and micro economic conditions, current and future market trends, and competitive advantage and recognize the resources which are required in order to implement the business strategy. Third, to discuss the ongoing availability of those resources (IIRC, 2013a, Framework: 4.28; Kruz, 2017). Finally, firms should analyze the extent to which material environmental and social considerations, have been inserted into their strategic goals (IIRC, 2013a, Framework: 4.29; Kruz, 2017).

2.9.2.4 Completeness

Finally, the principle of completeness mentions that the coverage of information contained in sustainability reports should be relevant to influence the decisions of stakeholders. After reading a report, stakeholders can reap a general picture about the

financial and ESG performance (GRI, 2011). An integrated report should provide an overview of risks and opportunities, which helps a firm to develop its long term strategy. First, it should mention the internal and external sources of critical risks and opportunities, including ESG issues. For example, the sector and industry issues mentioned in standards issued by the Sustainability Accounting Standards Board (IIRC, 2013a, Framework: 4.25). Second, it should examine the organization's assessment of the probability that material risks or opportunities will have positive results, the magnitude of their results if they do, and the particular circumstances that might accelerate the probability of the risk or opportunity occurring (IIRC, 2013a, Framework:4.25). Third, it should mention the way that the organization will reduce key risks or create value from opportunities, expanding the identification of the related strategic objectives, strategies, policies, targets, and KPIs (IIRC, 2013a, Framework: 4.25). Fourth, an integrated report should analyze the frame of how the business model may be affected by the changes in the external environment or identified risks and opportunities. Finally, it should examine how the organization would respond to those changes (IIRC, 2013a, Framework:4.16; Kruz, 2017).

2.10. Basic accounting theories

IR considers the management's view of the market and tries to explain management's view of the market. According to the IIRC Framework paragraph 4.5, management should identify the principal activities and markets. In the same framework it-mentions that the management should describe the competitive landscape for the industry and sector. It should clarify the relative strengths and weaknesses of competitors, customer demand, the threat of new competition, substitute products or services, the bargaining power of customers and suppliers, potential for organic growth and acquisitions. Moreover according to the IIRC Framework paragraph 4.5, it should mention the macro and micro economic conditions affecting the industry and sector. Finally, based on the IIRC Framework paragraph 4.5, management should discuss global and local trends likely to impact the business and sector, for example, the speed and the effect of

technological change, population and demographic changes, human rights, poverty, education, carbon emissions, biodiversity, water stress, human health impacts of emissions, resource shortages, the legislative and regulatory environment in which the organization operates, and the political environment in countries where the organization operates ([Kruz, 2017](#))

2.10.1 Agency theory

Much of the research into corporate governance derives from agency theory. Corporate governance is viewed as a subset of a firm's contracts used to align the expectations of shareholders with the choices and strategies of managers. It creates a hierarchy in which the shareholders ensure that the board of directors control managers interests and choices, which are for the firm's benefit ([Jensen, 1983](#); [Shleifer and Vishny 1997](#); [Core et al., 1999, 2003](#)). Agency theory approximates corporate governance as a monitoring device, which is used in order to minimize the conflicts that are generated between agents and the principal. In this context agents are the managers, the principal are the shareholders and the board of directors acts as the monitoring device ([Agrawal and Knoeber 1996](#)). Problems arise because agents have incentives to fulfill their own interests at the expense of shareholders ([Fama and Jensen 1983](#); [Jensen and Meckling 1976](#)).

In corporate governance structures there are both formal and informal contracts. Formal contracts include corporate charters, exchange-listing requirements, employment contracts, board independence regulations, executive stockownership guidelines, bonus clawback provisions, blackout windows for executive stock trading, and so on. With informal contracts, shareholders and boards retain considerable discretion in carrying out many of their monitoring activities. Boards establish reputations regarding their independence from management, their expertise in advising management, and their work. This reputation develops over time, in part, based on characteristics such as the proportion of inside versus outside directors, the size of the board, the expertise of

directors, and the number of board meetings, as well as by the consistency of the board's decision-making processes and its stewardship of shareholder value ([Anderson et al., 2004](#)). However, there are two types of agency problems. The first type is created between shareholders and the board of directors. The expectations between two groups are assumed to be aligned (i.e. the board of directors composition should make the correct choices for the interests of shareholders) but many times the interests of managers differ from those of shareholders ([Ahmed and Duellman, 2007](#); [Carcello and Neal, 2003](#); [Francis and Martin, 2010](#); [La Fond and Roychowdhury, 2008](#)). The second type of agency problem is created between the board's and manager's interests. Their interests are assumed to be aligned with each other (i.e., the board consists of managers that are assumed to be beholden to the CEO) but are not completely aligned with the interests of shareholders ([Klein, 2002](#); [Zhao and Chen, 2008](#); [Duchin et al., 2010](#)).

When accounting-based standards are violated, principals break down and debts contracts are renegotiated ([DeFond and Jambalvo, 1994](#)). Responsibility for this is with agents, who have strong incentives to mislead principals in order to benefit. They announce basic fault news, most times bad, and provide misleading financial statements ([Dechow et al., 1995](#)). This behavior creates great concern and instability to the principal, violating the reliability and validity of the financial accounting process ([Anderson et al., 2004](#)).

Examining agency cost theory from the creditor's perspective, it is observed that board structure is an important oversight element in the financial accounting process. A board of directors is a corporate governance tool, which can affect the integrity of the financial accounting process, supervising the senior managers decisions and controlling the lending agreements ([Daley and Vigeland, 1983](#); [DeFond and Jambalvo, 1994](#); [Dichev and Skinner, 2002](#)). Their presence reduces the manipulation of accounting numbers and hence helps creditors to correctly evaluate the accounting information ([Anderson et al., 2004](#)).

Agency theory advocates the idea that the firm should apply adequate monitoring and control mechanisms, in order to protect the shareholders and management from conflicts of interest. Managers should pursue the interests of shareholders and not only their own interests ([Fama and Jensen, 1983a](#); [Kiel and Nicholson 2003](#)). So, the board of directors and the ownership structure are the basic governance mechanisms which align the interests of the agent and the principal ([Daily et al., 2003](#)).

There is a correlation between earnings management and corporate governance based on agency theory. Observing agency theory, it can control the role of boards that affects the firms' management and leads managers to manipulate the firm's accounting numbers ([Xie et al., 2003](#); [Kao and Chen, 2004](#); [Goodwin et al, 2009](#)). The use of an audit committee can control internally the boards of director's attitudes ([Fama and Jensen, 1983](#)). Furthermore, it has been proved that outside directors are negatively related to earnings management ([Klein, 2002](#) ; [Xie et al., 2003](#); [Peasnell et al., 2005](#); [Davidson et al., 2005](#); [Benkel et al., 2006](#); [Dimitropoulos and Asteriou, 2010](#)).

Agency theory considers that the CEO-chairman duality increases CEO power, but negatively affects CEO independence, hindering the firm's ability to establish supervisory mechanisms ([Berle and Means, 1932](#)). From the agency theory perspective, duality has a negative effect on performance. Agency theory argues for a separation of the two positions, and states that the CEO-chairman cannot perform both functions without there being a conflict of interest. Duality generates a powerful CEO who may be driven by self-interest, dominating the board of management, and this may result in poor performance ([Gabrielsson et al., 2007](#); [Ghosh et al., 2010](#); [Valenti et al., 2011](#); [Villanueva-Villar et al., 2016](#)). The importance of the monitoring role of the board of directors lies in the fact that when directors evaluate manager performance, they represent the shareholders ([Fama and Jensen, 1983](#); [He et al., 2009](#)).

The implication of agency theory, in terms of corporate governance, is that outside directors should defend shareholders' interests through appropriate monitoring

mechanisms that protect the shareholders from the self interest of the management. In this way, having a large number of outside directors on the board could have a positive impact on performance through service monitoring ([Fama and Jensen, 1983](#); [Arosa et al., 2013](#)).

Agency theory is not the only theoretical perspective that has been relied on to explain board roles and board composition. The service role can be related to the resource based view and resource dependence theory, where boards are considered to control inter-organizational dependencies and act as a strategic resource for securing critical resources for the firm ([Pfeffer and Salancik, 1978](#)). According to resource dependence theory, outsiders are seen as a linking mechanism between the firm and its environment that may support the managers in the achievement of the various goals of the organization ([Johnson et al., 1996](#); [Arosa et al., 2013](#); [Villanueva-Villar et al., 2016](#)).

2.10.2 Stewardship theory

Stewardship theory focuses on psychological and sociological approaches and aligns the interests of corporate executives (as stewards) with those of owners. This is a contrasting view to agency theory. This theory favors the view that managers are naturally trustworthy. Investors can trust them. This makes monitoring unnecessary ([Donaldson, 1990](#); [Donaldson and Davis, 1994](#); [Donaldson and Preston, 1995](#); [Davis et al., 1997](#)). Managers are good stewards of the firm and try to maximize the firm's profits and the shareholders returns in order to optimize their interests ([Donaldson and Davis 1994](#)). As the number of executive directors is higher in a board of directors, then the firm appears to have better economic performance. The directors can understand the business needs better than outside directors and can make better decisions for the firm's welfare ([Donaldson, 1990](#); [Donaldson and Davis, 1994](#); [Kesner, 1987](#)).

According to stewardship theory there is satisfaction for investors, as well as to other participants of the firm, which stems from the aspect that the manager's goal is to maximize the firm's objectives ([Clarke, 2004](#)). However, managers will not align their

own interests with those of shareholders. Psychologically when there is a lack of non-executive directors on a board of directors and when the relationship between principals and agents is based on the stewardship perspective, then managers are encouraged to commit fraud. (Choo and Tan, 2007).

From the perspective of stewardship theory (Davis et al., 1997), however, the relationship is the opposite, offering a more humanistic approach. Greater power in the hands of the CEO may lead to benefits that are greater than the costs in times of crisis: the CEO's response capacity will be faster when faced with changes, he or she will have a greater incentive to lead the firm out of the crisis, and thanks to his or her increased power he or she will be able to take extreme but necessary decisions (asset restructuring, mass redundancies, and so on) in unstable times, such as the financial crisis that began in 2007 (Dowell et al., 2011). Stewardship theory offers support to the idea that CEO duality contributes to timely decision-making, effective execution of plans and efficient monitoring, leading the firm to better performance (Huang et al., 2012; Arosa et al., 2013; García-Ramos and García-Olalla, 2014; Villanueva-Villar et al., 2016).

2.10.3 Stakeholder theory

The main purpose of integrating reporting is to highlight invisible ESG figures, which are related to the firm's prosperity and affects its value (Donaldson and Preston, 1995). However, there are arguments that focus only on shareholders, observing them as single users of financial and non-financial information outside of the firm. It is suggested that this shareholders view should be broadened (Cheng, 2008). It is crucial to present the basic perspectives of stakeholder theory, since it provides useful information for the integrated reporting analysis.

Stakeholder theory is not restricted to explaining the accountability of the board only to shareholders, but also to the other interested parts. It includes those who can affect or are affected by the firm's activities (Freeman, 1984). The board's goal is to create

net gain for all stakeholders (Donaldson and Preston, 1995). In order to implement this gain and maximize the total prosperity of the firm, they should consider the effects of their decisions on all the stakeholders (Clarke, 2004). Advocates of stakeholder theory argue that this theory colors the firms portrait, providing both social and economic values and that consideration of ethics and morality which are important for the estimation of a firm's value (Freeman, 1983, p. 248).

It is important for the firm to be profitable and viable, because the prospective stakeholders wish to invest in stable firms with low risk strategies (Jones and Wicks 1999). Senior managers should apply corporate governance strategies and policies which are aligned with the interests of the different stakeholders (Ogden and Watson 1999; Bird et al., 2007). Firms that ignore the stakeholders opinions are exposing themselves to business risks, such as losing competent staff or negative media exposure (Eccles and Krzus, 2010, p.30).

One relevant part of the IIRC Framework is that of capital and non-capital investments, which analyze the long-term strategy and interpret the way capital and non-capital investments create value and yield competitive advantage. Stakeholders need to be informed about the relationship between critical issues, such as trends, risks and opportunities. Moreover, they should be informed about capital and non-capital investments, for example, expenditures for property, plant, and equipment, intellectual property, and people, as examined in 3.5 part of the IIRC Framework. The IIRC Framework in 4.14 explains to stakeholders how investments create a competitive advantage for the firms and organizations to the elasticity of the business model. Parts 4.15 and 4.56 mention the nature and magnitude of trade-offs made when making capital allocation decisions. The most common links are those between R&D vs. acquisitions vs. dividends vs. repurchase of shares. Finally, stakeholders should be informed analytically of the positive and negative impacts on financial capital (funds available through operations, debt or equity financing), manufactured capital (plant, property, equipment), intellectual capital (patents, copyrights, licenses), human capital

(the organization's people-their capabilities, experience, drive to innovate), social capital (shared organizational values, relationships with customers, suppliers, communities), and natural capital (air, water, land), including significant effects on the capitals up and down the value chain (IIRC, 2013a, Framework: 2.14 and 4.31; Kruz, 2017).

2.11. IR monitory systems: corporate governance mechanisms, earning management, agency cost, firm's performance index, value relevance, multiple –based valuation indexes.

IR is a new accounting sector and given the developments in this area, there is a lack of research papers. A first attempt was made by [Dey and Burns \(2010\)](#) who analyzed the Novo Nordisk pioneering experience with IR. There are a few studies which have tested the relation between IR and other accounting issues, such as an XBRL taxonomy for IR ([Gonzalbez and Rodriguez, 2012](#)), an opportunity for Australian NGOs ([Adams and Simnett, 2011](#)), and the accounting curriculum implications of IR ([Owen, 2013](#)). Parallel to these, the big four auditor firms have written several short articles that introduce the IR notion and its implementation. However, there is no deep survey in this sector.

[Cheng et al., \(2014\)](#) study the core issues and challenges of IR. They do not only explain the concept of IR and how the IIRC framework operates, but also focus on the key issues on which the IIRC framework is based. They mention that IR “ identified and reported to the IIRC by a subcommittee of the International Association for Accounting Education and Research comprised of international accounting academics” (p. 90). They conclude with three main issues. They study the behavior of the providers of financial capital, the meaning of and trade-offs between different capitals, and the assurance of integrated reports. These subjects remain contentious, even after the application of the IIRC framework in 2013. However, [Cheng et al. \(2014\)](#) in their study mention several potential integrated reporting research issues.

This thesis uses articles published in the AAAJ special issue. Although there are definitional problems, which have been cited previously, a useful perspective to measure the impact of IR practice is to examine its potential to bring about change. IR is an innovative accounting method, which can be stimulated by innovative disclosure accounting implementation and by shaping the ways in which IR is enacted. There are three papers ([Brown and Dillard, 2014](#); [Higgins et al., 2014](#); [Stubbs and Higgins, 2014](#)) which discuss the potential IR reporting practices applied by early IR adopters to launch transitions to more integrated business practices.

First, [Stubbs and Higgins \(2014\)](#) examine and criticize the extent to which IR is aligned with innovative disclosure techniques. Studying the internal mechanisms used by early adopters of IR in Australia, they conclude that the approaches and the techniques that were used by early adopters, in order to implement IR, should be considered carefully at this early stage. A peak point which generated new challenges created by IR compared to sustainability reporting, is that IR recognizes better the way an organization creates value and focuses on each business strategy. They explain that the procedure of IR fits better with financial reports, enriching them with non-financial information. They question whether IR can increase the level of accounting disclosures and offer opportunities to reconceptualise the culture of a firm towards more ESG outcomes, as suggested by [Eccles and Krzus \(2010\)](#).

[Stubbs and Higgins \(2014\)](#) mention that finance managers use more the innovative IR disclosure mechanisms than sustainability managers. Parallel to [Stubbs and Higgins \(2014\)](#) and [Higgins et al. \(2014\)](#), [Brown and Dillard \(2014\)](#) analyze theoretically the value of IR as a change initiative that can contribute to sustainability. They based their work on science and technology studies with literature on dialogic and polylogic accountings to document the conflict between whether and how IR might promote sustainability goals. The basic point of their article is to critically assess IR and pull the trigger to “broaden out” and “open up” dialogue and debate about how the non financial practices, such as sustainability business practices, can incorporate in financial

reporting statements. They answer crucial questions, such as whether ESG reporting empowers stakeholders, how the firm's business model creates long-term value by identifying key value drivers at the reporting unit level, enhance accountability and foster sustainability transitions (Brown and Dillard, 2014; Kruz 2017).

Kruz (2017) lists the most important elements of IR long term strategy. First, firms that use IR should mention clearly their purpose, mission and vision and explain how the firm's business model creates long-term value by identifying key value drivers at the reporting unit level. Second, it is important for the firm to mention the management's view of the market, to inform investors about major trends impacting the market, to explain its growth strategy, the firm's relative positioning, and underlying assumptions (e.g., macroeconomic factors). Third, firms should emphasize the sources of their competitive advantage in the market. Talents, patents, and other intangible assets diversify and empower their position on the market. Fourth, firms should disclose their strategic goals which are important for value creation (e.g., returns on invested capital, organic revenue growth) in the context of current and future market trends, and the firm's competitive advantage. Fifth, the creation of a layout with a detailed plan of short-, medium-, and long-term actions, which is connected to the firm's goals and value creation. Sixth, firms should promote a strategy which is relevant to customer satisfaction and the brand name strength and the protection of the environment. Firms should relate how the selected metrics will be estimated and tracked consistently. They should explain how capital and non- capital investments will yield and produce competitive advantage and create long term value. Seventh, firms should inform investors about the risks and their mitigation plans, including sustainability (ESG) issues.

In this analysis six monitory systems test the validity power of the quality of accounting information that is provided by IR. The disclosure of financial and non-financial information is a daily practice, which is used by organizations and firms to inform shareholders. Managers make decisions based on these disclosures. Information

disclosure can be explained from an information asymmetry and can reduce the second (Palepu et al., 2004)⁶. This practice provides less uncertainty to shareholders decisions (Watts and Zimmerman, 1986)

2.11.1 IR and corporate governance

The first monitoring system is corporate governance. An effective corporate governance framework is necessary, in each country, to ensure a strong and healthy operation of the stock market and strengthen the role of supervisory authorities. International organizations such as the OECD, the World Bank and the IMF have stressed the importance of corporate governance. The recent scandals and the crisis in the financial sector have brought the issue of corporate governance to the heart of academic and supervisory attention. Recent studies have shown that companies with high corporate governance managed to survive in times of crisis (Villanueva-Villar et al, 2016). Internal corporate governance mechanisms (eg, independent directors, internal control, audit committees, remuneration committees) are presented as the most popular mechanisms to discipline management and reduce risk (Beasley, 1996; Xie et al., 2003).

The IIRC Framework, focusing on Content Element in section B, analyzes the governance information package. First, firms and organizations should illustrate their leadership structure, containing the characteristics, the skills and the diversity (range of academic background, gender, competence and working experience) of the board and the extent to which regulatory requirements affect the composition of the governance hierarchy (IIRC, 2013a, Framework: 4.9). Second, it should analyze the procedure used to make strategic decisions, build and monitor the culture of the organization and firm, its access to risk management, and mechanisms for directing ethical issues (IIRC,

⁶ Definition Palepu et al. (2004, p. 12-17): “managers have better information about their firm’s future performance than outside investors”.

2013a, Framework: 4.9). Third, firms should explain the particular actions that the board has considered to affect and check the strategic direction of the organization and should analyze all the governance practices that exceed local or regional legal requirements (IIRC, 2013a, Framework: 4.9). Fourth, firms should give information about the role of the board in promoting and enabling innovation and should describe the board's process to approve the integrated report and the procedure to issue "The Statement of Significant Audiences and Materiality" (Eccles et al., 2014).

Corporate governance can be used as an effective monitoring system (Gul and Tsui, 2001) increasing the reliability of financial information and the integrity of the financial reporting process (Watts and Zimmerman, 1986). In 2003, the Corporate Governance Council of the Australian Stock Exchange recommended that a part of good governance is to provide disclosures in their annual reports related to social and environmental responsibility (Gibson and O'Donovan, 2007). In 2010, the Canadian Securities Administration issued Staff Notice 51-333: Environmental Reporting Guidelines. The guidance defines the management's role of oversight and management of general risks, and particularly environmental risks. The GRI supports the role of management of sustainability, the viability and IR, designing guidelines on how to create reports and what should be the role of corporate governance. The level of disclosure should specify how the Board addresses supervision and risk management. (IIRC, 2011).

There are many studies that investigate the relation between the quality of accounting information and board characteristics. Many conclude that there is a negative relation between the percentage of outside directors and the likelihood of fraud (Beasley, 1996; Dechow et al., 1995; Farber, 2005) and to earnings management (Peasnell et al., 2000; Klein, 2002; Xie et al., 2003; and Bowen et al., 2005). Other studies advocate a higher percentage of outside directors is positively related to the analyst ratings of financial reporting quality (Wright and Wright, 1997).

A CEO has superior knowledge of the private information concerning a firm's competitive advantages and its internal environment. Therefore, duality may reduce the complete transfer of private information between CEO and board members, resulting in less voluntary disclosure (Kim et al., 2008; Samaha et al., 2015). Nevertheless, Anderson and Anthony (1986) argue that CEO duality establishes a clear-cut leadership in the formulation and the implementation of a firm's strategy. As a result, this leads to higher efficiency. They support the view that a unified leadership structure can limit information sharing costs and minimize the conflict of interests between the CEO and non-CEO chairman. Supporters of duality also highlight the importance of clear lines of authority and unity of command to restrict conflicts and improve decision making (Rhoades et al., 2001). Therefore, CEO duality may lead to higher levels of accounting disclosure. The results of previous studies that investigate the relationship between disclosure quality and CEO duality are mixed. While Allegrini and Greco (2013) and Li et al. (2008) document a significantly negative association between CEO duality and voluntary disclosure, other empirical investigations report an insignificant or a positive association between the variables (Cheng and Courtenay, 2006; Haniffa and Cooke, 2002).

Good corporate governance practices affect firm performance. There is extensive reference in the literature investigating the role and importance of corporate governance on a firm's performance. Corporate governance theory has attracted many researchers who argue that a firm should contribute positively to society (Carroll, 1999; Fisher, 2004), examining its non-financial information. For example, a firm can give some information about its regulatory and legal obligations and philanthropic opportunities (Iatridis, 2015). These social obligations integrate the idea that firms and society should operate together (Wood, 1991; Rezaee, 2009).

The basic reasons for including the ESG information in the corporate board agenda are the increasing social impacts of corporate scandals and the call for greater stakeholder orientation (Spitzeck, 2009; Jensen and Berg, 2011; Boiral, 2013). Moreover, European

Union law obligates firms to include information on both corporate governance and ESG information in their annual reports. This is a step towards IR since the non-financial performance of each firm should be stated comprehensively in annual reports (KPMG, 2010). IR is going to be the future for the ESG and corporate governance (Kolk and Pinkse, 2010). This is encouraged by the European Union Commission's ongoing discussions about the harmonization of the Transparency Directive, which contains the EU's disclosure rules for listed companies. The use of an integrated way in narrative reporting rules seems to be an important topic (EU Commission, 2011).

2.11.2. IR, earnings management and discretionary accruals

The second monitoring system is earnings management. Earnings quality is an important indicator of financial performance and influences firms' disclosure decisions. When managers are under pressure, they exploit the flexibility of them afforded under Generally Accepted Accounting Practices (GAAP) to manage earnings and to reach their goals. Under the ethical perspective, firms that disclose ESG information would be less inclined to manage their earnings, and hence their earnings disclosures are more honest and sincere (Francis et al., 2008).

"Integrated thinking" is introduced to explain the relation between IR and earnings quality. It is an attempt to find an optimal balance between managing short-term business imperatives and ongoing value creation (Churet and Eccles, 2014). Management actions that reduce the quality accounting information of the financial statements consist in the notion of earning management (Kinney et. al., 2004). Earning management appears when managers manipulate the accounting numbers (Fields et al., 2001). Managers apply this practice when they believe that the users of accounting information cannot understand and estimate the effect of earnings management. Earnings management provides lower quality of earnings. This results in the lower predictive ability of forecasted earnings and cash flows (Lev, 2003) and misleads investors into creating unethical practices (Kaplan, 2001).

Earnings management is a phenomenon which has been considered by academic researchers, financial markets regulators, operators and investors as one of the main indicators of financial performance of a firm. There are many crumples where managers manipulate accounting earnings. The most important reasons are related to the creation of compensation contracts (Guidry et. al., 1999; Healy, 1985; Holthausen, et. al., 1995), the reduction of political costs (Key, 1997; Watts and Zimmerman, 1986), loss avoidance (Burgstaher and Bichev, 1997), avoidance of debt covenant violations (DeFond and Jiambalvo, 1994), management buyouts (DeAngelo, 1986; Perry and Williams, 1994) and stock-financed acquisitions (Erickson and Wang, 1999).

2.11.2.1 Earnings smoothing

Earning management appears when managers manipulate the accounting numbers (Fields et al., 2001) smoothing them. Managers apply this practice when they believe that the users of accounting information cannot understand and estimate the effect of earnings management. Stable earnings stream is capable of supporting a higher level of dividends than a more variable earnings prospect. Earnings variability is interpreted as an important measure of the overall riskiness of the firm and has a direct effect on investors' capitalization rates and thus has an adverse effect on the value of a firm's shares and investors' subjective expectations for possible outcomes of future earnings and dividends (Burgstahler and Eames, 2003). Earnings management provides lower quality of earnings. This results in lower predictive ability of forecasted earnings and cash flows (Lev, 2003) and misleads investors to create unethical practices (Kaplan, 2001).

In addition, the theory of market equilibrium under conditions of uncertainty, agrees that smoothing represents an overt attempt to counter the cyclical nature of reported earnings, thereby tends to reduce the covariance of a firm's expected returns with returns on the market portfolio (Sharpe, 1970). Some researchers are not convinced by managers' motives of wanting to manage earnings and have advanced alternative

reasons, other than those advanced about why managers manage earnings. These include influencing potential managerial motivations/incentives, (Healy, 1985) and taking pressure off affiliated parties.

2.11.2.2. Earning management and ESG

There are few studies that test the association between ESG performance and earning management. Earning management can be related negatively, positively or not related with ESG performance. Firms with high ESG performance and better financial transparency should be associated negatively with earning management practices. There are many studies that focus on the positive association between ESG performance and financial performance (Waddock and Graves, 1997, p. 305; Griffin and Mahon, 1997; Roman et al., 1999). A firm experiencing economic development can make investments related to ESG performance policy, which can improve the firm's performance. This economic slack pushes the firm to abominate aggressive earnings management policies. Ethical obligation, reputation, and financial performance motivations for ESG performance predict a negative relation between ESG performance and earnings management (Waddock and Graves, 1997, p.312)

The negative association between ESG performance and earnings management can be explained by two factors. The first focuses on the effects of ethical implications of ESG performance on financial reporting. The other is related to the positive impact of the firms' reputation, which is created by ESG performance (Fombrun and Shanley, 1990; Linthicum et al., 2010). When a firm aims to value and to protect its reputation, its management should be inhibited from creating socially unacceptable activities. Managers ensure the previous goals by using ESG, maintaining the reputation of a firm at a high level. They also avoid earning management practices, which can damage the firm's profile (Linthicum et al., 2010).

However, there are some studies that predict a positive association between ESG performance and earnings management. This relies on opportunistic use of ESG

performance that is made by managers in order to be benefited ([Jensen and Meckling, 1976](#); [Carroll, 1979](#)). Moreover, when firms with high ESG performance try to implement the shareholders' demands, their financial performance can be affected negatively, leading firms' managers to manage the reported earnings. There is no relation between earnings management and ESG performance, when earnings management is affected by institutional factors unrelated to ESG performance ([Chih et al., 2008](#)). Firms with high disclosure scores of ESG performance had more discretionary accruals ([Belkaoui-Riahi, 2004](#)).

To solve this situation the role of external auditors is crucial. Earnings quality and external audit assist investors by aligning the objectives of management with the objectives of shareholders, thereby enhancing the reliability of financial information and the integrity of the financial reporting process ([Watts and Zimmerman, 1986](#)). Parallel to this, previous empirical studies investigated the effect of the presence of the audit committee on financial reporting ([Beasley, 1996](#); [Forker, 1992](#); [Peasnell, et al., 2001](#); [Li et al., 2015](#)) and earnings management ([Peasnell, et al., 2005](#)). High-quality control protects investors and improves the value of the firm ([Black et al., 2006](#)). The input of sustainable value creation gives the firm the ability to remain competitive in a fast-changing business environment. This gives power to managers to create a competitive infrastructure in a fast-changing business environment and manage new types of risks and opportunities associated with ESG issues ([Churet and Eccles, 2014](#)). Managers with a high proportion of equity do not tend to manipulate the accounting numbers ([Warfield et al., 1995](#)). Firms with a large proportion of block-holders of shares, appear to have more credibility in their financial statements and provide higher scrutiny over management activities ([Dechow et al., 1995](#)). Moreover, the existence of non-institutional investors reduces earnings management practices because of the advantage of more access to timely and relevant information ([Balsam et al., 2003](#)).

2.11.3. IR and agency costs

According to agency theory, firms should implement adequate monitoring or control mechanisms to protect the shareholders and management from conflicts of interest. Managers should pursue the interests of shareholders and not only their own interests (Fama and Jensen, 1983; Kiel and Nicholson, 2003). The basic governance mechanisms which align the interests of the agent and the principal are the board of directors and an ownership structure (Daily et al., 2003). Board size, board independence, and the separation of CEO and chair positions with the aim of improving the effectiveness of the overall oversight are the basic issues that report the board of directors (Dalton et al., 1998; Coles and Hesterly, 2000; Daily et al., 2003). A higher number of non-executive directors on the board can improve the firms' performance. A board should consist of a large number of outside independent directors and have a separate position of chairman and CEO to increase shareholder value (Fama and Jensen, 1983; Jensen and Meckling, 1976; Shleifer and Vishny, 1997). This presence of independent members on boards of directors will enhance the board's ability to monitor management (Young, 2008). Atkins et al. (2015) concluded that specialist socially responsible investment managers are starting to attend private financial reporting meetings, while mainstream fund managers are starting to attend private meetings on ESG issues. Institutional investors play an active role in controlling managerial discretion and improving the efficiency of information in capital markets, as investors are more sophisticated due to advantages in processing information (Gonzalez and Garcia – Meca, 2014; Balsam et al., 2003; Koh, 2003; Ferreira and Matos, 2008; Ferreira et al., 2010). Hence, opportunism and agency costs are reduced (Shleifer and Vishny, 1997). It is also important to resolve agency problems by aligning management's interests with the objectives of shareholders (Demsetz and Lehn, 1985). Moreover, the opportunistic behavior of managers can be limited by the existence and contribution of external auditing. External auditors can be used as another important monitoring system. Auditors have the responsibility to provide reliable accounting information. It can lead

to the effective questioning of management (Cohen et al., 2008). When a firm is audited by independent and high quality external auditors, it shows low earnings management and hence better accounting information (Frankel et al., 2002; Krishnan, 2003). As Iatridis (2012b) argues, the domination of company boards by non-executive and independent directors, the presence of nomination and internal audit committees, as well as the firm's size, leverage, managerial and institutional ownership reduce agency costs (Singh and Davidson, 2003; Weir et al., 2002). Finally, according to many studies it also shows the magnitude of earnings management associated with agency costs (Jensen and Meckling, 1976; Eisenhardt, 1989; Liang, 2004; Goldman and Slezak, 2006; Drymiotis and Hemmer, 2013).

2.11.4. IR and firm's performance

Agency theory examines the effects of boards of directors and managerial share ownership on firm's performance (Jermias and Gani, 2014). According to this theory, the firm should implement adequate monitoring or control mechanisms to protect the shareholders and management from conflicts of interest. Managers should pursue the interests of shareholders and not only their own interests (Fama and Jensen 1983; Kiel and Nicholson 2003). The firm's performance is not improved by the simple existence of good governance. The creation of managerial incentives alone is not sufficient for superior performance and should be supported by boards which capably perform their duties (Jermias and Gani, 2014). The basic governance mechanisms which align the interests of the agent and the principal are the board of directors and an ownership structure. (Daily et al., 2003).

Board size, board independence, and the separation of CEO and chair positions with the aim of improving the effectiveness of oversight are the basic issues that report the board of directors (Dalton et al., 1998; Coles and Hesterly, 2000; Daily et al., 2003). A higher number of non-executive directors on the board can improve the firm's performance. A board should consist of a large number of outside independent directors

and have a separate position of chairman and CEO to increase shareholder value (Fama and Jensen, 1983; Jensen and Meckling, 1976; Shleifer and Vishny, 1997). But, a disproportionately high number of inside directors has a negative association with firm performance. This presence of independent members on boards of directors will enhance the board's ability to monitor management (Jermias and Gani, 2014).

As Iatridis (2012a) argues, the domination of company boards by non-executive and independent directors, the presence of nomination and internal audit committees, as well as the firm's size, leverage, managerial and institutional ownership, improves the firm's performance (Singh and Davidson, 2003; Weir et al., 2002). This presence of independent members on boards of directors will enhance the board's ability to monitor management. Institutional investors play an active role in controlling managerial discretion and improving the efficiency of information in capital markets, as investors are more sophisticated with advantages in processing information (Gonzalez and Garcia – Meca, 2014; Balsam et al., 2003; Koh, 2003; Ferreira and Matos, 2008; Ferreira et al. 2010).

It is also important to resolve agency problems by aligning management's interests with the objectives of shareholders (Demsetz and Lehn, 1985). Moreover, the opportunistic behavior of managers can be aligned with the contribution of external auditing. External auditors can be used as another important monitoring system. Auditors have the responsibility to provide reliable accounting information. They lead to effective questioning of management (Cohen et al., 2008). When a firm is audited by independent and high quality external auditor it shows low earnings management and hence better accounting information and improvement performance (Frankel et al., 2002; Krishnan, 2003).

The concept of “integrated thinking” has been introduced to explain the relation between IR and firm performance. This concept attempts to find an optimal balance between managing short-term business imperatives and ongoing value creation (Churet

and Eccles, 2014). It is also important to resolve agency problems by aligning management's interests with the objectives of shareholders (Demsetz and Lehn, 1985). Moreover, the opportunistic behavior of managers can be aligned through the contribution of external auditing. External auditors can be used as another important monitoring system. Auditors have the responsibility to provide reliable accounting information and to effectively question management (Cohen et al., 2008). A firm that is audited by independent, high-quality external auditors indicates low earnings management, better accounting information and improved performance (Frankel et al., 2002; Krishnan, 2003).

2.11.5. IR and value relevance of summary accounting information (i.e. book value of equity and earnings)

Before the use of IR, accounting mechanisms did not consider non-financial information and corporate financial information faced similar shortfalls, which failed to consider all the necessary factors that may have a significant impact on value creation (Ernst and Young, 2014). Value relevance has been examined by researchers for many years (Beaver, 2002). The fundamental notion generates an accounting value as value-relevant when it is significantly associated with the dependent variable (Carnevale et al., 2012). The fact that there was no convergence between the market value of firm's shares and their book value created the need for many researchers to explore the value relevance of non-financial information (Lourenco et al. 2014).

Previous studies concluded that there was a significant relation between the market value of equity and non-financial information. There is a great number of studies applying value relevance test the firms' environmental (Al-Tuwaijri et al. 2004; Barth and McNichols, 1994; Clarkson et al., 2011; Cormier and Magnan, 1997, 2007; Moneva and Cuellar, 2009). Cormier and Magnan (2007) found a positive relation between firms' earnings valuation multiples and environmental reporting in firms from Canada, France and Germany. Other studies focus on the corporate environmental reputation

effects to the current annual stock returns and current and future annual earnings (Hussainey and Salama, 2010). Parallel to this, another study of Australian firms concluded in a negative relation between a firm's value and its carbon intensity profile (Chapple et al., 2011).

Baboukardos (2017) in his study, using a sample of 692 firm-year observations of French listed firms, tries to broaden investors understanding of the value relevance of environmental performance, by providing empirical evidence on the role of IR. He finds that firms with recognized environmental provisions on their balance sheets enable investors to estimate a strong future financial performance. He concludes that capital market participants place a positive and significantly higher value on the environmental performance ratings of firms with recognized environmental provisions, than on the ratings of firms without environmental provisions.

On the contrary, there have been studies that have shown the opposite relation between sustainability reporting and value relevance. The results were derived from a sample of European banks, in which the disclosure level of sustainability information exhibit an opposite behavior of value relevance of their net assets. Banks that don't apply sustainability reporting perform better view of value relevance (Carnevale et al., 2012; Lourenco et al. 2014).

2.11.6. IR and multiple-based valuation models

One of the seven guiding principles of IR is materiality (IIRC, 2015). In this part highlighted the importance of evaluation. ESG issues may present new risks and opportunities which affect the firms performance and valuation (GRI, 2013). Multiple-based valuation models (relative valuation models) evaluate the firm's intrinsic value implementing only accounting numbers. In this study the multiple-based screening method is used, which is the most common used multiples valuation technique. It is separated into two sub-categories; in technical screens, where it defines the investment strategies based on trading indicators, and in fundamental screens, where it compares

the stock's price to specific accounting items of a company's financial reports, such as P/E ratios (Penman, 2007)

Tasker (1998) shed light on multiple's academic research, indicating that industry does matter in the choice of the appropriate multiple. She examined cross-industry accounting-based valuation models and analyzed how these patterns were used by investment bankers when the correct offer price of target firms in takeover transactions was estimated. Since her analysis and results derived from small sample, these results could not be generalized for each industry population but it could be noted that for each industry there was a "preferred multiple". Furthermore, when the selection of the set of comparable firms was based on similar historical earnings growth and not on randomly selected firms of this industry, then a smaller valuation error could be implemented (Boastman and Baskin, 1998).

Demirakos et al., (2003) examining a sample of "104 sell side analyst's equity research reports covering 26 companies" conclude that the single-period comparative, especially the P/E ratio, is the dominant valuation methods in the assessed analyst's reports. This ratio appears to be more popular in sectors with many tangible assets and characterized by stability, such as the beverage sector rather than more fast-growing with less intangible assets sectors, such as electronics and pharmaceutical.

Following Burgstahler et al. (2006) and based on prior accounting research (e.g., Healy and Wahlen, 1999; Dechow and Skinner, 2000; Leuz et al., 2003), two different proxies can be computed capturing a range of earnings management activities, such as the magnitude of total accruals, the smoothness of earnings relative to cash flows and the association between accounting accruals and operating cash flows (e.g., Lang et al., 2003; Wysocki, 2004; Lang et al., 2006). These two proxies are used as an important indicator of financial performance and influence firms' disclosure decisions (Francis et al., 2008). IR can be a useful proxy to control the behavior of discretionary accruals, recognizing social trends which are likely to affect positive business developments and

creating appropriate internal incentives that encourage a long term-view ([Churet and Eccles, 2014](#)).

3. Hypotheses Development

A number of hypotheses are developed to examine the effects on IR disclosure quality of firm performance, corporate governance, agency costs, earnings quality, value relevance of summary accounting information (i.e., the book value of equity and earnings) and multiple-based valuation models. The hypotheses presented in this study will create expectations for a higher degree of economic integration through IR implementation and provide more complete information to shareholders and investors.

3.1. IR, disclosure quality and corporate governance

The mission of the IIRC is “to create a globally accepted IR Framework, 2013 which brings together ESG information in a clear, concise, consistent and comparable format”⁷ to “help business to make more sustainable decisions and enable investors and other stakeholders to understand how an organization is really performing”⁸. Equation (1) is created to investigate whether the level of IR disclosure quality is positively associated with effective corporate governance techniques. Researchers have predicted that there is a significant relation between corporate transparency and accountability and disclosure quality (Huafang and Jianguo, 2007). Corporate governance is an effective monitoring system (Gul and Tsui, 2001).

Although the directors are ultimately accountable for adherence to appropriate best practice principles, the direct responsibility of the Board is focused on the design and adoption of adequate policies, inculcating the required culture to adhere to such policies, and the subsequent oversight of the implementation of such policies. Management bears responsibility for the implementation of policies, strategy, business plans and the like. In order to ensure the effective functioning of the Board, King III

⁷<http://www.theiirc.org/the-iirc/>, accessed 07 January 2018

⁸<http://www.theiirc.org/about/>, accessed 07 January 2018

proposes a unitary board structure comprising executive, non-executive and independent non-executive members. The majority should be non-executives, of whom the majority should be independent. The Board should be chaired by an independent non-executive director. The CEO of the company should not also fulfil the role of the Chair of the Board. King III further proposes a formal election and induction process for new Board members, ongoing director development, and emphasizes the importance of effective Board performance. It also provides guidance on remuneration of directors and executives, and the composition and responsibility of Board committees. King III proposes that the Boards of all companies establish audit, risk, remuneration and nominations committees, and be assisted by a competent company secretary (Deloitte, 2009)

A board should consist of a large number of outside independent directors and have a separate position for the chairman and CEO to increase shareholder value (Fama and Jensen, 1983; Jensen and Meckling, 1976; Shleifer and Vishny, 1997). This presence of independent members on boards of directors enhances the board's ability to monitor management (Young et al., 2008). Effective corporate governance mechanisms, such as the existence of an audit committee and a nomination committee and the presence of independent directors, board of directors and management, can act as monitors of managers (La Fond and Watts, 2008). Therefore, independent directors affect a range of board decisions, such as the firing of nonperforming CEOs (Weisbach, 1988), resistance to greenmail payments (Kosnik, 1987) and the negotiation of tender offers (Byrd and Hickman, 1992).

***Hypothesis 1:** Firms that enrich their annual reports with IR components provide high-quality accounting disclosure and therefore exhibit more effective corporate governance mechanisms.*

King III emphasises the fact that risk management should be seen as an integral part of the company's strategic and business processes. The Board's responsibility for

governance of risk should be set out in a risk management policy and plan. The Board should consider the risk policy and plan, and should monitor the whole risk management process. While the Board remains responsible for the risk management policy and the determination of the company's risk appetite and risk tolerance, management is responsible for the design, implementation and effectiveness of risk management. The Board should receive combined assurance regarding the effectiveness of the risk management process. The Board may assign its responsibility for risk management to the risk committee. Membership of this committee should include executive and non-executive directors. Where the company decides to assign this function to the audit committee, careful consideration should be given to the resources available to the audit committee to adequately deal with governance of risk in addition to its audit responsibilities (IoD, 2009).

3.2. IR and earnings quality and discretionary accruals

In the question of how managers behavior to manipulate their firm's accounting numbers can be controlled and estimated, and under what conditions earnings management can be applied, many empirical accounting studies have supported the view that accruals provide management with the opportunity to alter earnings (Bhattacharya et al., 2012). Discretionary accruals are used as a proxy for earnings management, since they can be used as surrogates for earnings quality and earnings management (Jones 1991; DeFond and Subramanyam 1998; Kothari et al. 2004).

The opportunistic earnings management literature, largely based on Healy (1985) research, found that managers use accruals to strategically increase or decrease bonus income.⁹ For example, the most common manipulation strategy of managers is based

⁹ Schipper (1989) identifies both internal and external incentives for earnings management. We focus our attention on internal incentives.

on earnings smoothing. They defer income through accruals when profit target for a bonus plan cannot be achieved or when bonuses have already reached maximum levels, and can accelerate income in other periods. [Guidry et al. \(1999\)](#) in their study use data from businesses' unit level rather than firm level. They conclude with the same results as Healey's bonus manipulation effects. [Gaver et al. \(1995\)](#) study discretionary accruals instead of total accruals and find that earnings are manipulated, but to smooth income rather than manipulate bonuses.

[Goel and Thakor \(2003\)](#) interpret the theoretical background upon which earnings management (in the form of earnings smoothing) generates value for shareholders. They observe in their model, that the higher level of the volatility of the underlying stock, the greater the incentive informed investors have to collect information and reported profit at the expense of liquidity traders. Thus, earnings smoothing by managers reduces volatility, in an effort to protect investors with no information.

[Holthausen et al. \(1995\)](#) also conclude that managers may use accruals to defer earnings for current use and shift them in next use with the goal of maximizing long-term bonus income. However, when earnings are in the middle of the upper and lower bounds, defined by performance based contracts and performance based compensation, it is more varied to reported earnings. Executive managers may persistently manipulate earnings upward rather than smoothing earnings over time ([Cornett et al., 2009](#)).

On the other hand, some recent studies focus on the relation between earnings quality, stock prices and managers' wealth. This is done using two different ways. Option and restricted stock compensation are the direct managers' choices, which can increase its wealth by inflating stock prices. Indeed there are studies that conclude with the fact that such compensation is related to where higher degrees of earnings management are dominant ([Cornett et al., 2009](#)).

For example, in their study [Teoh et al. \(1998 a,b\)](#) conclude that firms which use more aggressive accrual policies, prior to IPOs and SEOs, tend to have poorer post-issue

stock price performance than firms with less aggressive accounting policies. Their results suggest that earnings management inflates stock prices prior to the IPO or SEO. The study of [DuCharme et al. \(2004\)](#) aligned with those of [Teoh et al. \(1998a,b\)](#) and find that managers appear artificially reported earnings prior to stock offers. They have as a goal to maximize the net benefit of a stock offering to existing shareholders at the expense of new shareholders and conclude that there is a negative association between returns and abnormal accruals. Finally, [Beneish and Vargus \(2002\)](#) focus on periods of abnormally high accruals, which inflate earnings and observe a positive relation between abnormally high accruals and inside sales of shares and that after the “event period” stock returns have the tendency to be poor.

[Gao and Shrieves \(2002\)](#), [Bergstresser and Philippon \(2006\)](#), [Cohen et al. \(2004\)](#), and [Cheng and Warfield \(2005\)](#) in their studies conclude that the use of discretionary accruals and manipulation of reported earning is more common at firms where top management compensation is more closely tied to the value of stock in general and options more particularly. [Burns and Kedia \(2003\)](#) illustrate that firms whose CEOs have large option positions have the tendency to rasp earnings restatements.

Accruals are the best instrument for earning management rather than cash earnings. This occurs because accruals can be difficult to manage and cannot be manipulated easily ([Schipper, 1989](#); [Burilovich and Kattelus, 1997](#)). Using accruals it is reduced timing and mismatching problems in the underlying cash flows. When estimated future cash flows are used to measure accruals, estimation errors or noise are included. As the estimation error is increased, the accruals quality is decreased ([Dechow and Dichev, 2002](#)).

Following [Burgstahler et al. \(2006\)](#) and based on prior accounting research (e.g., [Healy and Wahlen, 1999](#); [Dechow and Skinner, 2000](#); [Leuz et al., 2003](#)), two different proxies are computed capturing a range of earnings management activities, such as the magnitude of total accruals, the smoothness of earnings relative to cash flows and the

association between accounting accruals and operating cash flows. These proxies may be not perfect and indicate earnings management only in a relative sense, but relative measures meet the demands of the design of this thesis (Lang et al. 2003; Lang et al. 2006). The claims that are set out above are listed in the hypothesis below.

Hypothesis 2a: *Firms that enrich their annuals reports with IR components provide a high quality of accounting disclosure and therefore exhibit higher earnings quality.*

Hypothesis 2b: *Firms that provide IR disclosures are likely to apply low discretionary accruals.*

Earnings quality is an important indicator of financial performance and influences firms' disclosure decisions (Francis et al., 2008). IR can be a useful proxy to control the behavior of discretionary accruals. It recognizes social trends which are likely to affect positive business developments, creating appropriate internal incentives that encourage a long term-view (Churet and Eccles, 2014)

3.3. IR and agency costs

Observing agency theory can control the role of boards that affects the firms' management and leads managers to manipulate the firm's accounting numbers (Xie et al., 2003; Kao and Chen, 2004; Goodwin et al., 2009). It is proven that outside directors are negatively related to earnings management (Klein, 2002; Xie et al., 2003; Peasnell et al., 2005; Davidson et al., 2005; Benkel et al., 2006; Dimitropoulos and Asteriou, 2010). Effective corporate governance mechanisms, such as the existence of independent directors, can act as monitors of managers (La Fond and Watts, 2008). The existence of independent directors on the board improves accounting disclosures and illustrates the impact of board composition on corporate disclosures (Donnelly and Mulcahy, 2008; Huafang and Jianguo, 2007; Core et al., 1999). The presence of independent directors on the board controls management behavior, reduces the ability

of managers to make decisions that maximize their private benefits, and minimizes the adverse effects of the agency problem ([Renders and Gaeremynck, 2007](#)).

Hypothesis 3: Firms that enrich their annual reports with IR components provide high-quality accounting disclosure and therefore exhibit lower agency costs.

King III proposes integrated reporting to ensure that all stakeholders are able to assess the economic value of the company. This entails the integration of the company's financial reporting with sustainability reporting and disclosure. The Board should ensure that the positive and negative impacts of the company's operations, as well as plans to improve the positives and eradicate the negatives, are conveyed in the integrated report. King III suggests that the Board may delegate oversight of the integrated report to an appropriate committee (either the audit committee or a sustainability committee). The audit committee should oversee the provision of independent assurance over sustainability issues and should assist the Board by reviewing the integrated reporting and disclosure to ensure that it does not contradict financial reporting ([Deloitte, 2009](#))

3.4. IR and firms performance

Studies vary in their assessment of which value driver (cash flows and accruals) performed better. [Sloan \(1996\)](#) suggests that it is better for financial analyses to be based on the cash flow component of profitability than on accruals. However, [Ohlson \(1995\)](#) and [Felthman and Ohlson \(1995\)](#) note that current profitability (return on assets) and growth in net operating assets better explained future profitability and provided a more accurate and less biased estimate of the intrinsic value of a firm. Growth in net operating assets is split into accruals and growth in long-run net operating assets. Accruals better indicate the quality of earnings because the GAAP reported that net income ignored information that was provided by accruals ([Chan et al., 2006](#)). However, in this analysis both value drivers of cash flows and accruals are used.

***Hypothesis 4:** There is a positive association between firm performance and the level of IR disclosure quality.*

3.5. IR and value relevance of summary accounting information (i.e. book value of equity and earnings)

Signaling theory is based on the idea of information asymmetry between the insiders and outsiders in a firm ([Akerlof, 1970](#); [Spence, 1973](#)). When this condition exists, the basic premise of signaling theory is that the managers of a high-quality firm want to signal the firm's value to its stakeholders ([Magness, 2009](#)). This theory is useful to clarify the importance of information regarding the ESG of a firm to other parties, both in the case of information disclosed by the firm itself ([Hasseldine et al., 2005](#); [Magness, 2009](#); [Toms, 2002](#)) and in the case of information provided by external parties ([Hussainey and Salama, 2010](#)). Following signaling theory, firms are considered to provide more ESG principles to inform stakeholders. Hence, firms provide value-relevant information to investors about the firm's organizational effectiveness compared to that of competing firms ([Hussainey and Salama, 2010](#)). Non-financial information reduces investor uncertainty and influences the firm's share price ([Ramchander et al., 2012](#); [Lourenco et al., 2014](#)).

Empirical studies suggest that firms which applied King III report principles, particularly those from South Africa, illustrated sufficient information about risks, challenges ([Marx and Mohammadali-Haji, 2014](#)) and uncertainties, and suggested ways for improvement ([Ernst and Young, 2014](#); [Baboukardos and Rimmel, 2016](#)). [De Klerk and De Villiers \(2012\)](#) examined the value relevance of ESG disclosures and concluded that their results supported the business case for high-quality integrated reports, advanced by the [IRCSA \(2011\)](#) and the [IIRC \(2013c\)](#). Moreover, after IR adoption, the valuation coefficients of earnings remained steadily higher than they were before. The improvement signals in the value relevance of earnings became visible after the first year of the King III report adoption and became relevant regarding the book value of

equity after the second year ([Baboukardos and Rimmel, 2016](#)). The abovementioned assertions can be formally stated in the following hypothesis.

Hypothesis 5: Firms with high IR disclosure quality tend to exhibit a higher value relevance of summary accounting information (i.e., the book value of equity and earnings).

3.6. IR and multiple-based valuation models

When price-to-value driver multiples are used, problems arise regarding how analysts should estimate the numerator and the denominator in a pricing multiple on a comparable basis. The normal situation is to apply an equity or entity perspective method both in numerator and denominator. If an equity value item, such as share price, is located in the numerator, then the denominator should use an equity perspective value driver, such as net income or profit from continuous operations. The same approach should apply if analysts prefer to estimate a price-to-value driver multiple using the entity perspective. An entity perspective multiple can put the value of the entity (debt plus equity) in the numerator, whereas sales or earnings before interest and taxes (EBIT) can be placed in the denominator. However, in many situations analysts prefer to marry entity and equity perspectives to create a suitable multiple. For example, internet and high tech firms use an equity value item, such as share price, as the numerator. However, because the equity perspective value driver (i.e., net income) usually has a negative value, analysts prefer to substitute an equity perspective value driver with an entity perspective value driver (i.e., sales or EBIT) in the denominator ([Bradshaw and Sloan, 2002](#)). The claims outlined above are listed in the hypothesis below.

Hypothesis 6: Firms with a high IR disclosure quality tend to exhibit a higher valuation index compared to firms with a lower IR disclosure quality.

4. Research Design

In this chapter the econometric methodology used in this thesis is analyzed, the methodology of accounting models, the procedure of checklist creation, the design of sample selection and the models specification. First, in section 4.1, the methodology of Logit Probit Models (LPM) is analyzed, then the Maximum Likelihood Estimation of LPM. Panel data methodology is illustrated in section 4.2. It highlights the fixed effects methodology and the Heckman correction method. Second, in section 4.4, the most used accrual-based models are analyzed (e.g Modified Jones model ([Dechow et al \(1995\)](#); Jones model (1991); DeAngelo model (1986); Event Period Model ([McNichols and Wilson \(1988\)](#))). Third, in section 4.5, the procedure for creating the IR checklist is presented. Fourth, in section 4.6, the design of sample selection is analyzed. In the last section of this chapter, six model specifications are analyzed. In section 4.7 six models based on previous accounting methodology are created and discussed.

4.1. Logit and Probit Models for Binary Response

There are two most important disadvantages in which the fitted probabilities can ~~be~~ take a value less than zero or greater than one, and the partial effect of any explanatory variable (appearing in level form) is constant. In order to overcome these limitations of the LPM, more sophisticated binary response models can be used ([Wooldddridge, 2013, p. 576](#)). In a binary response model, interest lies primarily in the response probability

$$P(y = 1 |x) = P(y = 1 |x_1, x_2, \dots, x_k) \quad (M-1)$$

where x is used to indicate the full set of explanatory variables. For example, when ~~as~~ variable y is set as an employment indicator, then variable x might be contained various individual characteristics. Some individual characteristics can be education, age, marital status, and any other factors which can affect employment status, including a binary indicator variable for participation in a recent job training program ([Wooldddridge, 2013, p. 576](#)).

4.1.1. Specifying Logit and Probit Models

In the LPM, it is assumed that the response probability is linear in a set of parameters, β_j . In order to avoid the LPM limitations, a class of binary response models should be considered, which have the formation of equation (M-2),

$$P(y = 1 | x) = G(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k) = G(\beta_0 + x\beta), \quad (M-2)$$

Where the function $G(z)$ takes values between zero and one: $0 < G(z) < 1$ for all real number z . This confirms that the estimated response probabilities take values between zero and one. Then, the equation (M-2) is formulated as: $\beta = \beta_1 x_1 + \dots + \beta_k x_k$. There are many nonlinear functions which can be included in the function $G(z)$ in order to confirm that the probabilities take values between zero and one. In this section two cases which enhance the most cases of LPM are analyzed ([Wooldridge, 2013, p. 576](#)). In the logit model, $G(z)$, the logistic function is:

$$G(z) = \frac{\exp(z)}{[1 + \exp(z)]} = \Lambda(z), \quad (M-3)$$

which is illustrated in (M-3) equation. $G(z)$ takes values between zero and one for all real numbers z . This is the cumulative distribution function for a standard logistic random variable. In the probit model, the function $G(z)$ takes the standard normal Cumulative Distribution Function (CDF), which is illustrated as an integral:

$$G(z) = \Phi(z) = \int_{-\infty}^z \varphi(v) dv \quad (M-4)$$

where $\varphi(z)$ is the standard normal density

$$\varphi(z) = (2\pi)^{-1/2} \exp(-z^2/2) \quad (M-5)$$

The decision to choose $G(z)$ again ensures that (M-2) highly takes values between zero and one of all the parameters and the x_j . The $G(z)$ functions in formulas (M-3) and (M-4) are both increasing functions. Each increases most quickly at $z = 0$, $G(z) \rightarrow 0$ as $z \rightarrow -\infty$, and $G(z) \rightarrow 1$ as $z \rightarrow \infty$. Logit and probit models can be created from an

underlying latent variable model (Wooldridge, 2013, p. 576). Let y^* be an unobserved, or latent, variable, determined by

$$y^* = \beta_0 + x\beta + e \quad y = 1[y^* > 0], \quad (M-6)$$

where it is introduced the notation $I[\cdot]$ to create a binary result. The function $I[\cdot]$ is called the indicator function, which takes on the value one when the event in brackets is true, and zero otherwise. Therefore, y is one if $y^* > 0$, and y is zero if $y^* \leq 0$. It is assumed that e is an independent variable of x . The variable e presents either a standard logistic distribution or a standard normal distribution. In either case, the variable e is symmetrically distributed about zero, which means that $1 - G(-z) = G(z)$ for all real numbers z . (Wooldridge, 2013, p. 576).

From (M-6) and the assumptions given, the response probability for y can be derived:

$$P(y = 1 | x) = P(y^* > 0 | x) = P[e > -(\beta_0 + x\beta) | x] = 1 - G[-(\beta_0 + x\beta)] = G(\beta_0 + x\beta)$$

which is exactly the same as (M-2).

In most uses of binary response models, the basic goal is to explain the effects of the x_j on the response probability $P(y = 1 | x)$. The latent variable formulation tends to give the impression that it is primarily interested in the effects of each x_j on y^* . As it is proved for logit and probit models, the direction of the effect of x_j on $E(y^* | x) = \beta_0 + x\beta$ and on $E(y | x) = P(y = 1 | x) = G(\beta_0 + x\beta)$ is always the same. But the latent variable y^* rarely has a well-defined unit of measurement. (For example, y^* might be the difference in utility levels from two different actions.) Thus, the magnitudes of each j are not, by themselves, especially useful (in contrast to the linear probability model). For most purposes, it is required to estimate the effect of x_j on the probability of success $P(y = 1 | x)$, but this is complicated by the nonlinear nature of $G(\cdot)$ function (Wooldridge, 2013, p. 577).

To find the partial effect of roughly continuous variables on the response probability, it should rely on calculus. If x_j is a roughly continuous variable, its partial effect on $p(x) = P(y = 1 | x)$ is obtained from the partial derivative:

$$\frac{\partial p(x)}{\partial x_j} = g(\beta_0 + x\beta)\beta_j, \text{ where } g(z) \equiv \frac{dG}{dz}(z) \quad (M-7)$$

Because $G(\cdot)$ function is the CDF of a continuous random variable, g is a probability density function. In the logit and probit cases, $G(\cdot)$ is a strictly increasing CDF, and so $g(z) > 0$ for all z . Hence, the partial effect of x_j on $p(x)$ depends on x through the positive quantity $g(\beta_0 + x\beta)$. This can be interpreted that the partial effect always has the same sign as β_j .

Equation (M-7) illustrates that the relative effects of any two continuous explanatory variables do not depend on x : the ratio of the partial effects for x_j and x_h is β_j / β_h . Focusing on the typical paradigm, in which g is a symmetric density about zero, with a unique mode at zero, it is observed that the largest effect occurs when $\beta_0 + x\beta = 0$. For example, when a probit case is applied with $g(z) = \phi(z)$, $g(0) = \phi(0) = 1/\sqrt{2\pi} = 0.40$. When a logit case is applied to $g(z) = \frac{\exp(z)}{[1 + \exp(z)]^2}$, and so $g(0) = 0.25$. If x_1 is a binary explanatory variable, then the partial effect from goes x_1 from zero to one, holding all other variables fixed, is simply illustrated as

$$B(\beta_0 + \beta_1 + \beta_2 x_2 + \dots + \beta_k x_k) - G(\beta_0 + \beta_2 x_2 + \dots + \beta_k x_k) \quad (M-8)$$

It is confirmed that this depends on all the values of the other x_j . For example, if the variable y is an employment indicator and the variable x_1 is a dummy variable, indicating participation in a job training program, then the function (M-8) can be interpreted as the change in the probability of employment, due to the job training program. This originates from other factors that affect employability, such as education and experience. It should be cautioned that knowing the sign of 1 is sufficient in order to decide whether the program had a positive or negative effect. But if it required

estimating the magnitude of the effect, it should find it by using the quantity in (M-8). Moreover, the difference in (M-8) can also be used for other kinds of discrete variables (such as number of children) (Wooldddridge, 2013, p. 577). If x_k denotes this variable, then the effect on the probability of x_k going from c_k to $c_k + 1$ is simply illustrated as

$$G(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k(c_k + 1)) - G(\beta_0 + \beta_1 + \beta_2 x_2 + \cdots + \beta_k c_k) \quad (M-9)$$

It is straightforward to analyze the standard functional forms among the explanatory variables. For example, in the model

$$P(y = 1 | z) = G(\beta_0 + \beta_1 z_1 + \beta_2 z_1^2 + \beta_3 \log(z_2) + \beta_4 z_3)$$

the partial effect of z_1 on $P(y = 1 | z)$ is $P(y = 1 | z)/\partial z_1 = g(\beta_0 + x\beta)(\beta_1 + 2\beta_2 z_1)$, and the partial effect of z_2 on the response probability is $P(y = 1 | z)/\partial z_2 = g(\beta_0 + x\beta)(\beta_3/z_2)$ where $x\beta = \beta_1 z_1 + \beta_2 z_1^2 + \beta_3 \log(z_2) + \beta_4 z_3$.

Therefore, $g(\beta_0 + x\beta)(\beta_3/100)$ is the approximate change in the response probability when z_2 increases by 1%. (Wooldddridge, 2013, p. 578).

There is the case when it is required to estimate the elasticity of the response probability with respect to an explanatory variable. In that case care must be taken in interpreting the percentage changes in probabilities. This is explained using an example. When a change occurs in a probability from 0.04 to 0.06 represents a 2-percentage-point increase in the probability, but a 50% increase relative to the initial value. Using calculus, in the preceding model the elasticity of $P(y = 1 | z)$ with respect to z_2 can be illustrated as $\beta_3[g(\beta_0 + x\beta)/G((\beta_0 + x\beta))]$. In the first case, the elasticity appears always the same sign as β_3 , but it generally depends on all parameters and all values of the explanatory variables. If $z_3 > 0$, the second elasticity always has the same sign as the parameter β_4 (Wooldddridge, 2013, p. 576).

4.1.2. Maximum Likelihood Estimation of Logit and Probit Models

The estimation method of the LPM can be based on the use of the ordinary least squares, or, in some cases, weighted least squares. Since of the nonlinear nature of $E(y|x)$, OLS and WLS are not applicable. Nonlinear versions of these methods can be used and more specifically the use of Maximum Likelihood Estimation (MLE). In this section, the MLE methodology is analyzed. When the classical linear model assumptions occur, the OLS estimator is the maximum likelihood estimator (conditional on the explanatory variables). When it is focused on limited dependent variable models, maximum likelihood methods are indispensable. Because MLE is based on the distribution of y given x , the heteroskedasticity in $Var(y|x)$, is automatically accounted for (Wooldridge, 2013, p. 579).

It is assumed that a random sample of size n . In order to obtain the maximum likelihood estimator, conditional on the explanatory variables, it should define the density of y_i given x_i the formula which can be written as

$$f(y|x;\beta) = [G(x_i\beta)]^y [1 - G(x_i\beta)]^{1-y} \quad y = 0,1, \quad (M-10)$$

where, for simplicity, it absorbs the intercept into the vector x_i . When $y=1$ it is observed that the formula forms as $G(x_i)$ and when $y=0$, the formula forms as $1-G(x_i\beta)$. The log-likelihood function for observation i is a function of the parameters and the data (x_i, y_i) and is obtained by taking the log of (M-10):

$$l_i(\beta) = y_i \log[G(x_i\beta)] + (1 - y_i) \log[1 - G(x_i\beta)] \quad (M-11)$$

Because $G(\cdot)$ takes values between zero and one for logit and probit, $l_i(\beta)$ is well defined for all values of β . The log-likelihood for a sample with size of n observation, the formula is illustrated in (M-11) across all observations: $L(\beta) = \sum_{i=1}^n l_i(\beta)$. The MLE of β denoted by $\hat{\beta}$ maximizes this log-likelihood. If $G(\cdot)$ is the standard logit

CDF, then $\hat{\beta}$ the logit estimator; if $G(\cdot)$ is the standard normal CDF, then $\hat{\beta}$ is the probit estimator (Wooldridge, 2013, p. 576).

4.2. Methodology of panel data analysis

4.2.1. Methodology of Econometric Estimations

In this chapter, the most commonly used techniques for time-series cross-section data analyses in single equation models will be surveyed. It is applied univariate analysis and created both Pearson and Spearman correlations matrixes to test the six hypotheses of this thesis. In the subsequent multivariate analysis the fixed-effects OLS method is used¹⁰. In all the estimations, the Newey and West (1987) method modified for use in a panel data set is implemented. Through this method, robust standard errors are created (Liang and Zeger, 1986; Moulton, 1986; Andrews, 1991; Rogers, 1993; Williams, 2000). The Newey-West approach was suitable for panel data, and the estimation results were consistent regarding heteroskedasticity and autocorrelation (Cecchetti et al., 1997; Sun and Cui, 2014). Finally, the independent variables were standardized to mitigate multicollinearity issues (Kim and Park, 2010).

4.2.2. Panel data models

A panel data (or longitudinal data) set consists of a time series for each cross-sectional member in the data set (Wooldridge, 2013, p.10). There are studies which use panel, or longitudinal, data sets (Greene, 2002, p. 284).

The key feature of panel data that distinguishes them from a pooled cross section is that the same cross-sectional units (individuals, firms, or counties in the preceding examples) are followed over a given time period (Wooldridge, 2013,p.10). In the

¹⁰Fixed-year effects and two-digit SIC industry fixed effects were included.

typical panel, however, there are a large number of cross-sectional units and only a few periods. Thus, the time-series methods discussed there may be somewhat problematic. Recent work has generally concentrated on models better suited to these short and wide data sets. The techniques are focused on cross-sectional variation, or heterogeneity. The fundamental advantage of a panel data set over a cross section is that it will allow the researcher greater flexibility in modeling differences in behavior across individuals (Greene, 2002, p. 285).

The basic framework for this discussion is a regression model of the form

$$y_{it} = x'_{it}\beta + z'_i\alpha + \varepsilon_{it}. \quad (M-12)$$

As Greene (2002) and Baltagi (2005) and analyzes that there are K regressors in x_{it} , not including a constant term. The heterogeneity, or individual effect is $z'_i\alpha$ where z_i contains a constant term and a set of individual or group specific variables, which may be observed, such as race, sex, location, and so on or unobserved, such as family specific characteristics, individual heterogeneity in skill or preferences, and soon, all of which are taken to be constant over time t . As it stands, this model is a classical regression model. If z_i is observed for all individuals, then the entire model can be treated as an ordinary linear model and fit by least squares. Various cases it will be considered. The first case is the pooled regression. If z_i contains only a constant term, then ordinary least squares provides consistent and efficient estimates of the common α and the slope vector β (Greene, 2002, p.284). The second case is that of fixed effects: this case explains that if z_i is unobserved, but correlated with x_{it} , then the least squares estimator of β is biased and inconsistent as a consequence of an omitted variable. However, in this instance, the model

$$y_{it} = x'_{it}\beta + \alpha_i + \varepsilon_{it}.$$

where $\alpha_i = z'_i\alpha$ embodies all the observable effects and specifies an estimable conditional mean. This fixed effects approach takes α_i to be a group-specific constant

term in the regression model. It should be noted that the term “fixed”, as used here, indicates that the term does not vary over time, not that it is non stochastic, which need not be the case (Baltagi, 2005, p.135; Greene, 2002, p. 285; Wooldridge, 2009, pp.484-485). The third case is that of random effects. This case explains that if the unobserved individual heterogeneity, however formulated, can be assumed to be uncorrelated with the included variables, then the model may be formulated as

$$y_{it} = x'_{it}\beta + E[z'_{ia}] + \{z'_{ia} - E[z'_{ia}]\} + \varepsilon_{it} = x'_{it}\beta + \alpha + u_i + \varepsilon_{it},$$

that is, as a linear regression model with a compound disturbance that may be consistently, albeit inefficiently, estimated by least squares. This random effects approach specifies that u_i is a group specific random element, similar to ε_{it} except that for each group, there is but a single draw that enters the regression identically in each period. Again, the crucial distinction between these two cases is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not. This basic formulation will be examined, then consideration of an extension to a dynamic model (Baltagi, 2005, p.176; Greene, 2002, p. 285; Wooldridge, 2009, p.492-495). The fourth case is that of random parameters. The random effects model can be viewed as a regression model with a random constant term. With a sufficiently rich data set, this idea may be extended to a model in which the other coefficients vary randomly across individuals as well. The extension of the model might appear as

$$y_{it} = x'_{it}(\beta + h_i) + (\alpha + u_i) + \varepsilon_{it},$$

where h_i is a random vector which induces the variation of the parameters across individuals. This random parameters model was proposed quite early in this literature, but has only fairly recently enjoyed widespread attention in several fields. It represents a natural extension, in which researchers broaden the amount of heterogeneity across individuals, while retaining some commonalities- the parameter vectors still share a common mean (Greene, 2002, p. 285). Some recent applications have extended this yet

another step by allowing the mean value of the parameter distribution to be person-specific, as in

$$y_{it} = x'_{it}(\beta + \Delta z_i + h_i) + (\alpha + u_i) + \varepsilon_{it},$$

where z_i is a set of observable, person specific variables, and Δ is a matrix of parameters to be estimated. Finally the fifth case is that of covariance structures. It will be reconsidered the source of the heterogeneity in the model. In some settings, researchers have concluded that a preferable approach to modeling heterogeneity in the regression model is to layer it into the variation around the conditional mean, rather than in the placement of the mean (Greene, 2002, p. 286). In a cross-country comparison of economic performance over time, Alvarez et al. (1991) estimated a model of the form

$$y_{it} = f(\text{labor organization}_{it}, \text{political organization}_{it}) + \varepsilon_{it}$$

in which the regression function was fully specified by the linear part, $x'_{it}\beta + \alpha$, but the variance of ε_{it} differed across countries. Beck et al. (1993) found evidence that the substantive conclusions of the study were dependent on the stochastic specification and on the methods used for estimation.

4.2.3. Fixed effects

This formulation of the model assumes that differences across units can be captured in differences in the constant term. Each α_i is treated as an unknown parameter to be estimated. Let y_i and X_i be the T observations for the i th unit, i be a $T \times 1$ column of ones, and let ε_i be associated $T \times 1$ vector of disturbances (Greene, 2002, p. 287). Then,

$$y_i = X_i\beta + i\alpha_i + \varepsilon_i.$$

Collecting these terms gives

$$\begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{bmatrix} = \begin{bmatrix} X_1 \\ X_2 \\ \vdots \\ X_n \end{bmatrix} \beta + \begin{bmatrix} i & 0 & 0 & \dots & 0 \\ 0 & i & 0 & \dots & 0 \\ 0 & 0 & i & \vdots & 0 \\ 0 & 0 & 0 & \dots & i \end{bmatrix} \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \vdots \\ \alpha_n \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_n \end{bmatrix}$$

$$y = [X \ d_1 \ d_2 \ \dots d_n] \begin{bmatrix} \beta \\ \alpha \end{bmatrix} + \varepsilon_i \quad (M-13)$$

where d_i is a dummy variable indicating the i th unit. Let the $nT \times n$ matrix $D = [d_1 \ d_2 \ \dots d_n]$. Then, assembling all nT rows gives

$$y = X\beta + D\alpha + \varepsilon, \quad (M-14)$$

This model is usually referred to as the least squares dummy variable (LSDV) model (although the “least squares” part of the name refers to the technique usually used to estimate it, not to the model, itself). This model is a classical regression model, so no new results are needed to analyze it. If n is small enough, then the model can be estimated by ordinary least squares with K regressors in X and n columns in D , as a multiple regression with $K+n$ parameters. Of course, if n is thousands, as is typical, then this model is likely to exceed the storage capacity of any computer. But, by using familiar results for a partitioned regression, the size of the computation ~~it~~ can be reduced (Baltagi, 2005, p.175; Greene, 2002, p. 287; Wooldridge, 2009, p.488-489).

The least squares estimator of β is written as

$$b = [X'M_D X]^{-1} [X'M_D y], \quad (M-15)$$

Where, $M_D = I - D(D'D)^{-1}D'$.

This amounts to a least squares regression using the transformed data $X_* = M_D X$ and

$y_* = M_D y$. The structure of D is particularly convenient; its columns are orthogonal, so

$$M_D = \begin{bmatrix} M^0 & 0 & 0 & \dots & 0 \\ 0 & M^0 & 0 & \dots & 0 \\ 0 & 0 & M^0 & \vdots & 0 \\ 0 & 0 & 0 & \dots & M^0 \end{bmatrix} \quad \text{Each matrix on the diagonal is } M^0 = 1_r - \frac{1}{T} i i'$$

Premultiplying any $T \times 1$ vector z_i by M^0 creates $M^0 z_i = z_i - \bar{z}_i$ (Note that the mean is taken over only the T observations for unit i). Therefore, the least squares regression of

$M_D y$ on $M_D X$ is equivalent to a regression of $[y_{it} - \bar{y}_i]$ on $[x_{it} - \bar{x}_i]$, where \bar{y}_i and \bar{x}_i are the scalar and $K \times 1$ vector of means of y_{it} and x_{it} over the T observations for group i . (Greene, 2002, p. 288; Wooldridge, 2009, p.488-489) The dummy variable coefficients can be recovered from the other normal equation in the partitioned regression:

$D'Da + D'Xb = D'y$ or $a = [D'D]^{-1} D'(y - Xb)$. This implies that for each i ,

$$a_i = \bar{y}_i - b' \bar{x}_i \quad (M-16)$$

The appropriate estimator of the asymptotic covariance matrix for b is

$$Est.Asy.Var [b] = s^2 [X'M_D X]^{-1}, \quad (M-17)$$

which uses the second moment matrix with x 's now expressed as deviations from their respective group means. The disturbance variance estimator is

$$s^2 = \frac{\sum_{i=1}^n \sum_{t=1}^T (y_{it} - x'_{it}b - a_i)^2}{nT - n - K} = \frac{(y - M_D Xb)'(y - M_D Xb)}{(nT - n - K)} \quad (M-18)$$

The it th residual used in this computation is

$$e_{it} = y_{it} - x'_{it}b - a_i = y_{it} - x'_{it}b - (y_{it} - x'_{it}b) = (y_{it} - \bar{y}_i) - (x_{it} - \bar{x}_i)'b$$

Thus, the numerator in s^2 is exactly the sum of squared residuals using the least squares slopes and the data in group mean deviation form. But, done in this fashion, one might then use $nT - K$ instead of $nT - n - K$ for the denominator in computing s^2 , so a correction would be necessary (Greene, 2002, p. 288). For the individual effects,

$Asy.Var a_i = \frac{\sigma^2}{T} + \bar{x}'_i \{Asy.Var [b]\} \bar{x}_i$, so a simple estimator based on s^2 can be computed.

4.2.3.1. Testing the significance of the group effects

The t ratio for α_i can be used for a test of the hypothesis that α_i equals zero. This hypothesis about one specific group, however, is typically not useful for testing in this regression context. If it is interested in differences across groups, then the hypothesis that the constant terms are all equal with an F test can be tested. Under the null hypothesis of equality, the efficient estimator is pooled least squares (Greene, 2002, p. 289). The F ratio used for this test is

$$F(n-1, nT-n-K) = \frac{(R_{LSDV}^2 - R_{Pooled}^2)/(n-1)}{(1-R_{LSDV}^2)/(nT-n-K)} \quad (M-19)$$

where LSDV indicates the dummy variable model and pooled indicates the pooled or restricted model with only a single overall constant term. Alternatively, the model may have been estimated with an overall constant and $n-1$ dummy variables instead. All other results (i.e., the least squares slopes, s^2 , R^2) will be unchanged, but rather than estimate α_i , each dummy variable coefficient will now be an estimate of $\alpha_i - \alpha_1$ where group “1” is the omitted group. The F test that the coefficients on these $n-1$ dummy variables are zero is identical to the one above. It is important to keep in mind, however, that although the statistical results are the same, the interpretation of the dummy variable coefficients in the two formulations is different (Greene, 2002, p. 289; Wooldridge, 2009, p.487).

4.2.3.2. The within- and between-groups estimators

A pooled regression model can be formulated in three ways. First, the original formulation is

$$y_{it} = x'_{it}\beta + \alpha + \varepsilon_{it} \quad (M-20a)$$

In terms of deviations from the group means,

$$y_{it} - \bar{y}_t = (x_{it} - \bar{x}_t)'\beta + \varepsilon_{it} - \bar{\varepsilon}_t \quad (M-20b)$$

while in terms of the group means,

$$\bar{y}_t = \bar{x}_t' \beta + a + \bar{\varepsilon}_t \quad (M-20c)$$

All three are classical regression models, and in principle, all three could be estimated, at least consistently if not efficiently, by ordinary least squares. [Note that (M-20c) involves only n observations, the group means.] Consider then the matrices of sums of squares and cross products that would be used in each case, where the focus goes only on estimation of β (Greene, 2002, p. 289) . In (M-20a), the moments would accumulate variation about the overall means, $\bar{\bar{y}}$ and $\bar{\bar{x}}$ and the total sums of squares and cross products can be used,

$$S_{xx}^{total} = \sum_{i=1}^n \sum_{t=1}^T (x_{it} - \bar{\bar{x}})(x_{it} - \bar{\bar{x}})' \text{ and}$$

$$S_{xy}^{total} = \sum_{i=1}^n \sum_{t=1}^T (x_{it} - \bar{\bar{x}})(y_{it} - \bar{\bar{y}})'$$

For (M-20b), since the data are in deviations already, the means of $(y_{it} - \bar{y}_i)$ and $(x_{it} - \bar{x}_i)$ are zero. The moment matrices are within-groups (i.e., variation around group means sums of squares and cross products) (Greene, 2002, p. 289).

$$S_{xx}^{within} = \sum_{i=1}^n \sum_{t=1}^T (x_{it} - \bar{x}_i)(x_{it} - \bar{x}_i)' \text{ and}$$

$$S_{xy}^{within} = \sum_{i=1}^n \sum_{t=1}^T (x_{it} - \bar{x}_i)(y_{it} - \bar{y}_i)'$$

Finally, for (M-10c), the mean of group means is the overall mean. The moment matrices are the between-groups sums of squares and cross products-that is, the variation of the group means around the overall means (Greene, 2002, p. 289; Wooldridge, 2009, p.496).

$$S_{xx}^{between} = \sum_{t=1}^T (\bar{x}_t - \bar{\bar{x}})(\bar{x}_t - \bar{\bar{x}})' \text{ and}$$

$$S_{xy}^{total} = \sum_{i=1}^n \sum_{t=1}^T (x_{it} - \bar{x})(y_{it} - \bar{y})'$$

It is easy to verify that,

$$S_{xx}^{total} = S_{xx}^{within} + S_{xx}^{between} \text{ and } S_{xy}^{total} = S_{xy}^{within} + S_{xy}^{between}$$

Therefore, there are three possible least squares estimators of β corresponding to the decomposition. The least squares estimator is,

$$b^{total} = [S_{xx}^{total}]^{-1} S_{xy}^{total} = [S_{xx}^{within} + S_{xx}^{between}]^{-1} [S_{xy}^{within} + S_{xy}^{between}] \quad (M-21)$$

The within-groups estimator is,

$$b^{within} = [S_{xx}^{within}]^{-1} S_{xy}^{within} \quad (M-22)$$

This is the LSDV estimator computed earlier. [See (M-15).] An alternative estimator would be the between-groups estimator,

$$b^{between} = [S_{xx}^{between}]^{-1} S_{xy}^{between} \quad (M-23)$$

(sometimes called the group means estimator). This least squares estimator of (M-20c) is based on the n sets of groups means. (Note that it is assuming that n is at least as large as K) (Greene, 2002, p. 289; Wooldridge, 2009, p.496). From the preceding expressions (and familiar previous results),

$$S_{xy}^{within} = S_{xx}^{within} b^{within} \text{ and } S_{xy}^{between} = S_{xx}^{between} b^{between}$$

Inserting these in (M-21), it is observed that the least squares estimator is a matrix weighted average of the within- and between-groups estimators,

$$b^{total} = F^{within} b^{within} + F^{between} b^{between} \quad (M-24)$$

Where,

$$F^{within} = [S_{xx}^{within} + S_{xx}^{between}]^{-1} S_{xx}^{within} = I - F^{between}$$

The form of this result resembles the Bayesian estimator and it can be shown that,

$$F^{within} = \{[Asy.Var(b^{within})]^{-1} + [Asy.Var(b^{between})]^{-1}\}^{-1} [Asy.Var(b^{within})]^{-1}$$

which is essentially the same mixing result with that of the Bayesian estimator. In the weighted average, the estimator with the smaller variance receives the greater weight (Greene, 2002, p. 289; Wooldridge, 2009, p.496).

4.2.3.3. Fixed time and group effects

The least squares dummy variable approach can be extended to include a time-specific effect as well. One way to formulate the extended model is simply to add the time effect, as in,

$$y_{it} = x'_{it}\beta + \alpha + \gamma_t + \varepsilon_{it} \quad (M-25)$$

This model is obtained from the preceding one by the inclusion of an additional $T - 1$ dummy variables. (One of the time effects must be dropped to avoid perfect collinearity -the group effects and time effects both sum to one.) If the number of variables is too large to handle by ordinary regression, then this model can also be estimated by using the partitioned regression¹¹. There is an asymmetry in this formulation, however, since

¹¹ The matrix algebra and the theoretical development of two-way effects in panel data models are complex. See, for example, Baltagi (2005). Fortunately, the practical application is much simpler. The number of periods analyzed in most panel data sets is rarely more than a handful. Since modern computer programs, even those written strictly for microcomputers, uniformly allow dozens (or even hundreds) of regressors, almost any application involving a second fixed effect can be handled just by literally including the second effect as a set of actual dummy variables.

each of the group effects is a group-specific intercept, whereas the time effects are contrasts—that is, comparisons to a base period (the one that is excluded) (Greene, 2002, p. 290; Baltagi, 2005, p.175). A symmetric form of the model is,

$$y_{it} = x'_{it}\beta + \mu + \alpha + \gamma_t + \varepsilon_{it} \quad (M-25')$$

where a full n and T effects are included, but the restrictions $\sum_i a_i = \sum_t \gamma_t = 0$

are imposed. Least squares estimates of the slopes in this model are obtained by regression of $y_{*it} = y_{it} - \bar{y}_i - \bar{y}_t + \bar{\bar{y}}$ on $x_{*it} = x_{it} - \bar{x}_i - \bar{x}_t + \bar{\bar{x}}$

where the period-specific and overall means are,

$\bar{y}_t = \frac{1}{n} \sum_{i=1}^n y_{it}$ and $\bar{\bar{y}} = \frac{1}{nT} \sum_{i=1}^n \sum_{t=1}^T y_{it}$, and likewise for \bar{x}_t and $\bar{\bar{x}}$. The overall constant and the dummy variable coefficients can then be recovered from the normal equations as $\hat{\mu} = m = \bar{\bar{y}} - \bar{\bar{x}}'b$,

$$\hat{a}_i = a_i = (\bar{y}_i - \bar{\bar{y}}) - (\bar{x}_i - \bar{\bar{x}})'b, \quad (M-27)$$

$$\hat{\gamma}_t = c_t = (\bar{y}_t - \bar{\bar{y}}) - (\bar{x}_t - \bar{\bar{x}})'b.$$

The estimated asymptotic covariance matrix for b is computed using the sums of squares and cross products of x_{*it} computed in (M-26) and

$$s^2 = \frac{\sum_{i=1}^n \sum_{t=1}^T (y_{it} - x'_{it}b - m - a_i - c_t)^2}{nT - (n - 1) - (T - 1) - K - 1}$$

If one of n or T is small and the other is large, then it may be simpler just to treat the smaller set as an ordinary set of variables and apply the previous results to the one way fixed effects model defined by the larger set. Although more general, this model is infrequently used in practice. There are two reasons. First, the cost in terms of degrees of freedom is often not justified. Second, in those instances in which a model of the time wise evolution of the disturbance is desired, a more general model than this simple

dummy variable formulation is usually used ([Greene, 2002, p. 292](#); [Baltagi, 1995, p.175](#)).

4.2.4 Durbin, Wu, Hausman test

The Durbin, Wu, Hausman test or Hausman specification test is a statistical hypothesis test which is used in econometrics ([James, 1954](#); [Wu, 1953](#); [Hausman, 1978](#); [Nakamura and Nakamura, 1981](#)). This test is used to measure the consistency of an estimator (which is already the consistent) when compared to an alternative less efficient estimator, ([Greene, 2012, pp.234-237](#)). The application of this test helps one evaluate if a statistical model corresponds to the data.

In panel data analysis, the Hausman test can be applied to differentiate between fixed effects model and random effects. When b_1 (fixed effects estimator) is consistent efficient, then H_0 is true. On the other hand, when b_0 (random effects estimator) is consistent efficient, then H_1 is true. In this situation, fixed effects is preferred under the null hypothesis due to higher efficiency, while under the alternative random effects is at least as consistent and thus preferred ([Greene, 2012, pp. 379-380,420](#)).

4.2.4.1 Method

It is taken the linear regression model $y = bX + e$

Consider the linear model $y = bX + e$, where y is the dependent variable and X is vector of independent variables, b is a vector of coefficients of independent variables and e is the error term. The b estimator takes two values, b_0 and b_1 . Examining the null hypothesis, both of these estimators are consistent, but b_1 is efficient and has the smallest asymptotic variance, at least in the class of estimators containing b_0 , which is not consistent. Under the alternative hypothesis, b_0 is consistent, whereas b_1 isn't ([Greene, 2012, pp. 379-380](#)).

Then the Wu, Hausman statistic is

$$H = (b_1 - b_0)'(\text{Var}(b_0) - \text{Var}(b_1))^\dagger (b_1 - b_0),$$

Where † denotes the Moore–Penrose pseudoinverse¹². Considering the null hypothesis, this statistic has asymptotically the chi-squared distribution with the number of degrees of freedom equal to the rank of matrix $\text{Var}(b_0) - \text{Var}(b_1)$ (Greene, 2012, pp. 379-380).

If the null hypothesis is rejected, this means that b_1 estimator is inconsistent. The Hausman specification test is used to check for the endogeneity of a variable (by comparing instrumental variable estimates to OLS estimates). Moreover, this test checks the validity of extra instruments by comparing the estimate of instrumental variable using a full set of instruments Z to the estimate of instrumental variable that use a proper subset of Z . Note that in order for the test to work in the latter case, the validity of the subset of Z should be checked, and should consist of enough instruments in order to identify the parameters of the equation. Furthermore, The Hausman test proved that the covariance between an efficient estimator and the difference of an efficient and inefficient estimator is zero (Greene, 2012, pp. 379-380). The estimation of the Hausman test develops below.

$$\sqrt{N}(q - 0) \xrightarrow{d} N(0, [1 \quad -1] \begin{bmatrix} \text{Var}(b_1) & \text{Cov}(b_1, b_0) \\ \text{Cov}(b_1, b_0) & \text{Var}(b_0) \end{bmatrix})$$

Consider the function: $q = b_0 - b_1 \Rightarrow \text{plim } q = 0$

$$\sqrt{N}(q - 0) \xrightarrow{d} N(0, [1 \quad -1] \begin{bmatrix} \text{Var}(b_1) & \text{Cov}(b_1, b_0) \\ \text{Cov}(b_1, b_0) & \text{Var}(b_0) \end{bmatrix} \begin{bmatrix} 1 \\ -1 \end{bmatrix})$$

$$\text{Var}(q) = \text{Var}b_1 + \text{Var}b_0 - 2\text{Cov}(b_1, b_0)$$

¹² In mathematics, and in particular linear algebra, a pseudoinverse A^+ of a matrix A is a generalization of the inverse matrix (Ben-Israel and Thomas, 2003). The most widely known type of matrix pseudoinverse is the Moore-Penrose inverse (Ben-Israel and Thomas, 2003; Campbell and Mayer, 1991; Nakamura, 1991; Rao and Mitra, 1971), which was independently described by Moore in 1920 (Moore, 1920), Bjerhammar in 1951 (Bjerhammar, 1951), and Penrose in 1955 (Penrose, 1955). When referring to a matrix, the term pseudoinverse, without further specification, is often used to indicate the Moore–Penrose inverse. The term generalized inverse is sometimes used as a synonym for pseudoinverse.

Based on the commonly used result, proved by Hausman, the covariance of an efficient estimator with its difference from an inefficient estimator is zero yields,

$$\text{Var}(q) = \text{Var}b_0 - \text{Var}b_1$$

The chi-squared test is based on the Wald criterion

$$H = \chi^2 [K - 1] = (b_1 - b_0)' (\text{Var}(b_0) - \text{Var}(b_1))^\dagger (b_1 - b_0),$$

Where † denotes the Moore–Penrose pseudoinverse

4.3. Heckman correction

4.3.1. Introduction

The Heckman correction (the two-stage method, Heckman's lambda or the Heckit method) is any of a number of related statistical methods developed by James Heckman at the University of Chicago in 1976 to 1979, which allows the researcher to correct for selection bias. Selection bias problems are endemic to applied econometric problems, which makes Heckman's original technique and subsequent refinements by both himself and others, indispensable to applied econometricians ([Baltagi, 2005, p. 213](#))

4.3.2. Method

Statistical analyses based on non-randomly selected samples can lead to erroneous conclusions and poor policy. The Heckman correction, a two-step statistical approach, offers a means of correcting for non-randomly selected samples. Heckman discussed bias from using nonrandom selected samples to estimate behavioral relationships as a specification error. He suggests a two-stage estimation method to correct the bias. The correction uses a control function idea and is easy to implement. Heckman's correction involves a normality assumption, provides a test for sample selection bias and formula for bias corrected model. Suppose that a researcher wants to estimate the determinants of wage offers, but has access to wage observations for only those who work. Since people who work are selected non-randomly from the population, estimating the

determinants of wages from the subpopulation who work may introduce bias (Heckman, 1979; Lee, 2001, p.403; Baltagi, 2005, pp. 216-217,p.220,p.225).

The Heckman correction takes place in two stages. In the first stage, the researcher formulates a model, based on economic theory, for the probability of working. The canonical specification for this relationship is a probit regression of the form, $Prob(D = \frac{1}{Z}) = \Phi(Z_\gamma)$ where D indicates employment ($D = 1$ if the respondent is employed and $D = 0$ otherwise), Z is a vector of explanatory variables, γ is a vector of unknown parameters, and Φ is the cumulative distribution function of the standard normal distribution. Estimation of the model yields results that can be used to predict this employment probability for each individual. In the second stage, the researcher corrects for self-selection by incorporating a transformation of these predicted individual probabilities as an additional explanatory variable. The wage equation may be specified as $\omega^* = X\beta + u$ where ω^* denotes an underlying wage offer, which is not observed if the respondent does not work. The conditional expectation of wages given the person works is then

$$E[\omega \setminus X, D = 1] = X\beta + E[u \setminus X, D = 1]$$

Under the assumption that the error terms are jointly normal, the equation becomes

$$E[\omega \setminus X, D = 1] = X\beta + \rho\sigma_u\lambda(Z_\gamma),$$

Where ρ is the correlation between unobserved determinants of propensity to work ε and unobserved determinants of wage offers u , σ_u is the standard deviation of u , and λ is the inverse Mills ratio evaluated at Z_γ . This equation demonstrates Heckman's insight that sample selection can be viewed as a form of omitted-variables bias, as conditional on both X and on λ it is as if the sample is randomly selected. The wage equation can be estimated by replacing γ with Probit estimates from the first stage, constructing the λ term, and including it as an additional explanatory variable in linear regression estimation of the wage equation. Since $\sigma_u > 0$, the coefficient on λ can only be zero if

$\rho=0$, so testing the null that the coefficient on λ is zero is equivalent to testing for sample selectivity. Heckman's achievements have generated a large number of empirical applications in economics, as well as in other social sciences. The original method has subsequently been generalized, by Heckman and by others ([Heckman, 1979](#); [Lee, 2001, p403](#); [Baltagi, 2005, pp. 216-217,p.220,p.225](#)).

4.3.3 Inverse Mills ratio

Inverse Mills ratio is used when in regression analysis there is a possible selection bias problem. This problem can be called as “non-selection hazard”. When the dependent variable is censored (for example there is not a positive result for all observations), it gathers many observations at zero values. [Tobin \(1958\)](#) was the first who observed this problem and showed that when the estimation procedure is not considered, then an ordinary least squares estimation will generate biased parameter estimates. Moreover, when the dependent variables are censored, it is rejected the null hypothesis of the Gauss–Markov assumption that there is no correlation between independent variables and the error term ([Takeshi, 1985, pp.366-368](#)). As used in this thesis, James Heckman implemented a two-stage estimation procedure using the inverse Mills ratio to test for the selection bias ([Heckman, 1979, pp. 153-161](#); [Takeshi, 1985, pp.368-373](#)). In the first stage, the inverse Mills ratios are generated from the estimation of probit model. Logit cannot be used. The probit model assumes that the error term follows a standard normal distribution. ([Heckman, 1979, pp. 153-161](#)). Finally, the new inverse Mills ratio variable generated from the estimated parameters of first stage, is then used as an extra explanatory variable in the OLS estimation ([Heckman, 1979, pp. 475-492](#)). The computing of inverse Mills ratio follows ([Grimmett and Stirzaker, 2001](#); [Mills, 1926](#); [Klein and Moeschberger, 2003](#); [Small, 2010](#)).

The inverse Mills ratio (IMILLS) is the function

$$\text{IMILLS}(x) = \frac{\overline{G(x)}}{h(x)},$$

where $h(x)$ is the probability density function and

$$\overline{G(x)} = \Pr[X > x] = \int_x^{\infty} h(u) du$$

is the complementary cumulative distribution function. The Mills ratio is related to the hazard rate $f(x)$, which is defined as

$$f(x) = \lim_{\delta \rightarrow 0} \frac{1}{\delta} \Pr[x < X \leq x + \delta | X > x]$$

Thus, the inverse Mills ratio is as follows:

$$\text{IMILLS}(x) = \frac{1}{f(x)}$$

4.4. Jones model methodology

4.4.1 Introduction

Researchers have made many attempts to create an accounting and financial model in order to detect earnings management. This trial started in 1945 and continues until today. Nowadays, most of studies in the area of earnings management focus on recent models. Most of the criticisms of prior research work are based on model misspecifications. This part examined a review in previous studies and those attempted at modeling earnings management behavior ([Kighir et al, 2014](#)). In the next chapter some paradigms on earnings management detection modeling are presented - graphical modeling of specific accruals ([Gordon, 1964](#); [Alchibald, 1967](#)).

Mathematical modeling of specific accruals ([Copeland, 1968](#); [Biedleman, 1973](#)), Total Discretionary Accruals modeling with time series data ([Healy, 1985](#); [Jones 1991](#); [Dechow, et al., 1995](#)), Total Discretionary Accruals modeling with cross sectional data ([DeFond and Jambalvo, 1994](#); [Peasnell et al., 2000](#)), use of manipulation scores modeling ([Beneish, 1997,1999](#)), Distribution of reported earnings and accruals modeling ([Burgstahler and Dichev, 1997](#); [Degeorge, et al., 1999](#)), Real Activity Management ([Roychowdhury, 2006](#); [Eldenburg, et al 2011](#)), use of Neural networks ([Hoglund, 2012](#)).

4.4.2. Model creation

In 1953, Hepworth tried to test earnings management behavior, working on 'smoothing periodic income'. He modeled some of the accounting techniques related to earning smoothness and to accruals, where changes could be applied to the accounting result in successive accounting periods. However, no attempt was made at detecting income smoothing ([Hepworth, 1953](#); [Kighir et al., 2014](#)).

4.4.3 Graphs and time series

The first hypothesis where 'managers select accounting measurement and reporting rules which smooth reported income' tested by Gordon in 1964. This hypothesis pulled the trigger and generated reactions and researches in the field of accounting income smoothing. Gordon suggested an operational test of smoothing and made a graphical presentation, where for each firm fit a curve to a stream of income calculated two ways, (a) excluding the manipulative variable, and (b) including it. "If the variations of the observations around the curve are smaller in the latter case, income smoothing has been the consequence of transactions in the account" ([Gordon, 1964](#)).

Two years later, Dopuch and Drake made a survey of a sample of twelve firms, in which investments in non subsidiary companies occurred over the period 1955 to 1964. They made graphs illustrating the total income and income from non subsidiary investment activities. Finally they concluded that in their sample there was no serious ~~of~~ income smoothing for any firms ([Dopuch and Drake, 1966](#)).

During the same period, Archibald collected a sample of 55 firms and investigated how and why these firms changed their depreciation method from accelerated to straight-line. He concluded that this was made for financial and tax reporting purposes. He used tables and graphical illustrations and discovered a median improvement of about 10.18 percent in net earnings. He noticed that 22 of the 55 switch-back firms had lower profits

in the year of the change, but offered no conclusion on whether it was meant for smoothing. ([Archibald, 1967](#); [Kighir et al., 2014](#)),

4.4.4. Accruals using mathematical model

In 1966 the first attempt to apply a mathematical model to test income smoothing was made by Gordon, Horwitz, and Meyer GHM. The variable that enhanced the earning smoothness was investment credit and tested Gordon's hypothesis. In their hypothesis they considered whether their accounting measurement tended to adjust the firm's percentage change in earnings per share to the average percentage change in the industry or to smooth the firm's earnings per share toward a normal value, or to smooth the firm's rate of return on stockholder's equity. For first time the double exponential smoothing to measure the first two criteria above creating more error was used. This was opposite to their estimations, leaving open to question the validity of their evidence ([Gordon, Horwitz, and Meyer GHM, 1966](#); [Kighir et al., 2014](#)).

Copeland and Licastrò used a sample of firms with unconsolidated subsidiaries (169 sets of data) and tested the hypothesis whether these firms when reported at cost, did not attempt to smooth income by varying their dividend payment. A chi-square contingency test was applied, using one smoother variable. They concluded that dividend income technique was not used to smooth income ([Copeland and Licastrò, 1968](#); [Kighir et al., 2014](#)).

Copeland attempted to empirically test the existence of income smoothing, using more than one smoother variable. He examined the income smoothing in financial statements ex post facto. He defined complete smoothed income for any period as an amount equal to reported net income for the preceding period with the added stipulation that three or more consecutive years were considered. Using a Chi square test, he found no evidence of income smoothing. The reason that results were tentative was related to the limited size of the sample, and length of the time series. ([Copeland, 1968](#); [Kighir et al., 2014](#)).

White made alternative tests that used values from a 10-year time trend as a measure of normal earnings. He included more accounting variables using regression for the first time as a method for detecting smoother firms. He created two different samples, one with random observations and one with smoother observations. In smoother samples he applied linear and logarithmic least-squares methods, line to the EPS time series, for each firm in the two industry groups. He concluded that firms with smoother earnings did not manipulate their accounting figures (White, 1970; Kighir et al., 2014)

Barefield and Comiskey in ten years time series data tested the variability and average absolute growth increments for firms that had an opportunity to use remitted earnings of unconsolidated subsidiaries to help smooth earnings. They reported that the result of the study, with regard to smoothing, was only modest and inconclusive (Barefield and Comiskey, 1972). Dascher and Malcom, tested the smoothing hypothesis for a sample of chemical firms for two periods. One period had a duration of 6 years and the other 11 years. They examined the reduction in variability about a semi logarithmic trend attributable to discretionary smoothing variables. Their results support the notion that uses time series data and all available smoothing devices. (Dascher and Malcom, 1972; Kighir et al., 2014)

Beidleman (1973) tested the existence of smoothing in US firms. He empirically surveyed conventional techniques for disaggregating time-series data that may be used to separate the time trend of normal earnings from the random and cyclical factors which are the objects of the smoothing process.

That firms whose normal earnings (E_t) are expected to change by a constant amount (g) each year can be described by equation (M-28).

$$E_t = (E_o + g_{at}) \quad (M-28)$$

The normal level of earnings for firms which maintain a geometric progression or constant rate of growth (g_r) is described by equation (M-29).

$$E_t = (E_o + g_r)^t \quad (M-29)$$

The difference between observed earnings and normal earnings as defined represents random and/or cyclical factors and can be used to test for evidence of smoothing by management. He used least-squares linear time trend regression for firms that were expected to grow at a constant rate using a sample of firms which reported at least three discretionary items out of six, for ten years or more.

$$E_{it} = a_{ei} + b_{eit} + \mu_{eit} \quad (M-30)$$

A similar linear model was used for discretionary smoothing variables (D_{it})

$$D_{it} = a_{di} + b_{dit} + \mu_{dit} \quad (M-31)$$

Semi logarithmic time trend regression was used for firms that were expected to grow at a constant growth rate to test for smoothing using similar models. The test of the hypothesis is based on the correlation between the residuals from equations (M-30) and (M-31). Correlation coefficients and tests of the significance of the relationship between the time-series residuals are obtained by regressing the residuals.

$$\mu_{dit} = a_{si} + b_{si}\mu_{eit} + \mu_{sit} \quad (M-32)$$

T tests on b_{si} provide a measure of the statistical significance of the relationship. The test results strongly suggest that firms employ certain devices over which they have discretion to normalize reported earnings (Kighir et al., 2014).

4.4.5. Total discretionary accruals using time series data

4.4.5.1. Healy model

Healy (1985) conducted a more holistic research using total accruals (scaled by lagged total assets) as proxy for discretionary accruals (DA).

$$TA_t = DA_t \quad (M-33)$$

Where TA_t = Total Accruals in year t. and DA_t is Discretionary Accruals in year t.

The model implicitly assumed that there are no non-discretionary accruals in the estimation period. He concluded that managers applied accrual policies because they had personal incentives relevant to their bonus contracts. So, there are many times when managers relate their personal interests to the firms earnings management procedure (Healy, 1985). Healy was criticized by Kaplan for his stand on discretionary accrual and receivables effect on earnings instead of cash flow, his inability to present an expectation model for normal accruals and to clearly separate total accrual into non discretionary and discretionary implicitly assumed that in the absence of earnings maximization behavior of managers total accruals will be zero. Kaplan also noted that changes in several working capital accounts and thereby accruals depend upon the economic circumstances of the firm, which should ordinarily affect non discretionary accruals (Kaplan, 1985).

4.4.5.2. DeAngelo model

DeAngelo improved further on Healy's model by using prior period accrual (t-k) as a measure of 'normal' total accruals (NA_{t-1}) (scaled by lagged total assets) as proxy for non discretionary accruals in year t. According to the researcher, 'abnormal' total accrual (DA_t) is the difference between 'current' total accruals (AC_t) and prior period normal total accruals (NA_{t-1}), but failed to empirically partition normal total accruals into discretionary and non discretionary portions (DeAngelo, 1986).

$$DA_t = AC_t - NA_{t-1} \quad (M-34)$$

AC_t is current total accruals calculated as current net income minus operating cash flows.

This model assumes that there are no non-discretionary accruals in year t and uses prior period non discretionary accruals as proxy for current year non discretionary accruals.

McNichols and Wilson improved on DeAngelo's model by capturing the discretionary accruals as a measure of earnings management instead of the total accrual used by (Healy, 1985) and (DeAngelo, 1986), however they used specific component of discretionary accruals (McNichols and Wilson, 1988).

4.4.5.3. Jones Model

Jones investigated earnings management during import relief investigations by the US government using two stage models. The researcher used a firm-specific expectation model and a minimum of fourteen year time series data as estimation period.

The research measured 'normal' total accruals (Non Discretionary Accruals) in estimation period from financial statement data and used it to compute firm specific parameters (coefficients) and the same model during the event period (prediction period) to measure expected Non Discretionary Accruals (NDA_t) using coefficients obtained in the estimation period. The Discretionary Accrual (DA_t) which is the residue or prediction error, is calculated by subtracting expected Non Discretionary Accruals (NDA_t) from current or actual total accruals (TA_t) computed from financial statement data (Jones, 1991).

4.4.5.4. Estimation Period Model

$$NDA_{\tau} / T_{\tau-1} = \alpha_{oi} (1/T_{\tau-1}) + \alpha_{li} (\Delta REV_{\tau} / T_{\tau-1}) + \alpha_{2i} (PPE_{\tau} / T_{\tau-1}) \quad (M-35)$$

Where

$T_{\tau-1}$ = Lagged total assets in estimation period ($\tau-1$),

ΔREV_{τ} = Revenues in years τ less revenue in year $\tau-1$ scaled by total assets in year $\tau-1$,

PPE = gross Property Plant and Equipment in year τ scaled by total assets in year $\tau-1$,

α_{0i} , α_{1i} and α_{2i} are firm specific parameters or coefficients $\tau = 1, 2, 3, \dots, T$ years index for estimation period and $i = 1, 2, 3 \dots, N$ firm index.

4.4.5.5.Event Period Model

$$NDA_t/T_{t-1} = \beta_{0i}(1/T_{t-1}) + \beta_{1i}(\Delta REV_t/T_{t-1}) + \beta_{2i}(PPE_t/T_{t-1}) + \varepsilon_t \quad (M-36)$$

Where

NDA_t = expected non discretionary accruals in event year,

T_{t-1} = Lagged total assets in event year (t-1),

ΔREV_t = Revenues in years t less revenue in year t-1 scaled by total assets in year t-1,

PPE = gross Property Plant and Equipment in year t scaled by total assets in year t-1,

β_{0i} , β_{1i} and β_{2i} are firm specific parameters or coefficients from α_{0i} , α_{1i} and α_{2i} computed during estimation period $t = 1, 2, 3, \dots, T$ years index for event period and $i = 1, 2, 3 \dots, N$ firm index.

$$DA_t = TA_t - NDA_t \quad (M-37)$$

or

$$\varepsilon_t = DA_t = \{TA_t/T_{t-1}\} - \{(\alpha_{0i}(1/T_{t-1}) + \alpha_{1i}(\Delta REV_t/T_{t-1}) + \alpha_{2i}(PPE_t/T_{t-1}))\} \quad (M-38)$$

Where ,

TA_t = Actual total accruals from financial statement data = $\{\Delta \text{Current assets} - \Delta \text{cash} - \Delta \text{current liabilities} - \Delta \text{Current maturities of long term debt} - \Delta \text{Income taxes payable} - \text{Depreciation and amortization expenses}\}$.

Accruals (DA) derived from firm-specific expectations model is used to measure earnings management rather than discretionary component of a single accrual account used by (McNichols and Wilson, 1988).

According to Jones (1999) total accruals should capture a larger portion of managers' manipulations than a single accrual account. The expectation model, according to the researcher, should also control for economic conditions on the level of accruals. In this case change in revenues is used to control for the economic environment of the firm because they are an objective measure of the firms operations before managers' manipulations. The model also included gross Property, Plant and Equipment as control for the portion of total accruals related to nondiscretionary depreciation expenses in the event period.

4.4.5.6. Modified Jones Model

Dechow et al. (1995), took the profession unaware when the third female led a group of researchers in the accrual modeling algebra to propose a modification to (Jones, 1991) model. According to them the modification is to eliminate an error in the measurement of discretionary accruals from the standard Jones model. The Jones model implicitly assumed that discretion is not exercised over revenue in either the estimation period or the event period. The reasoning of the modified model is that all changes in credit sales in the event period result from earnings management. The researchers corrected the error by incorporating the changes in credit sales (ΔREC) to the standard Jones model in the event period. Event model

$$NDA_t = \beta_{0i}(1/T_{t-1}) + \beta_{1i}(\Delta REV_t - \Delta REC_t) + \beta_{2i}(PPE_t) + \varepsilon_t \quad (M-39)$$

Event period NDA_t , ΔREV_t , ΔREC_t , PPE_t all scaled by lagged total assets in event period (T_{t-1})

and β_{0i} , β_{1i} and β_{2i} are from α_{0i} , α_{1i} , α_{2i} respectively computed during estimation period.

$$DA_t = TA_t - NDA_t \quad (M-40)$$

or

$$\varepsilon_t = DA_t - \{TA_t\} - \{(\alpha_{0i}(1/T_{t-1}) + \alpha_{1i}(\Delta REV_t - \Delta REC_t) + \alpha_{2i}(PPE_t))\} \quad (M-41)$$

Where

DA_t = Discretionary accruals in year t TA_t = Actual total accruals from financial statement data = $\{\Delta \text{ Current assets} - \Delta \text{ cash} - \Delta \text{ current liabilities} - \Delta \text{ Current maturities of long term debt} - \Delta \text{ Income taxes payable} - \text{Depreciation and amortization expenses}\}$.

Estimation model remains the same.

$$NDA_{\tau} = \alpha_{0i}(1/T_{\tau-1}) + \alpha_{1i}(\Delta REV_{\tau}) + \alpha_{2i}(PPE_{\tau}) \text{ Estimation period} \quad (M-42)$$

NDA_{τ} , ΔREV_{τ} , PPE_{τ} all scaled by lagged total assets in event period ($T_{\tau-1}$)

Their research also evaluated alternative accrual based models for detecting earnings management and concluded that in terms of specification all the models appear well specified but the modified Jones model exhibits the most power in detecting earnings management.

The standard Jones model and modified Jones model was criticized by [Guay et al., \(1996\)](#) using a market based procedure and concluded that neither procedure generates a reliable measure of accrual management, but could not suggest an alternative. [\(Beneish, 1997\)](#) and [\(Young, 1999\)](#) queried the inclusion of depreciation charge in the measure of total accruals and opined that this can induce substantial measurement error in the resulting estimate of managed accruals.

4.5. Presentation of an integrated report

4.5.1. The purpose of an integrated report

The primary purpose of an integrated report is to improve the quality of information available to providers of financial capital. This is achieved by communicating broader and more relevant information that can assist in effective capital allocation decisions. It is recognized that investors consist only a part of this system. However, much of the

current research into IR and other relevant material data is focused on investors (IIRC, 2015).

4.5.2. Producing an integrated report

In order to develop an integrated report, it usually needs the existence of management and staff. Also, a large number of reporting frameworks is required. Figure 3 depicts the interaction of these frameworks, which includes company law, accounting standards, requirements for narrative reports contained in company law or guidance documents such as the IASB Management Commentary Guidance Statement (IIRC and IFRS, 2013), the GRI Framework (GRI, 2013), the International Integrated Reporting Framework (IIRC, 2013b) and the AA 1000 Account Ability Principles Standard (IIRC and SASB, 2013). The frameworks most commonly used to compose an integrated report are the International Integrated Reporting Framework and the GRI Framework. (ACCA, 2012; IIRC, 2015).

Figure 3. Frameworks influencing evolution of IR (ACCA, 2016, p.25).



The platforms of sustainability reporting are composed of reports and portions of websites, which are dedicated to sustainability topics. IR tries to offer the proper prospects of all firms regarding environmental, social and ethical challenges. Firms are consistently at least three times more likely to discuss business opportunities born from addressing sustainability challenges in IR mechanisms than in 10-K filings and at minimum twice as likely as in annual reports (GRI, 2013; PWC, 2014).

Integrated reports are produced by revising the content of another report, such as the annual report and constantly evolving it. Other integrated reports are produced by combining an annual report and a sustainability report. There are many firms which create statutory documents to meet regulatory requirements in their home country and in relation to their stock exchange listings (eg in the US) (ACCA, 2012).

Figure 4. Internal and external participants in IR (ACCA, 2016, p.25).

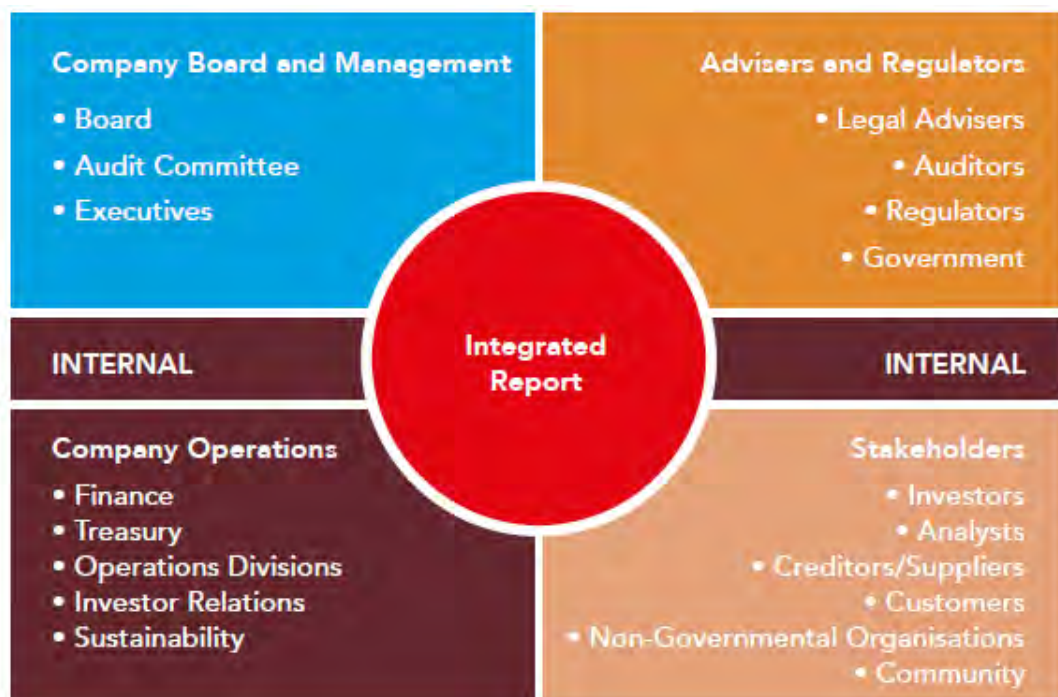


Figure 4 depicts the parties who participate in the creation of a report. Within any firm, managers and staff from many sections or divisions are likely to be involved in the preparation of corporate reports, including an integrated report. Often, the members are derived from several areas related to finance, treasury, investor relations, and sustainability. These members can be the board of directors, board committees (such as the audit committee) and senior executives. Moreover, there are other external members who may influence the content of the integrated report, auditors and legal advisers, regulatory agencies and government bodies. Other external stakeholders include shareholders, investors, customers and employees (ACCA, 2012; IIRC and SASB, 2013).

4.5.3 Checklist creation

The checklist presented in Table 1 assigns weightings to the respective chapters of King III and the criteria for awarding grades selected. Each firm was evaluated independently. This thesis emphasizes both overall compliance and disclosure quality in nine (9) areas. These include: (i) ethical leadership and corporate citizenship, (ii) boards and directors, (iii) audit committees, (iv) governance of risk, (v) governance of information technology, (vi) compliance with laws, codes, rules and standards, (vii) internal audit, (viii) governing shareholder relationships, (ix) IR and disclosure.

In table 1 the basic checklist information is illustrated analytically. The IR is expected to be focused on substance over form and should disclose information that is Complete, Timely, Relevant, Accurate, Honest, Accessible and Comparable, with the past performance of the company, and should also contain forward-looking information.

Table 1. Checklist composition

Chapter	Title	Summary
i.	Ethical leadership & corporate citizenship	This chapter focuses on the corporate governance information. There are three questions that analyze the ethical leadership policy and firms' management.
ii.	Boards & directors	This chapter provides information relevant to boards and directors. Specifically, it is given information about strategy, risk, performance and who the chairman is. Six questions are answered in this chapter.
iii.	Audit committees	This chapter collects information about audit committees. It checks if the Board has ensured that the Company has an effective and independent audit committee. Six questions are answered in this chapter.
iv.	The governance of risk	This chapter checks the governance of risk. The board should take the necessary steps to ensure that there are processes in place to ensure complete, timely, relevant accurate information/responses. Three questions are answered in this chapter.
v.	Governance of information technology	The board should take the necessary steps to ensure that there are processes in place to access IT reporting by the board in the integrated report. One question is answered in this chapter.
vi.	Compliance with laws, codes, rules and standards	The board should disclose in the integrated report the applicable non binding rules, codes and standards to which the company adheres to on a voluntary basis. One question is answered in this chapter.
vii.	Internal audit	If the board in its discretion decides not to establish an internal audit function, full reasons should be disclosed in the company's integrated report, with an explanation of how adequate assurance of an effective governance, risk management and internal control environment has been maintained. One question is answered in this chapter.
viii.	Governing shareholder relationship	The board should disclose in its integrated report the nature of its dealings with its stakeholders and the outcomes of these dealings. One question is answered in this chapter.
ix.	IR and Disclosure	This chapter checks the financial and the sustainability disclosure. Nine questions are answered in this chapter.

4.5.4. Categories of checklist

In table 2 a checklist is created to record the quality of accounting information of firms which enrich their annual reports with IR information. Firms are ranked in four different categories and classified from A to D. Each checklist contains twenty eight observations. The first category is named A and contains a range of top firms which showed scores from 86 to 100%.

Table 2. Categories of checklist

Category	Observations	Percentage
A Best practice: content & communication	25-28	86% - 100%
B- Best practice: content	21-24	72% - 85%
C- Compliant in spirit	17-20	58% - 71%
D- Compliant but	12-16	42% - 57%

4.5.4.1. Category A- Best practice: content and communication

Firms in category A have best practice content and demonstrate good communication according to the principles for IR. For example, a firm with a full and analytic description of IR presented in an easy-to-understand report. They provide extra detailed information on their websites. It is important to note, in the scoring scale, that a score of 86% to 100% is fully compliant with the IR content and communication practices.

4.5.4.2. Category B- Best practice: content

Firms scoring 21 to 24 points (72-85%) are ranked in category B. Firms of this group go beyond compliance to provide the type of best practice IR outlined in the King III report. For example, some firms list deals and their outcomes between board and stakeholders, which are relevant to IR. These deals illustrate non financial results based on improvement of the environment, working conditions, working level, and the social image of the firm.

4.5.4.3. Category C- Compliant in spirit

Firms scoring 17 to 20 points (58-71%) are ranked in category C. Information is included to a good standard that meets with the spirit of the IR requirements. For example, firms give some firm-specific explanation for a list of IR implementations that is clearly formulated.

4.5.4.4. Category D- Compliant but

Firms scoring 12 to 16 points (42-57%) are ranked in the last category, D. The information included in the firm's report complies technically, but falls short of the spirit of the IR requirements. For example, perhaps the firm ~~to~~ mention that it uses IR practices, but doesn't provide any specific information relevant to the IR action of the members of boards and directors. Specifically, it provides poor or no information about its strategy, risk, performance and who ~~is~~ the chairman is. Moreover, there is no information supplied about audit committees. Firms that scored 42%- 57% presented very poor reports.

4.5.5. Construction of IR score DS and DDS

This section describes the construction of DS, which is a disclosure score index that measures the IR quality of the information provided by ~~of~~ IR firms. Because there is no theoretical guidance regarding how to weight each measure in constructing an aggregated IR score, DS is created by including all nine content elements in the King III report and the King III code that are confirmed by the IR Framework, 2013. DS is derived from the scale of the total received scores of each firm to the maximum score (28 observations based on the [King III checklist](#)). A self-constructed measure is selected as the main proxy of the IR disclosure score for two reasons. First, it is aligned with the [Healy and Palepu \(2001\)](#) study, which suggests that self-constructed scores have higher confidence and focus on the specific characteristics of firms. Second, self-constructed scores can be constructed for any firm. There is no limitation regarding the size of the firm or whether any firm's financial and non-financial data are provided by external

data providers. Therefore, samples based on self-constructed scores exhibit less selection. However, there are two limitations in using self-constructed disclosure scores (Healy and Palepu, 2001). First, there is considerable researcher judgment involved in data collection and checklist creation. Second, these disclosure scores are constructed using data from available documents, such as published annual reports and websites (Lee and Yeo, 2016).

Based on the methodology of Amiraslani et al. (2013), it is expected that firms with high IR disclosure quality are firms whose proportional accounting disclosures (related to the level of IR compliance) are greater than or equal to the median value of this percentage. Therefore, the variable DDS, which is an independent variable for all models of the thesis, takes a value of 1, indicating high IR information quality, if a firm has gathered an IR disclosure score equal or greater than the median price notifications percentage of all sampled firms. If the accounting disclosure score is less than the median price, then the DDS for this firm is 0.

4.6. Design of sample selection and its limitations

This thesis covers the sample period 2011 to 2015, since IIRC was established on 2 August 2010. In the same year, in South Africa, a multi-organization Integrated Reporting Committee (IRC) was established. Its goal was to develop guidelines on IR and a framework for an integrated report for listed companies in its country (IFAC, 2015).

This analysis will be structured at two levels. At the first level, an analysis of balance sheet and income statement was implemented to obtain numerical information about financial instruments. These data were downloaded from Datastream. A sample of 173 listed firms was collected from the official website of IIRC. However, from the 173 firms, 34 did not provide adequate data in Datastream, 57 were firms from the financial,

insurance and real estate sector and were removed from the sample¹³. Finally, the sample consisted of 82 listed firms from 25 countries. The second level of analysis focuses on annual reports. In this levels, a codification of certain quantitative and qualitative information into predefined categories and answers was accomplished (Lopes and Rodrigues, 2007). Integrated reports of the firms were used in the research survey. They provided details for independent board members and the independent directors on the nomination committee, non – executive board members on the nomination and audit committee, and whether or not the posts of CEO and chairman were separated. From Thomson Reuters database, data for Institutional Ownership were obtained. Sample selection distribution development is illustrated in table 3 below.

Table 3. Sample Selection

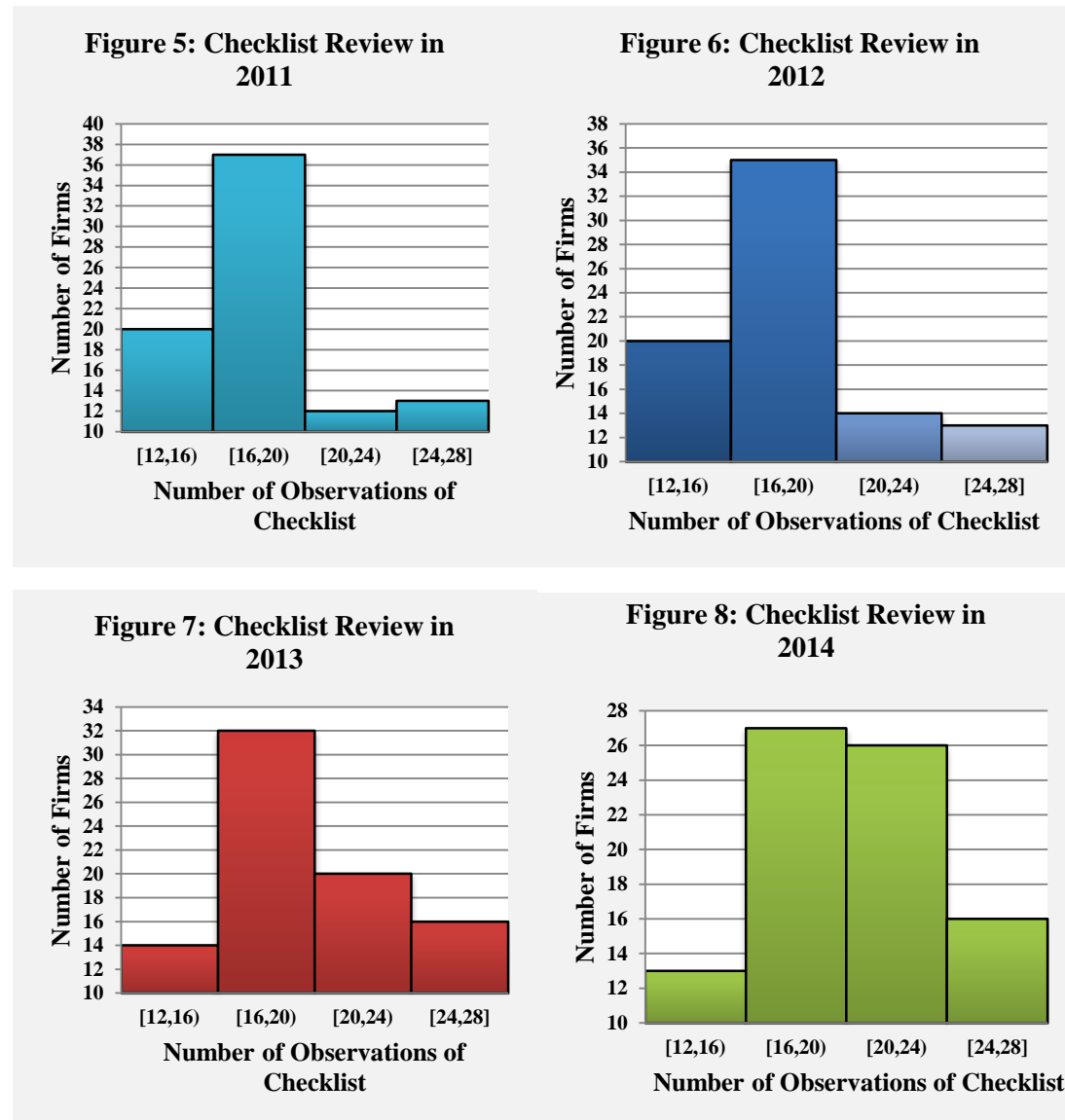
Selection Criteria	Number of Firms
<u>Panel A: Selection of firms:</u>	
Total number of firms listed in IR database	173
Less:	
Firms in financial, insurance and real estate industries	(57)
Firms without data available in Datastream	(34)
Total Sampled Firms	82
<u>Panel B: Sample firms according to their primary industry classification:</u>	
Manufacturing	21
Mineral	15
Transportation and Communication	12
Retail	18
Services	16
Total Sampled Firms	82
<u>Panel C: Sampled firms across years:</u>	
2011	69
2012	74
2013	76
2014	81
2015	82
Total firm-year observation	382

¹³ These firms use accounting methods that are not comparable with those of industrial firms (Iatridis, 2012a).

Histograms 5 to 10 depict the improvement of firms over time, which disclose more IR information. Parallel to this, in table 4, the IR checklist distribution per year is illustrated. Table 4 shows, that firms have a tendency over time to conform better with IR requirements. 2013 reveals an increase in IR disclosure quality. Either histograms 5 to 10 and in table 4, it was observed that in the first two years of IR adoption, firms tend to provide basic IR information. In 2011 (2012) only 25 (27) firms scored more than 20 observations in checklist scores. Moreover, in 2015, firms seemed to comply with the IR notion. 41 firms had checklist scores of more than 20 observations. This improvement is also depicted in the linear regression graph in figure 11, where an incensement in average disclosure score is observed during that time. In the last year a high level of IR compliance occurred, 72.43%. This shows a trend of firms employing IR with a higher level of compliance.

Figures 5-10: Histograms and linear regression graph

Figures 5 to 10 summarize the results of the checklist scores in four distributed categories. Each checklist records the level of IR quality accounting information according to King III Report. Firms ranked in four different categories as are illustrated in the horizontal axis of each histogram. Each checklist contains twenty eight observations. Graph 11 illustrates the timeless development of the average disclosure score in the sample.



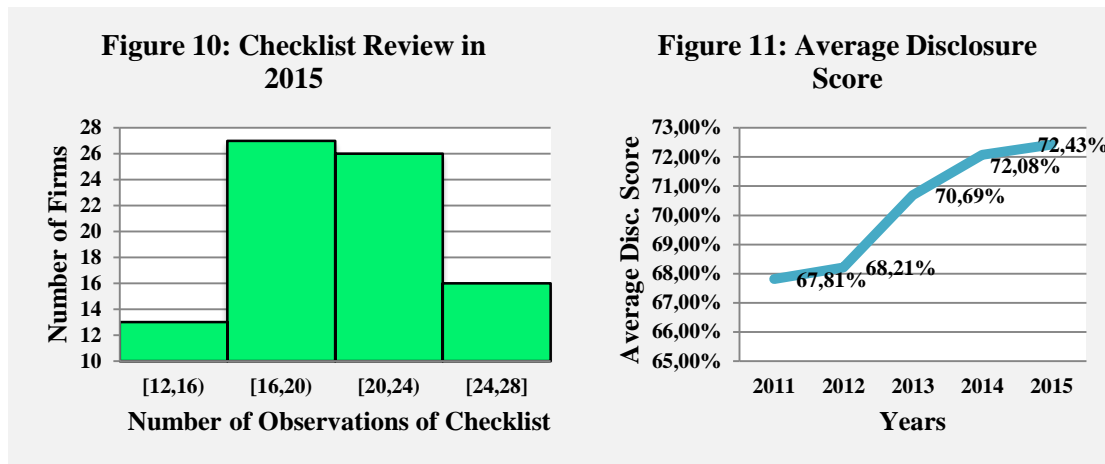
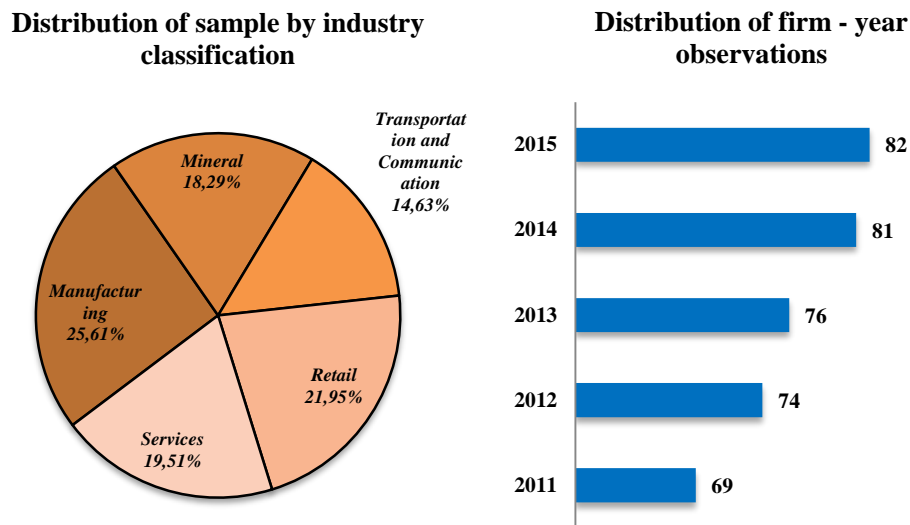


Table 4. IR Checklist Distribution per year

IR Questions' Classification on the Checklist	Years				
	2011	2012	2013	2014	2015
[12,16)	20	20	14	13	13
[16,20)	37	35	32	27	27
[20,24)	12	14	20	26	26
[24,28]	13	13	16	16	16
Total	82	82	82	82	82

In panel B of table 3 the sample distribution is presented, classified by primary industry. From the total sample of 82 firms, 21 firms come from the manufacturing industry, 15 firms from the mineral industry, 12 firms from the transportation and communication industry, 18 from the retail industry and 16 firms from the services industry. In figure 12, this classification is interpreted with averages in a pie chart. It is observed that 25.61% of IR firms came from the manufacturing industry, 21.95% of IR firms from the detail industry, 19.51% of IR firms from the services industry, 18.29% of IR firms from the mineral industry and 14.63% of IR firms from the transportation and communication industry.

Figures 12-13: Firms distribution by industry classification and by firm – year observations



In panel C of Table 3, the sample distribution across five years is presented. From the total sample of 382 observations, 69 observations are related to 2011, 74 observations to 2012, 76 observations to 2013, 81 observations to 2014 and 82 observations to 2015. In figure 13 this classification is illustrated in a histogram.

4.7. Model Specifications

4.7.1. Model Specification of IR, disclosure quality and corporate governance mechanisms

To test main hypothesis 1, the model below was created:

$$DS_{i,t} = a_0 + a_1IR_{i,t} + a_2PPE_{i,t} + a_3AS_TURN_{i,t} + a_4DER_{i,t} + a_5DIVPAY_{i,t} + a_6MBR_{i,t} + a_7SIZE_{i,t} + a_8LNMV_{i,t} + a_9DEBT_RATIO_{i,t} + a_{10}ROE_{i,t} + a_{11}BIG_4_{i,t} + a_{12}PAR_{i,t} + a_{13}PERIDNC_{i,t} + a_{14}PERINBB_{i,t} + a_{15}PERNEAC_{i,t} + a_{16}PERNENC_{i,t} + a_{17}DUALITY_{i,t} + a_{18}CGC_{i,t} + a_{19}NC_{i,t} + a_{20}INST_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{i,t} \quad (1)$$

Where,

Variable Explanation of Equation (1)	
Variable	Description
DS	IR Disclosure Score Index. DS is derived from the scale of total received score of each firm to the maximum score (equals 28 observations based on KING III checklist).
IR	A dummy variable equal to 1 for firms that use the name “Integrated annual Report” on their report, or 0 otherwise.
PPE	Net properties, plant and equipment divided into total assets at the end of fiscal year t (Clarkson et al, 2008).
AS_TURN	A measure of asset utilization that captures how efficiently the firm’s assets are used and is estimated as the ratio of annual sales to total assets at the end of fiscal year t.
DER	The logarithm of discretionary operating expenses, which defined as operating expenses incurred at the discretion of firm management, including selling, general and administration expenses ¹⁴ .
DIVPAY	The dividend payout ratio equals cash common dividends to net income at the end of fiscal year t.
MBR	Market – to – book ratio in fiscal year t. It is calculated as the market value of equity divided by the book value of equity at the end of the year.
SIZE	The natural logarithm of total assets at the end of fiscal year t.
LNMV	Another proxy of firm’s size. It is calculated as the natural logarithm of the market capitalization at the end of fiscal year t.
DEBT_RATIO	A proxy of leverage equals total liabilities to total assets at the end of fiscal year t.
ROE	Return on equity in fiscal year t and calculated as net income during year t scaled by total equity at the beginning of the year.
BIG_4	A dummy variable. When a firm is audited by a Big 4 accounting firm the dummy variable equal to 1 and 0 otherwise.
PAR	The logarithm of the number of pages in the firm’s annual report.
PERIDNC	The percentage of independent directors on the nomination committee as stipulated by the company.
PERINBB	The percentage of nomination committee members who are independent of the board of directors.
PERNEAC	The percentage of non-executive board members on the audit committee as stipulated by the company.
PERNENC	The percentage of non-executive board members on the nomination committee.
DUALITY	A dummy variable which takes 1 if a firm’s CEO is also the chairman of the board of directors and 0 otherwise.
CGC	A dummy variable equal to 1 if the firm has a corporate governance committee and 0 otherwise.
NC	A dummy variable equal to 1 if the firm has a nomination committee and 0 otherwise.
INST	The ratio of number of shares owned by institutional shareholders to total outstanding common shares.

Earnings quality is measured through the degree to which firms engage in earnings management practices. [Healy and Wahlen \(1999\)](#) define earnings management as the alteration of a firm’s economic performance in order to mislead stakeholders and

¹⁴DER excludes the cost of goods sold, interest expenses, leasing and hiring expenses, depreciation, and bad debt expenses. In some cases, there is insufficient information to accurately identify which expenses/costs are to be excluded from the estimate of DER, though the information has been crosschecked with DataStream, as well as with company websites for verification, thus the expectation is that DER is overestimated for some firms in the sample ([Clarkson et al, 2008](#))

influence contractual outcome. To measure earnings management discretionary accruals¹⁵ as used in previous studies. (Rangan, 1998; DeFond and Subramanyam, 1998; Teoh et al., 1998b, 1998a; DeFond and Park, 2001; Bartov et al., 2001; Alcarria Jaime and De Alborno Noguer, 2004; DuCharme et al., 2004; Kothari et al., 2004; Park and Park, 2004; Carey and Simnett, 2006; Garza – Gomerz et al., 2006; Jo and Kim, 2007; Jaggi et al, 2009; Rodriguez – Perez and Van Hemmen, 2010; Iatridis, 2010; Iatridis, 2012a; Iatridis 2012b; Iatridis and Dimitras, 2013; Ecker et al., 2013; Dimitras et al., 2015).

4.7.2. Model Specification of IR and earnings quality and discretionary accruals

To test the main hypothesis 2a, the model below was created:

$$DAC_{i,t} = \gamma_0 + \gamma_1 DS_{i,t} + \gamma_2 IR_{i,t} + \gamma_3 (IR * DS)_{i,t} + \gamma_4 LEV_{i,t} + \gamma_5 SIZE_{i,t} + \gamma_6 MBR_{i,t} + \gamma_7 BIG_4_{i,t} + \gamma_8 ROA_{i,t} + \gamma_9 CFO_{i,t} + \gamma_{10} CASH_{i,t} + \gamma_{11} DUALITY_{i,t} + \gamma_{12} CGC_{i,t} + \gamma_{13} INST_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + u_{i,t} \quad (3)$$

Based on Jones (1991), the discretionary accruals were estimated from the model:

$$\frac{ACC_{i,t}}{TA_{i,t-1}} = \beta_0 + \beta_1 \left(\frac{1}{TA_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}} \right) + \beta_3 \left(\frac{PPE_{i,t}}{TA_{i,t-1}} \right) + \varepsilon_{i,t} \quad (2) \quad [ACC_{i,t} = Earnings_{i,t} - CFO_{i,t}]$$

Where,

Variable Explanation of Equation (2) and (3)	
Variable	Description
ACC	Are the total accruals equals to the net income minus the operating cash flow at the end of fiscal year t.
TA	Book value of total assets at the begging of year t.
ΔREV	The change in sales revenue from the preceding year.
PPE	Net properties, plant and equipment divided into total assets at the end of fiscal year t (Clarkson et al., 2008).

¹⁵ In our study we use the term “discretionary accruals” interchangeably with the term “abnormal accruals”, even though it is a somewhat loaded term that seems more associated with an active choice rather than an outcome of the measurement system or error (Dechow et al., 2010).

DAC	Discretionary accruals, \hat{a} estimated by the Jones (1991) model. DAC are the residuals that derived from the estimation of the equation (2) { DeFond and Subramanyam, 1998 ; Bartov et al., 2001 ; Kothari et al., 2004 ; Garza – Gomez et al., 2006 }
DS	IR Disclosure Score Index. DS derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on KING III checklist).
IR	A dummy variable equal to 1 for firms that use the name “Integrated annual Report” on their report and 0 otherwise.
IR*DS	An interaction term between IR and DS
LEV	Leverage in fiscal year t. \hat{a} Calculated as total debt scaled by total assets at the end of year t.
SIZE	The natural logarithm of total assets at the end of fiscal year t.
MBR	Market – to – book ratio in fiscal year t. Calculated as the market value of equity divided by the book value of equity at the end of the year.
BIG_4	A dummy variable. When a firm is audited by a Big 4 accounting firm the dummy variable equal to 1 and 0 otherwise.
ROA	Return on Assets in fiscal year t, calculated as net income during year t scaled by total assets at the begging of the year.
CFO	Operating cash flow in fiscal year t scaled by total assets at the beginning of the year.
CASH	Cash and short – term investment at the end of fiscal year t scaled by total assets at the begging of the year.
DUALITY	A dummy variable which takes 1 when a firm’s CEO is also the chairman of the board of directors and 0 otherwise.
CGC	A dummy variable equal to 1 if the firm has a corporate governance committee and 0 otherwise.
INST	The ratio of number of shares owned by institutional shareholders to total outstanding common shares.

To test main hypothesis 2b, the model below was created:

$$DAC_{i,t} (AA_{i,t}) = \gamma_0 + \gamma_1 DS_{i,t} + \gamma_2 IR_{i,t} + \gamma_3 (IR*DS)_{i,t} + \gamma_4 LEV_{i,t} + \gamma_5 SIZE_{i,t} + \gamma_6 MBR_{i,t} + \gamma_7 BIG_4_{i,t} + \gamma_8 ROE_{i,t} + \gamma_9 CFO_{i,t} + \gamma_{10} CASH_{i,t} + \gamma_{11} BSIZE_{i,t} + \gamma_{12} BOARDIND_{i,t} + \gamma_{13} DUALITY_{i,t} + \gamma_{14} INST_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + u_{i,t} \quad (5)$$

Because it uses two proxies for the DISCLOSURE_QUALITY, DDS and DS, the following two sub-models are estimated:

$$DAC_{i,t} = \gamma_0 + \gamma_1 DS_{i,t} + \gamma_2 IR_{i,t} + \gamma_3 (IR*DS)_{i,t} + \gamma_4 LEV_{i,t} + \gamma_5 SIZE_{i,t} + \gamma_6 MBR_{i,t} + \gamma_7 BIG_4_{i,t} + \gamma_8 ROE_{i,t} + \gamma_9 CFO_{i,t} + \gamma_{10} CASH_{i,t} + \gamma_{11} BSIZE_{i,t} + \gamma_{12} BOARDIND_{i,t} + \gamma_{13} DUALITY_{i,t} + \gamma_{14} INST_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + u_{i,t} \quad (5a)$$

$$DAC_{i,t} = \gamma_0 + \gamma_1 DDS_{i,t} + \gamma_2 IR_{i,t} + \gamma_3 LEV_{i,t} + \gamma_4 SIZE_{i,t} + \gamma_5 MBR_{i,t} + \gamma_6 BIG_4_{i,t} + \gamma_7 ROE_{i,t} + \gamma_8 CFO_{i,t} + \gamma_9 CASH_{i,t} + \gamma_{10} BSIZE_{i,t} + \gamma_{11} BOARDIND_{i,t} + \gamma_{12} DUALITY_{i,t} + \gamma_{13} INST_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + u_{i,t} \quad (5b)$$

Following [Ball and Shivakumar \(2006, 2008\)](#) normal accruals are estimated using the Jones model and a piecewise linear variant to capture the roles of accruals in noise reduction and in timely loss recognition:

$$\frac{ACCRUALS_{i,t}}{TA_{i,t-1}} = \lambda_0 + \lambda_1 \left(\frac{\Delta SALES_{i,t}}{TA_{i,t-1}} \right) + \lambda_2 \left(\frac{PPE_{i,t}}{TA_{i,t-1}} \right) + \lambda_3 \left(\frac{CFO_{i,t}}{TA_{i,t-1}} \right) + \lambda_4 \left(\frac{\Delta CFO_{i,t}}{TA_{i,t-1}} \right) + \lambda_5 \left(\frac{DCFO * CFO_{i,t}}{TA_{i,t-1}} \right) + v_{it} \quad (4)$$

Here,

$$Accruals = \{\Delta(Current Assets) - \Delta(Cash)\} - \{\Delta(Current Liabilities) - \Delta(Current maturities of long - term debt) - \Delta(Income Taxes Payable)\} - \{Depreciation and Amortization Expense\}$$

Where change (Δ) is computed as the difference in values from year t to year t – 1.

Further,

Variable Explanation of Equation (4) and (5)	
Variable	Description
ΔSALES	Change in revenues during period t.
PPE	Net properties, plant and equipment divided to total assets at the end of year t.
CFO	Cash flow from operations at the end of year t.
DCFO	An indicator variable that takes the value one if CFO < 0 and zero otherwise.
DCFO	An interaction term between DCFO and CFO.
TA	Book value of total assets at the begging of year t.
DAC	Discretionary accruals, estimated by the Jones (1991) model. DAC are the residuals that derived from the estimation of the equation (2) { DeFond and Subramanyam, 1998 ; Bartov et al., 2001 ; Kothari et al., 2004 ; Garza – Gomez et al., 2006 }
DS	IR Disclosure Score Index. DS derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on KING III checklist).
IR	A dummy variable equal to 1 for firms that use on their report the name “Integrated annual Report” and 0 otherwise.
IR*DS	An interaction term between IR and DS
LEV	Leverage in fiscal year t. Calculated as total debt scaled by total assets at the end of year t.
SIZE	The natural logarithm of total assets at the end of fiscal year t.
MBR	Market – to – book ratio in fiscal year t. Calculated as the market value of equity divided by the book value of equity at the end of the year.
BIG_4	A dummy variable. When a firm is audited by a Big 4 accounting firm the dummy variable equal to 1 and 0 otherwise.
ROE	Return on Equity in fiscal year t, calculated as net income during year t scaled by total equity at the begging of the year.
CFO	Operating cash flow in fiscal year t scaled by total assets at the beginning of the year.
CASH	Cash and short – term investment at the end of fiscal year t scaled by total assets at the begging of the year.
BSIZE	The number of directors on the board.
BOARDIND	The board independence ratio measured as number of independent directors divided by total board size.
DUALITY	A dummy variable which takes 1 when a firm’s CEO is also the chairman of the board of directors and 0 otherwise.
CGC	A dummy variable equal to1 if the firm has a corporate governance committee and 0 otherwise.
INST	The ratio of number of shares owned by institutional shareholders to total outstanding common shares.

Big auditors are associated with high reporting quality, e.g., lower absolute values of discretionary accruals ([Becker, et al., 1998](#)), and higher earnings response coefficients ([Teoh and Wong, 1993](#)). High quality of accounting disclosures is verified by good audit reports. This reduces information asymmetry and leads to lower cost of equity, creating better financing terms ([Ashbaugh-Skaife et al., 2006](#); [Botosan and Plumlee, 2002](#)).

4.7.3. Model Specification of IR and agency costs

To test main hypothesis 3, the model below was created:

$$AGENCOST = \lambda_0 + \lambda_1 DS_{i,t} + \lambda_2 REP_IMPROVE_{i,t} + \lambda_3 DAC_{i,t} + \lambda_4 DEBT_RATIO_{i,t} + \lambda_5 ROE_{i,t} + \lambda_6 SIZE_{i,t} + \lambda_7 LNMV_{i,t} + \lambda_8 MBR_{i,t} + \lambda_9 DUALITY_{i,t} + \lambda_{10} INST_{i,t} + \lambda_{11} BETA_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{i,t} \quad (6)$$

Where,

Variable Explanation of Equation (6)	
Variable	Description
AGENCOST	A proxy of agency costs equals with TOBIN'S_Q*CFO (Lang et al., 1991 and Healy and Palepu, 2001). TOBIN'S_Q is the ratio of the market value of assets to the replacement costs of assets (Cheng, 2008 ; Jermias and Gani, 2014). CFO is the Operating cash flow in fiscal year t scaled by total assets at the beginning of the year.
DS	IR Disclosure Score Index. DS derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on KING III checklist).
REP_IMPROVE	A dummy variable equal to 1 when a firm improves its IR quality during the period analysis and 0 otherwise.
DAC	Discretionary accruals, estimated by the Jones (1991) model. DAC are the residuals that derived from the estimation of the equation (2) {DeFond and Subramanyam, 1998; Bartov et al., 2001; Kothari et al., 2004; Garza – Gomez et al., 2006}
DEBT_RATIO	A proxy for leverage equals total liabilities to total assets at the end of fiscal year t.
ROE	Return on equity in fiscal year t and calculated as net income during year t scaled by total equity at the begging of the year.
SIZE	The natural logarithm of total assets at the end of fiscal year t.
LNMV	Another proxy of firm's size calculated as the natural logarithm of market capitalization at the end of fiscal year t ¹⁶ .
MBR	Market – to – book ratio in fiscal year t, calculated as the market value of equity divided by the book value of equity at the end of the year.
DUALITY	A dummy variable which takes 1 if a firm's CEO is also the chair of the board of director and 0 otherwise.
INST	The ratio of number of shares owned by institutional shareholders to total outstanding common shares.
BETA	The market beta coefficient obtained from Datastream for each firm and for each year

Large audit firms effectively control managers and reduce their opportunistic reporting behavior (Amiraslani et al., 2013). There is a correlation between the employment of an audit firm and the client's disclosure quality and compliance (Street and Gray, 2002; Brown and Tarca, 2005; Hodgdon et al., 2009; Amiraslani et al., 2013). Big 4 auditors are associated with high reporting quality, e.g., lower absolute values of discretionary accruals (Becker, et al., 1998), and higher earnings response coefficients (Teoh and

¹⁶It is argued that the agency relation is affected by firm growth where firms with different levels of growth exhibit different levels of free cash flow and/or information asymmetry (McConnell and Servaes 1995).

Wong, 1993). A high quality of accounting disclosures is verified by good audit reports. This reduces information asymmetry and leads to a lower cost of equity, creating better financing terms (Ashbaugh-Skaife et al., 2006; Botosan and Plumlee, 2002).

4.7.4. Model Specification of IR and firms performance

Tobin's Q is used as the dependent variable in this thesis. The main advantage of this metric of performance, in comparison with other measures, such as ROA or ROE, is that Tobin's Q captures the effectiveness of the control mechanisms of management. Following Cheng (2008), Tobin's Q ratio is measured as the market value of assets divided by the replacement cost of assets. The market value of assets equals the market value of equity, plus the difference between the book value of assets and the book value of equity. The book value of assets is used as a proxy for the replacement cost of assets (Jermias and Gani, 2014).

To test the main hypothesis 4, the model below was created:

$$TOBIN_Q_{i,t} = a_0 + a_1DISCLOSURE_QUALITY_{i,t} + a_2DUALITY_{i,t} + a_3BSIZE_{i,t} + a_4BOARDIND_{i,t} + a_5INST_{i,t} + a_6GROWTH_{i,t} + a_7TURNOVER_{i,t} + a_8SIZE_{i,t} + a_9LEVERAGE_{i,t} + a_{10}STDEV\Delta OI_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{i,t} \quad (7)$$

Because it is used two proxies for the DISCLOSURE_QUALITY, DDS and DS, the following two sub-models are estimated:

$$TOBIN_Q_{i,t} = a_0 + a_1DDS_{i,t} + a_2DUALITY_{i,t} + a_3BSIZE_{i,t} + a_4BOARDIND_{i,t} + a_5INST_{i,t} + a_6GROWTH_{i,t} + a_7TURNOVER_{i,t} + a_8SIZE_{i,t} + a_9LEVERAGE_{i,t} + a_{10}STDEV\Delta OI_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{i,t} \quad 7(a)$$

$$TOBIN_Q_{i,t} = a_0 + a_1DS_{i,t} + a_2DUALITY_{i,t} + a_3BSIZE_{i,t} + a_4BOARDIND_{i,t} + a_5INST_{i,t} + a_6GROWTH_{i,t} + a_7TURNOVER_{i,t} + a_8SIZE_{i,t} + a_9LEVERAGE_{i,t} + a_{10}STDEV\Delta OI_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{i,t} \quad 7(b)$$

Variable explanations are provided in the table below.

Variable Explanations of Equation (7)	
Variable	Description
Tobins_Q	The ratio of the market value of assets to the replacement costs of assets. Market value of assets = the sum of the market value of equity + (book value of assets – book value of equity). Replacement cost of assets = book value of assets (Cheng, 2008)
DDS	A dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see section 4.3.1
DS	IR Disclosure Score Index. DS is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on KING III checklist).
DUALITY	A dummy variable which takes 1 if a firm's CEO is also the chairman of the board of directors and 0 if otherwise.
BSIZE	The number of director on the Board.
BOARDIND	The board independence ratio measured as the number of independent directors divided by total board size.
INST	The ratio of number of shares owned by institutional shareholders to total outstanding common shares.
GROWTH	The growth in total assets from the begging to the end of year t.
TURNOVER	A measure of asset utilization that captures how efficiently the firm's assets are used and is estimated as the ratio of annual sales to total assets at the end of fiscal year t.
SIZE	The natural logarithm of total assets at the end of fiscal year t.
LEVERAGE2	Another proxy for firm's leverage calculated as the ratio of total debt to total assets.
STDEVAOI	The standard deviation of the annual change in the operating income.

4.7.5. Model Specification of IR and value relevance of summary accounting information (i.e. book value of equity and earnings)

The market value per share (MVPS) is used as the dependent variable in this study to capture the value relevance of the accounting information. Thus, the following model is estimated:

$$MVPS_{i,t} = \lambda_0 + \lambda_1 DISCLOSURE_QUALITY_{i,t} + \lambda_2 BVPS_{i,t} + \lambda_3 EBITPS_{i,t} + \lambda_4 LEVERAGE_{i,t} + \lambda_5 ROE_{i,t} + \lambda_6 CASH_{i,t} + \lambda_7 PPE_{i,t} + \lambda_8 SIZE_{i,t} + \lambda_9 DUALITY_{i,t} + \lambda_{10} PERIDAU_{i,t} + \lambda_{11} LN_EMPLOY_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{it} \quad (8)$$

Because it uses two proxies for the DISCLOSURE_QUALITY, DDS and DS, the following two sub-models are estimated:

$$MVPS_{i,t} = \lambda_0 + \lambda_1 DDS_{i,t} + \lambda_2 BVPS_{i,t} + \lambda_3 EBITPS_{i,t} + \lambda_4 LEVERAGE_{i,t} + \lambda_5 ROE_{i,t} + \lambda_6 CASH_{i,t} + \lambda_7 PPE_{i,t} + \lambda_8 SIZE_{i,t} + \lambda_9 DUALITY_{i,t} + \lambda_{10} PERIDAU_{i,t} + \lambda_{11} LN_EMPLOY_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{it} \quad 8(a)$$

$$MVPS_{i,t} = \lambda_0 + \lambda_1 DS_{i,t} + \lambda_2 BVPS_{i,t} + \lambda_3 EBITPS_{i,t} + \lambda_4 LEVERAGE_{i,t} + \lambda_5 ROE_{i,t} + \lambda_6 CASH_{i,t} + \lambda_7 PPE_{i,t} + \lambda_8 SIZE_{i,t} + \lambda_9 DUALITY_{i,t} + \lambda_{10} PERIDAU_{i,t} + \lambda_{11} LN_EMPLOY_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{it} \quad 8(b)$$

Variable explanations are provided in the table below,

Variable Explanations of Equation (8)	
Variable	Description
MVPS	Market Value of Equity scaled by the number of common shares.
DDS	A dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see section 4.5.5 .
DS	IR Disclosure Score Index. DS is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on KING III checklist). For more details see section 4.5.5 .
BVPS	Book Value of Equity scaled by the number of common shares.
EBITPS	Earnings before interest and taxation scaled by the number of common shares.
LEVERAGE	Leverage in fiscal year t. It calculated as total liabilities scaled by total assets at the end of year t.
ROE	Return on Equity in fiscal year t, calculated as net income during year t scaled by total equity at the begging of the year.
CASH	Cash and short – term investment at the end of fiscal year t scaled by total assets at the beginning of the year.
PPE	Net properties, plant and equipment divided by total assets at the end of fiscal year t (Clarkson et al., 2008)
SIZE	The natural logarithm of total assets at the end of fiscal year t.
DUALITY	A dummy variable which takes 1 when firm’s CEO is also the chairman of the board of directors and 0 if otherwise.
PERIDAU	The percentage of independent auditors on the audit committee.
LN_EMPLOY	The natural logarithm of the number of the employees.

4.7.6. Model Specification of IR and multiple-based valuation models

Financial analyses are used to select the set of comparable firms based on stock prices or flow items. Multiples are based on equity perspectives because numerators use the stock price; hence, it is composed of a price-to-value driver multiple. The most popular price-to-value driver multiple is the single P/E ratio. The P/E ratio consists of the growth rate and the risk of comparable firms’ stock prices; hence, it is widely utilized by financial analysts ([Bradshaw, 2002](#); [Barker, 1999](#); [Alford, 1992](#); [Boastman and Baskin, 1998](#)). Another reason that earnings are a dominant value driver is that historical earnings provide more accurate predictions and in short-term periods better

explain the variation in stock prices than flow items (Dechow, 1994). Historical earnings are used more frequently to construct P/E ratios (Dechow, 1994).

It is used the approach of introducing industry and fixed-year effects as a partial solution to controlling for the effects of firm and economic characteristics that change over time and affect value creation. The impact of IR in the valuation of firms is tested by constructing the industry-adjusted price/earnings ratio following Alford (1992) in order to match firms to industry growth and risk factors (Francis et al., 2005; Eliwa et al., 2016). Considering the implicit assumptions underlying the use of fixed effects, six specific variables that have been found to affect value creation in other studies are checked: earnings quality, disclosure quality, growth, beta, firm size, and leverage (see Glaum et al., 2013; Preiato et al., 2015; Bernardi and Stark, 2016). Therefore the following model is estimated:

$$P/E_{i,t} = \kappa_0 + \kappa_1 EARNINGS_QUALITY_{i,t} + \kappa_2 DISCLOSURE_QUALITY_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad (9)$$

Because it uses two proxies for the DISCLOSURE_QUALITY, DDS and DS, and two proxies for EARNINGS_QUALITY, the following four sub-models are estimated:

$$P/E_{i,t} = \kappa_0 + \kappa_1 DAC_{i,t} + \kappa_2 DDS_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad 9(a)$$

$$P/E_{i,t} = \kappa_0 + \kappa_1 SMOOTHNESS_{i,t} + \kappa_2 DDS_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad 9(b)$$

$$P/E_{i,t} = \kappa_0 + \kappa_1 DAC_{i,t} + \kappa_2 DS_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad 9(c)$$

$$P/E_{i,t} = \kappa_0 + \kappa_1 SMOOTHNESS_{i,t} + \kappa_2 DS_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad 9(d)$$

Variable explanations are provided in the table below.

Variable Explanations of Equation (9)	
Variable	Description
P/E	Market value per share divided by the net income per share ¹⁷ .
DAC	Discretionary accruals, estimated by the Jones (1991) model. DAC are the residuals that derived from the estimation of the equation (2) { DeFond and Subramanyam, 1998 ; Bartov et al., 2001 ; Kothari et al., 2004 ; Garza – Gomez et al., 2006 }
SMOTNESS	Standard deviation of the operating income to standard deviation of the operating cash flows ¹⁸ . Both measures are standardized with total assets.
DDS	A dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see section 4.5.5 .
DS	IR Disclosure Score Index. DS is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on KING III checklist). For more details see section 4.5.5 .
GROWTH	The growth in total assets from the beginning to the end of year t.
BETA	The firm's systemic risk measured by the beta at the end of year t.
SIZE	The natural logarithm of the firm's market capitalization at the end of year t.
DEBT_RATIO	A proxy of leverage equals with total liabilities to total assets at the end of fiscal year t.

Following [Ball and Shivakumar \(2006, 2008\)](#), normal accruals are estimated using the [Jones model \(1991\)](#) and a piecewise linear variant to capture the role of accruals in noise reduction and in timely loss recognition:

$$\frac{ACCRUALS_{i,t}}{TA_{i,t-1}} = \lambda_0 + \lambda_1 \left(\frac{\Delta SALES_{i,t}}{TA_{i,t-1}} \right) + \lambda_2 \left(\frac{PPE_{i,t}}{TA_{i,t-1}} \right) + \lambda_3 \left(\frac{CFO_{i,t}}{TA_{i,t-1}} \right) + \lambda_4 \left(\frac{\Delta CFO_{i,t}}{TA_{i,t-1}} \right) + \lambda_5 \left(\frac{DCFO * CFO_{i,t}}{TA_{i,t-1}} \right) + v_{it}(10)$$

Here,

$$Accruals = \{\Delta(Current Assets) - \Delta(Cash)\} - \{\Delta(Current Liabilities) - \Delta(Current maturities of long - term debt) - \Delta(Income Taxes Payable)\} - \{Depreciation and Amortization Expense\}$$

where change (Δ) is computed as the difference in values from year t to year t – 1.

Further,

¹⁷ Firms which appeal negative price _ to _ earnings ratio excluded from our sample.

¹⁸ Where scaling by the cash flows is a control for differences in the variability of economic performance ([Dechow et al., 2010](#)).

Variable Explanations of Equation (10)	
Variable	Description
ΔSALES	Change in revenues during period t.
PPE	Net properties, plant and equipment divided to total assets at the end of year t.
CFO	Cash flow from operations at the end of year t.
DCFO	An indicator variable that takes the value one if CFO < 0 and zero otherwise.
DCFO*CFO	An interaction term between DCFO and CFO.
TA	Book value of total assets at the beginning of year t.

4.7.7. Further explanations of the financial variables

The existence of independent directors operates as an effective corporate governance measure. This can be used as a way to control managers. The existence of independent directors on the board improves the quality of accounting information and illustrates the impact of board composition on corporate disclosures (Donnelly and Mulcahy, 2008; Huafang and Jianguo, 2007; Core et al., 1999). **Firm's Size:** Firm size is related to corporate governance characteristics and affects the performance of a firm. Larger companies may have a higher amount of accounting disclosures (Lang and Lundholm, 1993). **Leverage:** Leverage is used as a measure to estimate debt covenant violations that represent the debt structure of a firm (Elayan et al., 2008). **Profitability:** The index that is used to measure the profitability is the return on assets ratio (ROA) (Lang and Ludholm, 1993; Herremans et al., 2011). The lower the index number, the more uniform development the firm will present. Therefore, a positive coefficient is expected. Firms with better financial performance tend to report more ESG information (Clarkson et al., 2008). **Discretionary operating expenses to total sales (DER):** this ratio suggests that the operating expenses of the management can be controlled efficiently, limiting their unnecessary or wasteful activities (Shleifer and Vishny, 1997).

4.7.8. Further explanations of the corporate governance variables

4.7.8.1. Board size

Previous studies reviewing board size, as a corporate governance measure, have concluded in non-coincident results. Some authors ([Lefort and Urzia, 2008](#)) do not find the board size variable significant. On the other hand, some studies have found a negative association between the board size and firm performance ([Hansson et al., 2011](#)). Other studies show an inverse relationship between firm value and board size. These findings are aligned with the agency theory methodology, which suggests the smaller the better ([Yermack, 1996](#)). [Yermack \(1996\)](#) presents evidence that small boards of directors are more effective and that firms with smaller boards achieve higher market value. [Arosa et al., \(2013, p.129\)](#) concluded with the same findings that large corporate boards may be less efficient, due to difficulties in solving the agency problem among the members of the board and [Jensen \(1983\)](#) suggests that a large board size is less effective because the coordination and process problems outweigh the advantages of having more people on whom to draw. Parallel to [Jensen \(1983\)](#), [Dowell et al., \(2011\)](#) concluded that firms with small board size tend to have greater capacity for making decisions quickly ([Villanueva-Villar et al., 2016](#))

On the other hand, [Nicholson and Kiel \(2007\)](#) and [Jackling and Johl \(2009\)](#) find a positive and significant relationship between the board size and firm performance. Their studies based on dependence theory, argues that a greater number of directors provide more information for appropriate decision-making. [Villanueva-Villar et al.,\(2016\)](#) conclude by suggesting a positive association between the board size and Tobin's Q focusing on crisis periods. This is due to the fact that board size, in a crisis context, seems, in fact, to contradict agency theory, since many studies (such as those by [Hambrick and D'Aveni \(1992\)](#) and [Mueller and Barker \(1997\)](#) have found that smaller boards are worse, in the sense that they have a higher probability of failure. In a situation of financial stress, in which the resource supply becomes essential to a company's survival, large boards offer opportunities for resource capture and networking ([Dowell et al., 2011](#); [Villanueva-Villar et al., 2016](#)). [Pucheta-Martínez \(2015\)](#) concluded that there is a positive relation between the board size and firms

performance, but only up to a certain point, after which value decreases as members are added to the board. Prior to this study, [Hillman et al. \(2011\)](#) and [O’Connell and Cramer \(2010\)](#) analyzed the advantages (supervision and advice) and the disadvantages (coordination problems, control, and decision-making) of a large board and concluded that a balance in the number of members of the board size should exist ([Villanueva-Villar et al., 2016](#)).

4.7.8.2. Chief executive officer (CEO) and chairman duality

The [Good Governance Code \(2015\)](#) states that CEO-chairman duality has both advantages and disadvantages. There are advantages such as the reduction in information and coordination costs, as well as clear leadership. On the other hand, the main disadvantage is the concentration of power in a sole person. Nevertheless, the Code does not lay down any recommendations about separating the two roles, but rather maintains the same lines as the Codes that were published earlier ([Unified Code, 2006](#)). In order to carry out this role properly, the board must be independent, both through the board structure and through the separation of the roles of chairman and CEO ([Villanueva-Villar et al., 2016](#)). Other studies conclude that there is a positive relationship between CEO duality and performance in high-complexity environments ([Chen, 2014](#); [Chang et al., 2015](#)). From the approach perspective of the institutional investors, it is considered to maintain the separation between CEO and Chairman, encouraging the independence of the board ([Villanueva-Villar et al., 2016](#)).

CEO and chairman in the same person, can give outside directors relevant information directly regarding the operations of the firm. This reduces the agency problems related to CEO duality ([Finkelstein and D’Aveni, 1994](#); [Valenti et al., 2011](#)) and gives the power to the CEO to make decisions more quickly ([Dowell et al., 2011](#)). It can be created a clearer strategic orientation, greater autonomy and better response capacity ([Cabrera Suárez and Martín-Santana, 2015](#)).

4.7.8.3. Board independence

All the written codes of good governance throughout the world recommend greater independence for boards ([Zattoni and Cuomo, 2008](#)). Independent board members are understood to be “those that are able to carry out their roles, having been appointed in accordance to their personal and professional conditions, without being influenced by relationships with the firm, its significant shareholders or directors” ([Unified Code, 2006, p. 52](#)).

Regarding the number of independent board members, the [Good Governance Code \(2015\)](#) recommends that they should make up at least half the total number of members, except in cases in which the firm does not have a high capitalization rate or when one of the shareholders or several of the shareholders jointly in concert, control more than 30% of the capital, in which case a third of the total number of members is recommended. This code differs from the Unified Code published in 2006 and updated in 2013, where the only recommendation was that independent members should represent at least a third of the total board. Board participation helps strengthen board independence in those countries in which minority shareholders have little protection, since it counters the power of majority groups ([Villanueva-Villar et al., 2016](#)).

One of the positive effects of bringing outside directors onto the board is that they can help monitor and control senior managers, making sure that their actions take investors’ interests into consideration ([Osma, 2008](#)).

Among the reasons why outside directors are considered to be more effective than inside directors, when monitoring managers, is the fact that they often have experience in decision-making in other companies, as well as a tendency to consider their reputation in the managerial work market ([Fama and Jensen, 1983](#); [Ghosh et al., 2010](#)). Independent directors are also expected to show greater objectivity and to have more expertise than affiliated directors. For these reasons, there is a belief that those boards with more outside directors are more independent ([Villanueva-Villar et al., 2016](#)).

Nevertheless, in spite of what the different theories suggest, the empirical studies carried out present differing results. The level of board independence, measured in terms of the percentage of external members, can create or destroy value in a firm. [Mínguez and Martin \(2003\)](#) cite empirical studies that obtained varying results. There are studies that found no significant relationship ([Hermalin and Weisbach, 1991](#); [Mínguez and Martin, 2003](#)), some that found a positive effect ([Barnhart et al., 1994](#); [Yermack, 1996](#)), and others that found a significant but negative relationship ([Agrawal and Knoeber, 1996](#); [Villanueva-Villar et al., 2016](#)).

[Lefort and Urzúa \(2008\)](#) found that an increase in the proportion of outside directors positively affects value creation. However, [Carter et al. \(2010\)](#) found that board independence is not significant. [Hermalin and Weisbach \(1991\)](#) indicate that there is a tendency in times of crisis to reduce the power of the CEO and to increase board independence. [Chang et al. \(2015\)](#) also observed a positive and significant relationship between board composition and firm performance for the period of ~~the~~ deepest crisis, 2008 to 2010.

On the other hand, [Francis et al. \(2012\)](#) found that board independence could enhance board efficacy and thereby firm performance during a crisis period; they took the percent age of outsiders on the board as a measure of independence (thus looking at outside directors, whether they were truly independent or were financial experts). From the view of institutional investors, one of the future challenges in the field of corporate governance would be to ensure the independence of directors. This would allow improvement of the firm's performance ([Villanueva-Villar et al., 2016](#)).

5. Results

5.1 Descriptive statistics

Table 5 reports the descriptive statistics for all variables used in hypotheses 1 to 3. In panel A, the descriptive statistics are exhibited for the dependent variables of equations (1), (3) and (5). On average, the disclosure score index for the international firms of the sample is 70.2% [standard deviation (st.dev.) 15.1%]. The average size of discretionary accruals is approximately 0.1% in total asset terms [st.dev.:5.8%]. Furthermore, the average ratio of market value * CFO (proxy for agency cost) is approximately 29% (in total asset terms) [st.dev.:1.29].

In panel B, the descriptive statistics for the financial, corporate governance and other control variables are reported. In Part 1, indicatively, the average asset turnover (AS_TURN) for the sample's firms is approximately 92.7% in total asset terms [st.dev.:72.2%]. The average debt ratio is approximately 59.1% in total asset terms [st.dev.: 16.1%]. The average ROA of international firms is 3.8% [st.dev.: 6%], indicating satisfactory levels of profitability. Finally, the average proportion of cash in total assets is approximately 11.5% [st.dev.: 11.5%], indicating that the sample is characterized by firms with appropriate levels of liquidity. In part 2, the descriptive statistics for the corporate governance control variables are reported. The average percentage of independent board members on the nomination committee (PERIDNC) is approximately 47.994% [st. dev.:30.763%]; the average percentage of nomination committee members who are independent of the board of directors (PERINBB) is approximately 24.485% [st.dev.:97.216%]; and the average percentage of non-executive board members on the audit committee (PERNEAC) is 40.507% [st.dev.: 36.997%]. On average, in 54.1% of the international firms, the CEO is also the chair of the board [st.dev.:49.9%]. Finally, the average proportion of the number of shares owned by institutional shareholders to total outstanding common shares (INST) is 18.4% [st.dev.:14.4%].

Table 5: Descriptive Statistics relevant to hypotheses 1 to 3

The period of interest is 2011-2015. The sample consists of 82 international firms from around the world listed in the IR database (<http://examples.integratedreporting.org/reporters?start=A>). **DS** is IR Disclosure Score Index. DS is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on **KING III checklist**). **DAC** is discretionary accruals. It is estimated using the **Jones (1991)** model. DAC are the residuals that derived from the estimation of the equation (2) (**DeFond and Subramanyam, 1998; Bartov et al., 2001; Kothari et al., 2004; Garza – Gomez et al., 2006**). **AG_COST** is a proxy of agency costs equals to **TOBIN'S_Q***CFO (**Lang et al., 1991 and Healy and Palepu, 2001**). **TOBIN'S_Q** is the ratio of the **market value** of assets to the replacement costs of assets (**Cheng, 2008 ; Jermias and Gani, 2014**). **CFO** is the Operating cash flow in fiscal year *t* scaled by total assets at the beginning of the year. **PPE** is net properties, plant and equipment divided into total assets at the end of fiscal year *t* (**Clarkson et al., 2008**). **AS_TURN** is a measure of asset utilization that captures how efficiently the firm's assets are used and is estimated as the ratio of annual sales to total assets at the end of fiscal year *t*. **DER** is the logarithm of discretionary operating expenses which is defined as operating expenses incurred at the discretion of firm management including selling, general and administration expenses. **DIVPAY** is the dividend payout ratio equal to cash common dividends to net income at the end of fiscal year *t*. **MBR** is market – to – book ratio in fiscal year *t*. It is calculated as the market value of equity divided by the book value of equity at the end of the year. **SIZE** is the natural logarithm of total assets at the end of fiscal year *t*. **LNMV** is another proxy of a firm's size. It is calculated as the natural logarithm of the market capitalization at the end of fiscal year *t*. **DEBT_RATIO** is a proxy of leverage equal to total liabilities to total assets at the end of fiscal year *t*. **LEV** is leverage in fiscal year *t*. It is calculated as total debt scaled by total assets at the end of year *t*. **ROA** is the return on assets in fiscal year *t* calculated as net income during year *t* scaled by total assets at the beginning of the year. **ROE** is the return on equity in fiscal year *t* calculated as net income during year *t* scaled by total equity at the beginning of the year. **CASH** is the cash and short – term investments at the end of fiscal year *t* scaled by total assets at the beginning of the year. **PERIDAU** is the percentage of independent board members on the audit committee. **PERIDNC** is the percentage of independent directors on the nomination committee. **PERINBB** is the percentage of nomination committee members who are independent of the Board. **PERNEAC** is the percentage of non – executive board members on the audit committee. **PERNENC** is the percentage on non – executive board members on the nomination committee. **DUALITY** is a dummy variable which takes 1 when a firm's CEO is also the chairman of the board of directors and 0 otherwise. **CGC** is a dummy variable equal to 1 if the firm has a corporate governance committee and 0 otherwise. **NC** is a dummy variable equal to 1 if the firm has a nomination committee and 0 otherwise. **INST** is the ratio of number of shares owned by institutional shareholders to total outstanding common shares. **BIG_4** is a dummy variable. When a firm is audited by a Big 4 accounting firm the dummy variable is equal to 1 and 0 otherwise. **PAR** is the logarithm of the number of pages in the firm's annual report. **BETA** is the market beta coefficient obtained from Datastream for each firm and for each year. **REP_IMPROVE** is a dummy variable equal to 1 when a firm improves its IR quality during the period analysis and 0 otherwise.

Variable	Mean	Median	Std.Dev.	Max	Min	N
Panel A: Depended Variables						
DS	0.702	0.679	0.151	1.000	0.464	410
DAC	0.001	-0.002	0.058	0.461	-0.308	388
AG_COST	0.290	0.079	1.290	9.788	-8.580	389
Panel B: Control Variables						
1. Financial Variables:						
PPE	0.313	0.260	0.225	0.890	0.002	388
AS_TURN	0.927	0.677	0.722	3.811	0.044	389
DER	9.729	9.502	2.442	15.956	2.188	378
DIVPAY	0.631	0.422	1.317	12.500	-1.524	332
MBR	10.194	1.607	30.815	305.434	0.002	382
SIZE	10.266	10.122	2.326	15.963	4.522	389
LNMV	9.404	9.033	1.686	16.664	6.638	403
TOBIN'S_Q	4.281	1.254	11.034	85.021	0.072	389
DEBT_RATIO	0.591	0.598	0.161	0.996	0.069	388
LEV	0.270	0.250	0.151	0.629	0.000	388
ROA	0.038	0.037	0.060	0.486	-0.329	389
ROE	0.055	0.097	1.011	0.877	-19.565	388
CFO	0.072	0.072	0.060	0.261	-0.288	389
CASH	0.115	0.089	0.115	0.891	0.000	387
2. Corporate Governance Variables:						
PERIDAU	50.430	50.000	36.635	100.000	0.000	410
PERIDNC	47.994	45.500	30.763	100.000	0.000	410
PERINBB	24.485	17.245	97.216	96.500	0.028	410
PERNEAC	40.507	35.750	36.997	100.000	0.000	410
PERNENC	24.225	20.250	20.063	75.250	0.000	410
DUALITY	0.541	1.000	0.499	1.000	0.000	410
CGC	0.538	1.000	0.499	1.000	0.000	409
NC	0.615	1.000	0.487	1.000	0.000	410
INST	0.184	0.171	0.144	0.632	0.000	410
3. Other Control Variables						
BIG_4	0.788	1.000	0.409	1.000	0.000	405
PAR	4.685	4.844	0.651	5.846	2.639	410
BETA	0.778	0.697	0.483	2.739	-0.397	410
REP_IMPROVE	0.341	0.000	0.475	1.000	0.000	410

In Part 3, the descriptive statistics for the other control variables are reported. A total of 78.8% of the international firms in the sample are audited by Big 4 auditors [st.dev.: 40.9%]. The average logarithm of the number of pages in the IR reports for international firms is 4.685 [st.dev.: 65.1%], indicating that the financial departments of the firms prepare IR reports with an average size of approximately 131 pages. The average market beta coefficient for the international firms in the sample is approximately 0.778 [st.dev.: 48.3%]. Finally, the average magnitude of the PER_IMPROVE variable is 0.341 [st.dev.:47.5%]. This result indicates that, on average, 34.1% of the firms in the sample have improved the quality of their financial statements based on IR through the period under examination.

In table 6 the descriptive statistics for all variables used in hypotheses 4 to 6 are reported. In Panel A the descriptive statistics for all the dependent variables of the equations are presented (7), (8), (9), (14), (15) and (16). On average, the firms in the sample indicate a market value of their assets that is four times larger than their assets' replacement cost (st.dev.: 11.034). The average return on assets of the firms is 3.8% (st.dev.: 6%). Furthermore, the average market value per share of the sample is 622.806 million Euros (st.dev.: 4420.951). The average market-to-book ratio is 4.349 (st.dev.: 1.268), implying that the 82 firms of the sample exhibit high growth opportunities. On average the P/E ratio is 3.195 (st.dev.: 2.4%), indicating that the firms were evaluated significantly positively by investors regarding their future profitability. On average the P/BV is 33.272 (st.dev.: 289.139), indicating that the firms have healthy future profit projections and that investors are probably ~~are~~ willing to pay a premium for that probability.

In panel B the descriptive statistics for financial, corporate governance and other control variables are reported. On average, 50.43% of the firms have independent board members on their audit committee (st.dev.: 36.635). The average number of board members is approximately 11 in the sample (st.dev.:3.1). The degree of board independence in the sample firms is approximately 33.6% (st.dev.:20.6%). On average,

in 54.1% of the firms the CEO is also the chairman of the board of directors (st.dev.:49.9%). The proportion of the firms' equity held by institutional shareholders is on average 18.4% (st.dev.:14.4%).

In panel C the descriptive statistics for the other independent variables of the models are reported. On average, 78.8% of the sample firms are audited by Big 4 auditors (40.9%). On average, the natural logarithm of the number of the firms' employees is 9.439 (st.dev.:1.726). The average beta of the sample firms is 0.778 (st.dev.: 48.3%). The average volatility of the annual growth of firms' operating income in the sample is 1.956 (st.dev.:16.145). Finally, the average size of the firms' annual reports is approximately 131 pages (st.dev.: 73.703).

Table 6: Descriptive Statistics relevant to hypotheses 4 to 6

This table presents descriptive statistics for the sample of firms. The period of interest is 2011-2015 and the sample consists of 82 international firms from around the world listed in the IR database (<http://examples.integratedreporting.org/reporters?start=A>). **TOBIN'S_Q** is the ratio of the **market value** of assets to the replacement costs of assets (Cheng, 2008 ; Jermias and Gani, 2014). **ROA** is the return on assets in fiscal year *t* calculated as net income during year *t* scaled by total assets at the begging of the year. **MVPS** is the market value of equity scaled by the number of common shares **MBR** is market – to – book ratio in fiscal year *t*. It is calculated as the market value of equity divided by the book value of equity at the end of the year. **P/E** is the price to earnings ratio which is calculated by dividing the market value price per share by the earnings per share. **P/BV** is the price to book ratio which is calculated by dividing the market price per share by book value per share. **DS** is IR Disclosure Score Index. **DS** is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on **KING III checklist**). **DDS** is a dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal to or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see [section 4.5.5](#). **SIZE** is the natural logarithm of total assets at the end of fiscal year *t*. **ROE** is the return on equity in fiscal year *t* calculated as net income during year *t* scaled by total equity at the begging of the year. **CFO** is the Operating cash flow in fiscal year *t* scaled by total assets at the beginning of the year. **CASH** is the cash and short – term investment at the end of fiscal year *t* scaled by total assets at the begging of the year. **TURNOVER** is a measure of asset utilization that captures how efficiently the firm's assets are used and is estimated as the ratio of annual sales to total assets at the end of fiscal year *t*. **DEBT_RATIO** is a proxy of leverage equal to total liabilities to total assets at the end of fiscal year *t*. **BVPS** is the book value of equity scaled by the number of common shares. **EBTPS** is earnings before interest and taxation scaled by the number of common shares. **LEVERAGE2** is another proxy for firm's leverage calculated as the ratio of total debt to total assets. **PPE** is net properties, plant and equipment divided to total assets at the end of fiscal year *t* (Clarkson et al., 2008). **GROWTH** is the growth in total assets from the begging to the end of year *t*. **DAC** are the discretionary accruals. The normal proportion of accruals estimated by the **Jones (1991)** model. **DAC** are the residuals that derived from the estimation of the normal accruals equation {DeFond and Subramanyam, 1998; Bartov et al., 2001; Kothari et al., 2004; Garza – Gomez et al., 2006}. **SMOOTHNESS** is the ratio of the standard deviation of operating income divided by the standard deviation of cash flow from operations. **PERIDAU** is the percentage of independent board members on the audit committee. **BSIZE** is the number of director on the Board. **BOARDIND** is the board independence ratio measured as the number of independent directors divided by total board size. **DUALITY** is a dummy variable which takes 1 when a firm's CEO is also the chairman of the board of directors and 0 otherwise. **INST** is the ratio of number of shares owned by institutional shareholders to total outstanding common shares. **BIG_4** is a dummy variable. When a firm is audited by a Big 4 accounting firm the dummy variable is equal to 1 and 0 otherwise. **LN_EMPLOY** is the natural logarithm of the number of the employees. **BETA** is the market beta coefficient obtained from Datastream for each firm and for each year.

Variable	Mean	Median	Std.Dev.	Max	Min	N
Panel A: Depended Variables						
TOBIN'S_Q	4.281	1.254	11.034	85.021	0.072	389
ROA	0.038	0.037	0.060	0.486	-0.329	389
MVPS	622.806	24.832	4420.951	49177.220	0.390	377
MBR	4.349	1.268	11.123	85.021	0.156	382
P/E	3.195	0.024	20.454	270.719	3.48E-05	338
P/BV	33.272	0.068	289.139	3135.360	7.04E-06	375
Panel B: Control Variables						
1. Financial Variables:						
DS	0.702	0.679	0.151	1.000	0.464	410
DDS	0.598	1.000	0.491	1.000	0.000	410
SIZE	10.266	10.122	2.326	15.963	4.522	389
ROE	0.055	0.097	1.011	0.877	-19.565	388
CFO	0.072	0.072	0.060	0.261	-0.288	389
CASH	0.115	0.089	0.115	0.891	0.000	387
TURNOVER	0.927	0.677	0.722	3.811	0.044	389
DEBT_RATIO	0.591	0.598	0.161	0.996	0.069	388
BVPS	245.655	17.547	522.863	3197.838	0.066	383
EBTPS	28.794	2.395	76.330	459.332	-224.670	381
PPE	0.313	0.260	0.225	0.890	0.002	388
GROWTH	0.025	0.028	0.486	1.000	-7.636	410
STDEVAOI	1.956	2.024	16.145	76.364	0.082	379
ABSDAC	0.031	0.023	0.039	0.451	5.42E-05	388
SMOOTHNESS	1.877	0.787	6.025	79.262	0.015	365
2. Corporate Governance Variables:						
PERIDAU	50.430	50.000	36.635	100.000	0.000	410
BSIZE	11.156	11.000	3.100	20.000	5.000	410
BOARDIND	0.336	0.286	0.206	0.889	0.000	410
DUALITY	0.541	1.000	0.499	1.000	0.000	410
INST	0.184	0.171	0.144	0.632	0.000	410
3. Other Control Variables:						
BIG_4	0.788	1.000	0.409	1.000	0.000	405
LN_EMPLOY	9.439	9.602	1.726	12.427	4.094	410
BETA	0.778	0.697	0.483	2.739	-0.397	410
PAR (in pages)	130.681	127.000	73.703	346.000	14.000	410

5.2 IR Disclosures Quality and Corporate Governance

In tables 7 and 8, the results of the relationship between the financial reporting quality as expressed by IR disclosure information and corporate governance mechanisms are

reported. Table 8 presents the correlations among the variables used in model (1). It is observed that there is a positive and significant (1% level) correlation (in both the Spearman and Pearson methods) between the IR disclosure score index (DS) and the corporate governance variables (variables 14 to 21). These results confirm the argument that firms that disclose high-quality IR information tend to display more effective corporate governance mechanisms. Although these individual results are significant, they rely on a multi-factor regression analysis for more valid and reliable results (Magnis and Iatridis, 2017).

In table 8, the estimation results of model (1) are reported. The coefficients of interest are α_{13} - α_{20} . In model (A), it is an estimated equation (1) with pooled OLS, whereas in model (B), the fixed effects approach is applied. Comparing columns 3-4 to columns 5-6, it is found that there are no important differences in either the signs of the estimated coefficients or the significance of these outputs. There is a positive and significant association in both models (A) and (B) at the 1% level between IR and DS. This finding indicates that firms that redact their IR reports with the term “Integrated Report” tend to exhibit higher quality accounting disclosures compared to those using the term “Annual Report”. The PERIDNC and PERNEAC variables are positively and significantly associated with DS at the 1% level, indicating that firms with a high proportion of independent and non-executive board members on nomination and audit committees tend to display higher IR disclosure quality, confirming the findings of Zahra and Stanton (1988), Core et al. (1999), Haniffa and Cooke (2005), Huafang and Jianguo (2007), and Donnelly and Mulcahy (2008). In contrast, the analysis shows that the existence of a smaller percentage of independent members of the nomination committee, who are independent of the board, tend to exhibit more quantitative IR disclosures. In addition, firms in which the CEO is also the chairman of the board of directors tend to display higher IR disclosure quality compared to firms in which the CEO and chairman of the board are different. This result confirms the findings of

[Haniffa and Cooke \(2002\)](#), who argue that a unified leadership structure improves decision-making and leads to a higher quality of accounting disclosures.

The asset turnover ratio (AS_TURN) is positively and significantly associated with DS at the 1% level, implying that firms that manage their assets effectively, to generate revenue, tend to display more quantitative IR disclosures. The study also finds that firms that are characterized as large in size (in terms of both book and market value) and with large debt levels, disclose higher-quality IR information, confirming the findings of [Lang and Lundholm \(1993\)](#), [Iatridis \(2015\)](#), [Deegan and Gordon \(1996\)](#), [Patten \(1991; 2002\)](#) and [Amiraslani et al. \(2013\)](#). In contrast, firms that experience higher growth (MBR) report lower IR disclosure quality and conceal unfavorable performance measures. Their goal is to avoid disappointing capital providers and, on the contrary, to facilitate their growth process ([Iatridis, 2011](#)). Furthermore, firms with high profitability, which is proxied by ROE, tend to display lower-quality IR disclosure because ROE and DS are associated negatively and significantly at the 1% level.

Table 7: Correlation Matrix for Hypothesis 1

Spearman correlations reported below the diagonal and Pearson correlations above the diagonal. *The superscripts ^a, ^b and ^c denote significance at 1%, 5% and 10% respectively.*

Correlations for H ₁	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
(1) DS	1.00	0.61 ^a	0.01	0.23 ^a	-0.05	0.10 ^c	0.12 ^b	-0.11 ^c	0.22 ^a	0.14 ^b	-0.09 ^c	0.28 ^a	0.50 ^a	0.65 ^a	0.31 ^a	0.70 ^a	0.35 ^a	0.19 ^a	0.63 ^a	0.63 ^a	0.29 ^a
(2) IR	0.58 ^a	1.00	0.05	0.23 ^a	0.05	0.05	0.18 ^a	-0.04	0.15 ^a	0.01	-0.09	0.09	0.26 ^a	0.54 ^a	0.27 ^a	0.53 ^a	0.19 ^a	0.08	0.45 ^a	0.52 ^a	0.12 ^b
(3) PP_E	-0.02	0.05	1.00	-0.18 ^a	-0.31 ^a	-0.14 ^b	-0.05	-0.26 ^a	-0.10 ^c	-0.05	0.03	0.10 ^c	-0.16 ^a	-0.02	-0.10 ^c	-0.08	0.00	0.25 ^a	-0.04	0.06	-0.12 ^b
(4) AS_TURN	0.11 ^b	0.23 ^a	-0.08	1.00	0.16 ^a	0.03	-0.08	-0.15 ^a	-0.03	-0.08	0.05	-0.01	0.14 ^b	0.12 ^b	0.30 ^a	0.20 ^a	0.01	-0.08	0.15 ^a	0.13 ^b	0.27 ^a
(5) DER	0.15 ^a	-0.01	-0.19 ^a	0.30 ^a	1.00	-0.02	-0.34 ^a	0.94 ^a	0.36 ^a	0.09	0.01	-0.08	0.02	-0.06	-0.13 ^b	-0.13 ^b	-0.11 ^c	0.01	-0.09 ^c	-0.08	-0.15 ^a
(6) DIVPAY	-0.02	-0.09	-0.18 ^a	-0.13 ^b	-0.04	1.00	-0.03	-0.02	-0.06	-0.06	0.03	0.07	0.09	0.09	0.13 ^b	0.11 ^c	0.16 ^a	-0.11 ^c	0.10 ^c	0.08	0.13 ^b
(7) MBR	0.28 ^a	0.15 ^a	0.12 ^b	0.02	-0.69 ^a	-0.04	1.00	-0.30 ^a	0.29 ^a	0.07	-0.28 ^a	-0.10 ^c	0.11 ^b	0.15 ^a	0.08	0.16 ^a	0.14 ^b	-0.09	0.06	0.15 ^a	0.07
(8) SIZE	-0.17 ^a	-0.08	-0.18 ^a	-0.10 ^c	0.90 ^a	0.06	-0.69 ^a	1.00	0.38 ^a	0.15 ^a	0.00	-0.07	0.00	-0.09	-0.23 ^a	-0.20 ^a	-0.11 ^c	0.02	-0.13 ^b	-0.12 ^b	-0.24 ^a
(9) LNMV	0.08	0.00	-0.01	-0.04	0.18 ^a	0.01	0.41 ^a	0.23 ^a	1.00	0.18 ^a	0.01	-0.04	0.20 ^a	0.09	-0.18 ^a	0.13 ^b	0.02	0.03	0.16 ^a	0.16 ^a	-0.13 ^b
(10) DEBT_RATIO	0.10 ^c	-0.01	-0.06	-0.14 ^b	0.01	0.08	0.18 ^a	0.14 ^b	0.05	1.00	-0.12 ^b	0.05	0.09 ^c	-0.07	0.04	-0.03	-0.04	0.10 ^c	0.12 ^b	0.11 ^c	-0.08
(11) ROE	0.07	-0.13 ^b	-0.15 ^a	0.02	-0.14 ^b	0.25 ^a	0.08	-0.09	0.00	0.17 ^a	1.00	-0.01	-0.01	0.06	-0.16 ^a	-0.04	0.03	0.07	-0.03	-0.03	0.09 ^c
(12) BIG_4	0.26 ^a	0.09	0.06	-0.04	-0.13 ^b	0.07	0.05	-0.12 ^b	-0.07	0.00	0.13 ^b	1.00	0.14 ^b	0.27 ^a	0.17 ^a	0.26 ^a	0.29 ^a	0.08	0.23 ^a	0.35 ^a	0.19 ^a
(13) PAR	0.52 ^a	0.27 ^a	-0.15 ^a	0.06	0.01	0.13 ^b	0.16 ^a	0.03	0.20 ^a	0.05	0.24 ^a	0.12 ^b	1.00	0.35 ^a	0.26 ^a	0.37 ^a	0.09	0.16 ^a	0.40 ^a	0.38 ^a	0.21 ^a
(14) PERIDNC	0.65 ^a	0.52 ^a	-0.03	0.07	-0.05	0.02	0.05	-0.08	-0.09	-0.10 ^c	-0.01	0.26 ^a	0.33 ^a	1.00	0.26 ^a	0.70 ^a	0.51 ^a	-0.10 ^c	0.57 ^a	0.53 ^a	0.34 ^a
(15) PERINBB	0.25 ^a	0.19 ^a	-0.09	0.25 ^a	-0.14 ^b	0.20 ^a	0.08	-0.23 ^a	-0.21 ^a	-0.06	0.16 ^a	0.20 ^a	0.24 ^a	0.31 ^a	1.00	0.38 ^a	0.04	-0.14 ^b	0.28 ^a	0.31 ^a	0.34 ^a
(16) PERNEAC	0.72 ^a	0.53 ^a	-0.10 ^c	0.16 ^a	-0.19 ^a	0.02	0.29 ^a	-0.25 ^a	0.00	-0.05	0.02	0.25 ^a	0.36 ^a	0.65 ^a	0.34 ^a	1.00	0.34 ^a	-0.07	0.72 ^a	0.70 ^a	0.32 ^a
(17) PERNENC	0.35 ^a	0.17 ^a	-0.04	-0.06	-0.14 ^b	0.09	0.06	-0.10 ^c	-0.10 ^c	-0.05	0.08	0.31 ^a	0.07	0.52 ^a	0.11 ^b	0.36 ^a	1.00	-0.11 ^b	0.27 ^a	0.28 ^a	0.38 ^a
(18) DUALITY	0.22 ^a	0.08	0.25 ^a	0.03	0.03	-0.12 ^b	0.03	0.03	0.16 ^a	0.10 ^c	0.16 ^a	0.08	0.13 ^b	-0.07	-0.15 ^a	-0.03	-0.16 ^a	1.00	0.06	0.24 ^a	-0.18 ^a
(19) CGC	0.67 ^a	0.45	-0.07	0.11 ^b	-0.14 ^a	0.11 ^c	0.26 ^a	-0.16 ^a	0.04	0.09	0.08	0.23 ^a	0.42 ^a	0.54 ^a	0.24 ^a	0.72 ^a	0.29 ^a	0.06	1.00	0.66 ^a	0.18 ^a
(20) NC	0.66 ^a	0.52 ^a	0.02	0.11 ^b	-0.14 ^b	0.03	0.26 ^a	-0.16 ^a	0.07	0.08	0.01	0.35 ^a	0.38 ^a	0.50 ^a	0.29 ^a	0.74 ^a	0.28 ^a	0.24 ^a	0.66 ^a	1.00	0.15 ^a
(21) INST	0.22 ^a	0.08	-0.18 ^a	0.20 ^a	-0.18 ^a	0.04	0.12 ^b	-0.25 ^a	-0.10 ^c	-0.13 ^b	0.19 ^a	0.18 ^a	0.18 ^a	0.32 ^a	0.48 ^a	0.27 ^a	0.36 ^a	-0.19 ^a	0.16 ^a	0.13 ^b	1.00

Table 8: Corporate Governance and IR

The table below summarizes the equation's results using Pooled and Fixed Effects OLS:

$$DS_{it} = a_0 + a_1 IR_{it} + a_2 PPE_{it} + a_3 AS_TURN_{it} + a_4 DER_{it} + a_5 DIVPAY_{it} + a_6 MBR_{it} + a_7 SIZE_{it-1} + a_8 LNMV_{it} + a_9 DEBT_RATIO_{it} + a_{10} ROE_{it} + a_{11} BIG_4_{it} + a_{12} PAR_{it} + a_{13} PERIDNC_{it} + a_{14} PERINBB_{it} + a_{15} PERNEAC_{it} + a_{16} PERNENC_{it} + a_{17} DUALITY + a_{18} CGC_{it} + a_{19} NC_{it} + a_{20} INST_{it} + \{Industry Effects\} + \{Year Effects\} + e_{it}$$

The period of interest is 2011-2015. This sample consists of 82 international firms listed in the IR database (<http://examples.integratedreporting.org/reporters?start=A>). *DS* is IR Disclosure Score Index. *DS* is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on *KING III checklist*). For more details see [section 4.5.5](#). Definitions of the rest of the variables are provided in notes to [Table 5](#). *Z* – statistic and *p* – values (in the parentheses) for each estimated variable are provided in columns (4) and (6). The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.

Dependent Variable: DS		Results			
Variable	Predictions	Model (A) (Pooled OLS)		Model (B) (Fixed Effects)	
		Estimations	Z –Statistic (P-values)	Estimations	Z –Statistic (P-values)
Intercept	?	0.1866***	3.91 (0.00)	0.2902***	4.43 (0.00)
IR	+	0.6629***	5.60 (0.00)	0.0649***	5.33 (0.00)
PPE	?	0.0176	0.78 (0.43)	-0.0178	-0.67 (0.50)
AS_TURN	+	0.0564***	4.11 (0.00)	0.0568***	4.04 (0.00)
DER	-	-0.0306***	-2.69 (0.01)	-0.0323***	-2.80 (0.01)
DIVPAY	+	0.0071**	2.16 (0.03)	0.0070**	2.10 (0.04)
MBR	?	-0.0005***	-2.72 (0.01)	-0.0005**	-2.49 (0.01)
SIZE	+	0.0027**	2.26 (0.02)	0.0284**	2.32 (0.02)
LNMV	+	0.0124***	3.74 (0.00)	0.0123***	3.59 (0.00)
DEBT_RATIO	+	0.0598**	2.13 (0.03)	0.0573*	1.89 (0.06)
ROE	?	-0.0222***	-5.23 (0.00)	-0.0227***	-5.33 (0.00)
BIG_4	+	0.0043	0.36 (0.72)	0.0143	1.16 (0.25)
PAR	+	0.0272***	3.45 (0.00)	0.0182**	2.12 (0.03)
PERIDNC	+	0.0016***	6.57 (0.00)	0.0015***	6.16 (0.00)
PERINBB	+	-0.0012***	-3.31 (0.00)	-0.0011***	-2.94 (0.00)
PERNEAC	+	0.0009***	4.26 (0.00)	0.0010***	4.51 (0.00)
PERNENC	+	0.0002	0.82 (0.41)	0.0003	1.24 (0.22)
DUALITY	-	0.0740***	7.24 (0.00)	0.0804***	7.45 (0.00)
CGC	+	0.0082	0.61 (0.54)	0.0071	0.52 (0.60)
NC	+	-0.0051	-0.35 (0.73)	-0.0103	-0.69 (0.49)
INST	+	0.148***	3.89 (0.00)	0.1386***	3.43 (0.00)
Industry Fixed Effects		No		Yes	
Year Fixed Effects		No		Yes	
Adj.R ²		0.5971		0.5999	
Rn ² statistic		920.992***		968.726***	
N		322		322	

5.3 IR and discretionary accruals

Table 9 shows the Spearman and Pearson correlations for all variables included in equation (3). The dependent variable DAC is correlated negatively and significantly (at the 5% level or higher) with SIZE and CFO, implying that large firms (in total asset terms) and firms with high operating cash flows tend to display more conservative earnings management practices. In contrast, firms that appear to offer high growth opportunities and high profitability tend to apply more aggressive earnings manipulation techniques.

In table 10, the results from the estimation of equation (3) are reported. The coefficients of interest are γ_1 - γ_3 . In model (A), it is an estimated equation (3) based on a pooled OLS, whereas in model (B), a fixed effects approach is adopted. In both models (A) and (B), the DS associates negatively and significantly at the 1% level with DAC. This output confirms [Iatridis' \(2011\)](#) findings and indicates that firms that present high-quality IR information tend to adopt milder earnings management techniques. Additionally, table 10 shows that IR is significantly negative at the 1% level, implying that firms that produce IR reports named “Integrated Report” tend to display lower discretionary accruals compared to those that use the name “Annual Report”. In table 10, it is observed that IR_DS and DAC are positively and significantly associated at the 1% level, implying that firms that display high-quality IR information and that redact their financial reports according to IR principles, tend to exhibit lower earnings quality compared to firms that do not exhibit such characteristics. In the same table, it is observed that earnings management practices are more common in firms in which the CEO also plays the role of chairman because DAC and DUALITY are positively and significantly associated at the 1% level. This result confirms the findings of [Irani and Oesch \(2013\)](#).

Table 10 shows that DAC is associated negatively and significantly at the 5% level (or better) with SIZE, MBR, CFO, CASH, CGC (only in model (B)) and INST. These results imply that large firms with a corporate governance committee exhibiting high

growth opportunities have high operating cash flows and liquidity levels and are composed of a high proportion of common shares, owned by institutional shareholders; and they tend to display lower discretionary accruals compared to firms that do not exhibit such characteristics. Hence, the findings of Lin et al. (2006), Chevis et al. (2007), Lenk and Szczesny (2007), Tendeloo and Vanstraelen (2005) and Iatridis (2011) are confirmed. In contrast, in the same table, it is observed that the LEV, ROA and BIG_4 (only in model (B)) variables are positively and significantly (at the 5% level or better) associated with DAC, implying that firms with a high level of leverage and profitability engage more in earnings management.

Table 9: Correlation Matrix for Hypothesis 2a

Spearman correlations reported below the diagonal and Pearson correlations above the diagonal. The superscripts ^a, ^b and ^c denote significance at 1%, 5% and 10% respectively.

Correlations for H ₂	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) DAC	1.00	0.01	-0.09 ^c	-0.10 ^c	-0.12 ^b	-0.02	0.04	0.54 ^a	-0.50 ^a	-0.03	-0.05	0.00	0.05
(2) DS	0.03	1.00	0.62 ^a	-0.09 ^c	-0.11 ^b	0.10 ^c	0.33 ^a	0.08	0.09 ^c	-0.18 ^a	0.19 ^a	0.63 ^a	0.33 ^a
(3) IR	-0.06	0.58 ^a	1.00	-0.18 ^a	-0.07	0.18 ^a	0.11 ^b	-0.06	0.04	-0.05	0.09 ^c	0.46 ^a	0.13 ^a
(4) LEV	-0.07	-0.10 ^b	-0.19 ^a	1.00	0.10 ^c	0.08	0.05	-0.09 ^c	0.10 ^c	-0.32 ^a	0.21 ^a	-0.12 ^b	-0.24 ^a
(5) SIZE	-0.18 ^a	-0.16 ^a	-0.12 ^b	0.10 ^c	1.00	0.10 ^a	0.08	0.05	-0.09 ^c	0.10 ^c	-0.32 ^a	0.21 ^a	-0.12 ^b
(6) MBR	0.12 ^b	0.24 ^a	0.17 ^a	0.10 ^c	-0.69 ^a	1.00	-0.11 ^b	-0.05	-0.07	-0.02	-0.10 ^c	0.07	0.05
(7) BIG_4	0.07	0.31 ^a	0.11 ^b	0.04	-0.11 ^b	0.03	1.00	0.12 ^b	0.10 ^c	-0.20 ^a	0.11 ^b	0.23 ^a	0.19 ^a
(8) ROA	0.37 ^a	0.06	-0.07	-0.19 ^a	-0.12 ^b	0.00	0.08	1.00	0.41 ^a	-0.18 ^a	0.08	0.12 ^b	0.18 ^a
(9) CFO	-0.53 ^a	0.02	0.00	0.04	-0.01	-0.03	0.05	0.41 ^a	1.00	-0.24 ^a	0.22 ^a	0.11 ^b	0.08
(10) CASH	-0.02	-0.20 ^a	0.00	-0.27 ^a	0.07	-0.12 ^b	-0.08	0.01	-0.13 ^b	1.00	-0.14 ^a	-0.16 ^a	-0.09 ^c
(11) DUALITY	0.00	0.21 ^a	0.09 ^c	0.21 ^a	0.04	0.02	0.11 ^b	0.12 ^b	0.19 ^a	-0.18 ^a	1.00	0.05	-0.21 ^a
(12) CGC	-0.03	0.66 ^a	0.46 ^a	-0.14 ^a	-0.16 ^a	0.23 ^a	0.23 ^a	0.05	0.08	-0.10 ^c	0.05	1.00	0.24 ^a
(13) INST	0.08	0.29 ^a	0.11 ^b	-0.24 ^a	-0.26 ^a	0.10 ^c	0.19 ^a	0.24 ^a	0.09 ^c	-0.06	-0.20 ^a	0.23 ^a	1.00

Table 10: IR and Earnings Quality

The table below summarizes the equation's results using Pooled and Fixed Effects OLS:

$$DAC_{it} = \gamma_0 + \gamma_1 DS_{it} + \gamma_2 IR_{it} + \gamma_3 (IR * DS)_{it} + \gamma_4 LEV_{it} + \gamma_5 SIZE_{it} + \gamma_6 MBR_{it} + \gamma_7 BIG_4_{it} + \gamma_8 ROA_{it} + \gamma_9 CFO_{it} + \gamma_{10} CASH_{it} + \gamma_{11} DUALITY_{it} + \gamma_{12} CGC_{it} + \gamma_{13} INST_{it} + \{Industry\ Effects\} + \{Year\ Effects\} + u_{it}$$

*The period of interest is 2011-2015. The sample consists of 82 international firms listed in the IR database (<http://examples.integratedreporting.org/reporters?start=A>). The dependent variable is discretionary accruals (DAC) and obtained from the Jones (1991) model. Definitions of the rest of the variables are provided in notes to Table 5. Z – statistic and p – values (in the parentheses) for each estimated variable are provided in columns (4) and (6). The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.*

Dependent Variable: DAC		Results			
Variable	Predictions	Model 1 (Pooled OLS)		Model 2 (Fixed Effects)	
		Estimations	Z –Statistic (P-values)	Estimations	Z –Statistic (P-values)
Intercept	?	0.0800**	9.52 (0.00)	0.0917***	10.74 (0.00)
DS	-	-0.0372***	-3.10 (0.00)	-0.0393***	-3.57 (0.00)
IR	-	-0.0444***	-4.63 (0.00)	-0.0342***	-3.86 (0.00)
IR_DS	-	0.0658***	4.94 (0.00)	0.0484***	3.92 (0.00)
LEV	-	0.0112**	2.02 (0.04)	0.0113**	2.16 (0.03)
SIZE	-	-0.0024***	-7.25 (0.00)	-0.0024***	-7.68 (0.00)
MBR	-	-0.0001***	-4.03 (0.00)	-5.53E-05**	-2.33 (0.02)
BIG_4	-	0.0019	0.96 (0.34)	0.0061***	3.35 (0.00)
ROA	+	0.8818***	62.13 (0.00)	0.8835***	65.60 (0.00)
CFO	+	-0.8968***	-63.88 (0.00)	-0.9051***	-69.37 (0.00)
CASH	-	-0.0372***	-5.08 (0.00)	-0.0292***	-4.32 (0.00)
DUALITY	+	0.0073***	4.44 (0.00)	0.0075***	4.98 (0.00)
CGC	-	-0.0031	-1.60 (0.11)	-0.0042**	-2.35 (0.02)
INST	-	-0.0229***	-3.88 (0.00)	-0.0225***	-3.99 (0.00)
Industry Fixed Effects		No		Yes	
Year Fixed Effects		No		Yes	
Adj.R ²		0.7307		0.7423	
Rn ² statistic		6085.52***		7321.07***	
N		376		376	

Table 11 shows the Spearman and Pearson correlations for all variables included in equation (5). The dependent variable DAC is correlated negatively and significantly (at the 5% level or higher) with SIZE and LEV, implying that large firms (in total asset terms) and firms with high leverage ratio tend to display more conservative earnings management practices. In contrast, firms owned largely by institutional shareholders and presenting high profitability tend to apply more aggressive earnings manipulation techniques.

Table 11: Correlation Matrix for Hypothesis 2b

Spearman and Pearson correlations among discretionary and control variables are illustrated in the table below. Below the diagonal the Spearman correlations are reported while Pearson correlations are reported above the diagonal. *The superscripts ^{***}, ^{**} and ^{*} denote significance at 1%, 5% and 10% respectively*

Correlations for H ₁	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) DAC	1.00	0.04	-0.09 [*]	-0.09 [*]	-0.16 ^{***}	0.03	0.07	0.17 ^{***}	-0.03	-0.06	-0.08	-0.10 [*]	0.04	0.11 ^{**}
(2) DS	0.04	1.00	0.62 ^{***}	-0.10 [*]	-0.11 ^{**}	0.05	0.33 ^{***}	-0.07	0.09 [*]	-0.18 ^{***}	0.12 ^{**}	-0.05	0.18	0.33 ^{***}
(3) IR	-0.10 ^{**}	0.58 ^{***}	1.00	-0.17 ^{***}	-0.07	0.12 ^{**}	0.11 ^{**}	-0.07	0.04	-0.05	0.09 [*]	0.12 ^{**}	0.08	0.14 ^{***}
(4) LEV	-0.14 ^{***}	-0.12 ^{**}	-0.19 ^{***}	1.00	0.10 [*]	-0.11 ^{**}	0.03	0.07	0.19 ^{***}	-0.30 ^{***}	0.17 ^{***}	-0.04	0.20 ^{***}	-0.21 ^{***}
(5) SIZE	-0.18 ^{***}	-0.16 ^{***}	-0.12 ^{**}	0.11 ^{**}	1.00	-0.43 ^{***}	-0.06	0.00	-0.01	0.01	0.33 ^{***}	0.29 ^{***}	0.02	-0.24 ^{***}
(6) MBR	0.07	0.19 ^{***}	0.15 ^{***}	0.15 ^{***}	-0.68 ^{***}	1.00	-0.01	0.01	-0.03	0.03	-0.05	0.13 ^{**}	-0.06	0.14 ^{***}
(7) BIG_4	0.11 ^{**}	0.31 ^{***}	0.11 ^{**}	0.02	-0.11 ^{**}	0.04	1.00	-0.01	0.10 [*]	-0.20 ^{***}	-0.03	0.00	0.11 ^{**}	0.19 ^{***}
(8) ROE	0.70 ^{***}	0.08	-0.09 [*]	0.17 ^{***}	-0.07	0.10 [*]	0.08	1.00	0.19 ^{***}	-0.01	0.03	-0.14 ^{***}	0.06	0.09 [*]
(9) CFO	0.04	0.02	-0.01	0.13 ^{***}	-0.01	-0.03	0.05	0.35 ^{***}	1.00	-0.24 ^{***}	0.17 ^{***}	-0.34 ^{***}	0.22 ^{***}	0.08
(10) CASH	-0.05	-0.20 ^{***}	0.00	-0.26 ^{***}	0.07	-0.13 ^{***}	-0.08	-0.08	-0.13 ^{**}	1.00	-0.14 ^{***}	0.17 ^{***}	-0.14 ^{***}	-0.09 [*]
(11) BSIZE	-0.08	0.16 ^{***}	0.10 [*]	0.21 ^{***}	0.37 ^{***}	-0.18 ^{***}	0.01	0.10 ^{**}	0.17 ^{***}	-0.03	1.00	0.01	0.23 ^{***}	-0.25 ^{***}
(12) BOARIND	-0.06	-0.05	0.15 ^{***}	-0.07	0.17 ^{***}	0.03	-0.01	-0.13 ^{**}	-0.35 ^{***}	0.13 ^{***}	-0.06	1.00	0.04	-0.19 ^{***}
(13) DUALITY	0.13 ^{**}	0.21 ^{***}	0.08	0.22 ^{***}	0.03	0.05	0.11 ^{**}	0.12 ^{**}	0.19 ^{***}	-0.18 ^{***}	0.23 ^{***}	0.09 [*]	1.00	-0.21 ^{***}
(14) INST	0.18 ^{***}	0.29 ^{***}	0.11 ^{**}	-0.20 ^{***}	-0.25 ^{***}	0.13 ^{**}	0.18 ^{***}	0.17 ^{***}	0.08	-0.06	-0.22 ^{***}	-0.16 ^{***}	-0.20 ^{***}	1.00

In table 12 the estimation results of equation 5 are presented. IR disclosure score (DS) is associated negatively and significantly, at the 1% level, with the discretionary accruals (DAC). Furthermore, in the model (2) the dummy variable DDS is associated negatively and significantly, at the 5% level with the DAC. This outputs confirms [Iatridis \(2011\)](#) findings and implies that firms with high IR disclosure quality tend to exhibit higher earnings quality, in comparison with firms with low IR disclosure quality. In addition, firms which compose annual reports with the sign “Integrated Reporting” tend to display higher accruals quality in comparison with firms in which in their annual reports have the sign “Sustainability Reporting” or “Annual Report”. This is because “IR” variable is associated negatively and significantly, at the 1% level, with “DAC” variable. Furthermore, big firms with high levels of leverage and operating cash flows tend to display higher earnings quality in comparison with small firms with low levels of leverage because the variables “SIZE”, “LEV” and “CFO” are associated negatively and significantly with the “DAC” at the 1% level. Firms with high growth opportunities, high profitability and liquidity which are audited by a big 4 accounting firm tend to exhibit lower earnings quality in contrast with firms with the opposite characteristics. These findings are based on the fact that the variables “MBR”, “ROE”, “CASH” and “BIG_4” are associated positively and significantly with the “DAC” at the 5% level or better. As expected, firms with a high number of members on their boards tend to exhibit lower earnings quality in comparison to firms with smaller board size. This finding stems from the fact that the variable “BSIZE” associated negatively and significantly, at the 1% level, with the “DAC”. Additionally, it is observed that there is a positive and significant association, at the 1% level, between the “DUALITY” and “DAC”, implying that firms in which the CEO is also chairman of the board exhibit lower earnings quality in contrast with firms in which the CEO and the chairman are independent. Finally, in table 12, it is observed that INST” and “DAC” are associated

negatively and significantly, at the 1% level, implying that the earnings quality of a firm is strengthened by the monitoring activities of institutional shareholders.

Table 12: IR and Discretionary Accruals for hypothesis 2b

The table below summarizes the equation's results using Fixed Effects OLS:

$$DAC_{i,t} = \gamma_0 + \gamma_1 DS_{i,t} + \gamma_2 IR_{i,t} + \gamma_3 (IR*DS)_{i,t} + \gamma_4 LEV_{i,t} + \gamma_5 SIZE_{i,t} + \gamma_6 MBR_{i,t} + \gamma_7 BIG_4_{i,t} + \gamma_8 ROE_{i,t} + \gamma_9 CFO_{i,t} + \gamma_{10} CASH_{i,t} + \gamma_{11} BSIZE_{i,t} + \gamma_{12} BOARDIND_{i,t} + \gamma_{13} DUALITY_{i,t} + \gamma_{14} INST_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + u_{i,t} \quad (5a)$$

$$DAC_{i,t} = \gamma_0 + \gamma_1 DDS_{i,t} + \gamma_2 IR_{i,t} + \gamma_3 LEV_{i,t} + \gamma_4 SIZE_{i,t} + \gamma_5 MBR_{i,t} + \gamma_6 BIG_4_{i,t} + \gamma_7 ROE_{i,t} + \gamma_8 CFO_{i,t} + \gamma_9 CASH_{i,t} + \gamma_{10} BSIZE_{i,t} + \gamma_{11} BOARDIND_{i,t} + \gamma_{12} DUALITY_{i,t} + \gamma_{13} INST_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + u_{i,t} \quad (5b)$$

*The period of interest is 2011-2015. The sample consists of 82 international firms from around the world listed in the IR database (<http://examples.integratedreporting.org/reporters?start=A>). The dependent variable is discretionary accruals (DAC) and obtained from the Ball and Shivakumar (2006, 2008) model. Definitions of the rest of the variables are provided in notes to Table 5. T – statistic and p – values (in the parentheses) for each estimated variable are provided in column (4). The standard errors are corrected for heteroscedasticity and industry – and year – level (two – dimensional) clustering (Petersen, 2009). The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.*

Dependent Variable: DAC		Estimations			
Variable	Predicted Sign	Model 1	T –Statistic (P-values)	Model 2	T –Statistic (P-values)
Intercept	?	0.0565***	4.76 (0.00)	0.0352***	3.85 (0.00)
DS	-	-0.0361***	-2.66 (0.01)		
DDS	-			-0.0047**	-2.12(0.03)
IR	-	-0.0364***	-3.10 (0.00)	-0.0094***	-4.18 (0.00)
IR_DS	-	0.0399**	2.41 (0.02)		
LEV	-	-0.0486***	-6.55 (0.00)	-0.0491***	-6.59 (0.00)
SIZE	-	-0.0017***	-3.31 (0.00)	-0.0017***	-3.18 (0.00)
MBR	-	0.0003***	3.16 (0.00)	0.0003***	3.20 (0.00)
BIG_4	-	0.0055**	2.24 (0.02)	0.0053**	2.25 (0.02)
ROE	+	0.2734***	304.12 (0.00)	0.2775***	309.02 (0.00)
CFO	+	-0.3069***	-17.23 (0.00)	-0.3093***	-17.22 (0.00)
CASH	-	0.0396***	4.39 (0.00)	0.0399***	4.41 (0.00)
BSIZE	-	-0.0009***	-2.76 (0.01)	-0.0008**	-2.49 (0.01)
BOARDIND	-	0.0037	0.69 (0.49)	0.0031	0.57 (0.57)
DUALITY	+	0.0126***	6.19 (0.00)	0.0120***	5.93 (0.00)
INST	-	-0.0226***	-2.91 (0.00)	-0.0189**	-2.57 (0.01)
Industry Fixed Effects		Yes		Yes	
Year Fixed Effects		Yes		Yes	
Adj. R ²		53.996%		54.443%	
N		377		377	

5.4. IR disclosures quality and agency cost

Table 13 presents the correlations found among all variables included in equation (6).

It is observed that agency costs (AG_COST) correlate positively and significantly (at the 5% level) with the IR disclosure score index (DS) in both the Spearman and Pearson

correlation triangle. This finding indicates that high-quality IR disclosure leads to high levels of agency costs. Although these univariate results are very interesting, they do not capture all the other factors that most likely affect the extent of the agency costs. Hence, it relies on a multivariate analysis for more accurate results ([Kanagaretnam et al., 2011](#); [Magnis and Iatridis, 2017](#)).

In table 14, the estimation output from the estimation of equation (6) are reported. The coefficients of interest are λ_1 and λ_2 . Regardless of the estimation method (Pooled or Fixed Effects OLS), the estimations of the independent variables do not deviate. In table 14, it is observed that DS and AGENCOST are negatively and significantly related at the 1% level. This result implies that firms that disclose high-quality IR information tend to display lower agency costs, confirming the findings of [La Fond and Watts \(2008\)](#). Additionally, during the research period, firms that improved their financial reporting quality, adopting (more) IR principles, and exhibit lower agency costs, as illustrated in table 14; the AGENCOST and REP_IMPROVE variables are associated negatively and significantly at the 5% level. It is important to note that AGENCOST and DAC are positively and significantly associated at the 1% level, indicating that firms that engage in more aggressive earnings management techniques tend to exhibit higher levels of agency costs. This result confirms the findings of [Jensen and Meckling \(1976\)](#), [Liang \(2004\)](#), [Goldman and Slezak \(2006\)](#), [Drymiotes and Hemmer \(2013\)](#) and [Eisenhardt \(1989\)](#).

In the sample, the large firms that engage less in earnings management and exhibit high levels of leverage tend to display lower agency costs. In contrast, firms with high profitability ratios and market capitalization and display increasing growth prospects, tend to exhibit higher information asymmetry between managers and stakeholders and therefore higher agency costs ([Smith and Watts, 1982](#)). In addition, firms in which the CEO is also the chairman of the board tend to exhibit high agency costs compared to those in which the CEO is a non-executive director.

Table 13: Correlation Matrix for H₃ Hypothesis

Spearman correlations are reported below the diagonal and Pearson correlations above the diagonal. The superscripts ^a, ^b and ^c denote significance at 1%, 5% and 10% respectively.

Correlations for H ₃	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) AG_COST	1.00	0.13 ^b	0.07	0.05	-0.06	0.04	-0.30 ^a	0.04	0.51 ^a	0.03	0.20 ^a	-0.33 ^a
(2) DS	0.13 ^b	1.00	-0.09 ^c	0.03	0.09 ^c	-0.07	-0.11 ^b	0.17 ^a	0.10 ^c	0.18 ^a	0.33 ^a	-0.29 ^a
(3) REP_IMPROVE	-0.02	-0.01	1.00	8.18E-05	0.06	0.03	0.14 ^a	0.14 ^a	-0.06	-0.11 ^b	0.00	0.08
(4) DAC2	0.04	0.03	-0.01	1.00	-0.15 ^a	0.16 ^a	-0.17 ^a	-0.05	-0.01	0.04	0.09 ^c	-0.09 ^c
(5) DEBT_RATIO	0.16 ^a	0.06	0.02	-0.24 ^a	1.00	-0.10 ^b	0.14 ^a	0.17 ^a	0.08	0.08	-0.08	-0.07
(6) ROE	0.29 ^a	0.08	0.08	0.65 ^a	0.18 ^a	1.00	0.00	0.00	-0.25 ^a	0.07	0.09 ^c	-0.04
(7) SIZE	-0.45 ^a	-0.16 ^a	0.16 ^a	-0.19 ^a	0.12 ^b	-0.08	1.00	0.39 ^a	-0.27 ^a	0.02	-0.24 ^a	0.29 ^a
(8) LNMV	0.28 ^a	0.05	0.11 ^b	0.04	0.04	0.02	0.25 ^a	1.00	0.31 ^a	0.03	-0.14 ^a	0.19 ^a
(9) MBR	0.66 ^a	0.24 ^a	-0.03	0.10 ^b	0.20 ^a	0.09 ^c	-0.69 ^a	0.39 ^a	1.00	-0.10 ^c	0.05	-0.10 ^c
(10) DUALITY	0.20 ^a	0.21 ^a	-0.11 ^b	0.14 ^a	0.07	0.13 ^a	0.03	0.16 ^a	0.03	1.00	-0.20 ^a	-0.07
(11) INST	0.10 ^c	0.29 ^a	-0.03	0.14 ^a	-0.14 ^a	0.18 ^a	-0.26 ^a	-0.13 ^a	0.10 ^c	-0.19 ^a	1.00	-0.25 ^a
(12) BETA	-0.24 ^a	-0.26 ^a	0.09 ^c	-0.10 ^c	0.00	-0.20 ^a	0.34 ^a	0.15 ^a	-0.20 ^a	-0.03	-0.24 ^a	1.00

Table 14: IR and agency cost

$$AGENCOST = \lambda_0 + \lambda_1 DS_{it} + \lambda_2 REP_IMPR_{it} + \lambda_3 DAC_{it} + \lambda_4 DEBT_RATIO_{it} + \lambda_5 ROE_{it} + \lambda_6 SIZE_{it} + \lambda_7 LNMV_{it} + \lambda_8 MBR_{it} + \lambda_9 DUALITY_{it} + \lambda_{10} INST_{it} + \lambda_{11} BETA_{it} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{it}$$

The period of interest is 2011-2015. The thesis sample consists of 82 international firms listed in IR database (<http://examples.integratedreporting.org/reporters?start=A>). Agency cost (AGENCOST) is the dependent variable and obtained by multiplying the Tobin's Q ratio with the CFO (operating cash flows divided with the firm's total assets). Definitions of the rest of the variables are provided in notes to Table 5. Z – statistic and p – values (in the parentheses) for each estimated variable are provided in columns (4) and (6). The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.

Dependent Variable: AGENCOST			Results		
Variable	Model (A) (Pooled OLS)			Model (B) (Fixed Effects)	
	Predictions	Estimations	Z –Statistic (P-values)	Estimations	Z –Statistic (P-values)
Intercept	?	0.2231***	7.27 (0.00)	0.2554***	6.72 (0.00)
DS	-	-0.1126***	-3.82 (0.00)	-0.1580***	-4.91 (0.00)
REP_IMPROVE	-	-0.0180**	-2.26 (0.02)	-0.0191**	-2.40 (0.02)
DAC	+	1.4280***	18.19 (0.00)	1.2683***	15.89 (0.00)
DEBT_RATIO	-	-0.1339***	-5.52 (0.00)	-0.0909***	-3.53 (0.00)
ROE	+	0.5236***	133.15 (0.00)	0.4850***	123.79 (0.00)
SIZE	?	-0.0189***	-9.26 (0.00)	-0.0175***	-8.68 (0.00)
LNMV	?	0.0145***	4.94 (0.00)	0.0117***	3.85 (0.00)
MBR	+	0.0120***	79.97 (0.00)	0.0122***	79.19 (0.00)
DUALITY	+	0.0579***	7.21 (0.00)	0.0624***	7.79 (0.00)
INST	-	0.0171	0.58 (0.56)	0.0335	1.08 (0.28)
BETA	?	-0.0121	-1.36 (0.17)	-0.0125	-1.41 (0.16)
Industry Fixed Effects		No		Yes	
Year Fixed Effects		No		Yes	
Adj.R ²		0.2971		0.2981	
Rn ² statistic		24549.20***		22937.71***	
N		382		382	

5.5. IR and firm performance

In table 15 the correlation matrix for all variables used in the model (7) are presented. Consistent with the hypothesis that there is a positive association between IR disclosure quality and firm performance, there is a positive and significant (at the 1% level) correlation between the variables DS (and DDS) and TOBIN'S_Q. Despite the fact that these individual results are interesting, they do not control for all other factors likely to influence the extent of performance variability of firms. Hence, a multivariate analysis for making inferences is applied ([Kanagaretnam et al., 2011](#); [Magnis and Iatridis, 2017](#)).

In table 16 the results from the estimation of equation (7) are reported. This table presents the estimations of the first model. As a dependent variable it uses TOBIN'S_Q ratio, which is estimated as a proxy for firm performance. TOBIN'S_Q is the ratio of the market value of assets to the replacement cost of assets (Cheng 2008; Jermias and Gani, 2014). It creates two models, model 7(a) and 7(b), in which the IR disclosure quality is checked in two different ways. In model 7(a) it uses the independent variable DDS and in model 7(b) the DS. In the first column of this table the explanatory variables tested in models 7(a) and 7(b) are analyzed. In the next column the predicted signs of each variable are listed. Then, the values of the coefficients of models 7(a) and 7(b) are depicted in columns 3 and 5, respectively. The T-statistic and p-values results of models 7(a) and 7(b) are shown in columns 4 and 6, respectively.

The coefficient of interest is α_1 . Independent variables DDS and DS are associated positively and significantly at the 1% level with TOBIN'S_Q, implying that firms with a higher IR disclosure quality tend to exhibit higher performance in comparison with those which display a lower IR disclosure quality. Furthermore, as expected, stronger corporate governance mechanisms lead to higher performance. Specifically, in table 16 it is observed that firms in which the CEO is simultaneously chairman of the board of directors present lower performance in comparison with firms in which the CEO and the chairman of the board are independent persons. Additionally, firms with a high

number of board members tend to display a lower performance in comparison with firms with a smaller board size, confirming the findings of [Weisbach \(1988\)](#) and [Jermias and Gani \(2014\)](#). The negative association between board size and performance is also consistent with the argument that a larger board takes more time and effort to reach consensus and encounters more free-riding problems among directors ([Cheng, 2008](#)). In table 16 it is observed that a higher independence of the board of directors leads to higher performance because BOARDIND is associated positively and significantly at the 1% level with TOBIN'S_Q. Additionally, the results indicate that institutional ownership (INST) is positive and significant at the 1% level, suggesting that firms benefit from the monitoring activities of institutional shareholders, and confirming the findings of [Bushee \(1998\)](#) and [Cyert et al. \(2002\)](#).

Furthermore, the findings suggest that firm size is negatively and significantly associated with performance both in models 7(a) and 7(b). This result is consistent with the findings of previous studies (e.g., [Jermias, 2007](#); [Westphal, 1999](#)). Finally, as expected, firms that are highly leveraged tend to display high performance due the fact that LEVERAGE2 is negatively and significantly, associated with TOBIN'S_Q at the 1% level, confirming the findings of [Lee and Yeo \(2016\)](#).

Table 15: Correlation Matrix for H4 Hypothesis

Spearman and Pearson correlations among performance and control variables are illustrated in the table below. Below the diagonal the Spearman correlations are reported while Pearson correlations are reported above the diagonal. **TOBIN'S_Q** is the ratio of the market value of assets to the replacement costs of assets (Cheng, 2008 ; Jermias and Gani, 2014). **DDS** is a dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. **DS** is IR Disclosure Score Index. DS is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on KING III checklist). For more details see section 4.5.5. **DUALITY** is a dummy variable which takes 1 when a firm's CEO is also the chairman of the board of directors and 0 otherwise. **BSIZE** is the number of director on the Board. **BOARDIND** is the board independence ratio measured as the number of independent directors divided by total board size. **INST** is the ratio of number of shares owned by institutional shareholders to total outstanding common shares. **GROWTH** is the growth in total assets from the begging to the end of year t. **TURNOVER** is a measure of asset utilization that captures how efficiently the firm's assets are used and is estimated as the ratio of annual sales to total assets at the end of fiscal year t. **SIZE** is the natural logarithm of total assets at the end of fiscal year t. **LEVERAGE2** is another proxy for firm's leverage calculated as the ratio of total debt to total assets. **STDEVΔOI** is the standard deviation of the annual change in operating income. T – statistic and p – values (in the parentheses) for each estimated variable are provided in columns to the right of these outputs. The superscripts ***, ** and * denote significance at 1%, 5% and 10% respectively.

Correlations for H ₁	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) TOBIN'S_Q	1.00	0.15***	0.07	-0.07	-0.02	-0.12**	0.16***	-0.13**	-0.05	-0.41***	-0.07	-0.05
(2) DDS	0.20***	1.00	0.73***	0.20***	0.12**	0.11**	0.26***	-0.02	0.10*	-0.14***	-0.04	0.01
(3) DS	0.23***	0.81***	1.00	0.20***	0.13***	0.03	0.33***	-0.01	0.26***	-0.11**	-0.09*	0.00
(4) DUALITY	0.07	0.20***	0.22***	1.00	0.23***	-0.05	-0.19***	-0.02	-0.12**	0.02	0.20***	0.09*
(5) BSIZE	-0.15***	0.14***	0.18***	0.23***	1.00	-0.03	-0.24***	-0.03	-0.24***	0.34***	0.19***	0.23***
(6) BOARDIND	-0.01	0.11**	0.05	-0.09*	0.05	1.00	0.20***	-0.02	0.01	-0.30***	-0.04	-0.27***
(7) INST	0.16***	0.25***	0.29***	-0.18***	-0.20***	0.18***	1.00	0.06	0.33***	-0.23***	-0.24***	-0.07
(8) GROWTH	0.06	-0.02	0.03	-0.01	-0.14***	-0.15***	0.20***	1.00	0.16***	0.09*	0.02	-0.01
(9) TURNOVER	0.10**	0.07	0.16***	0.01	-0.22***	-0.12**	0.26***	0.19***	1.00	-0.16***	-0.44***	0.03
(10) SIZE	-0.66***	-0.15***	-0.16***	0.03	0.38***	-0.18***	-0.25***	-0.09*	-0.14***	1.00	0.09**	0.37***
(11) LEVERAGE2	0.15***	-0.07	-0.10*	0.20***	0.18***	0.00	-0.24***	-0.06	-0.44***	0.09*	1.00	-0.05
(12) STDEVΔOI	-0.59***	-0.10*	-0.05	0.01	0.30***	-0.13***	-0.19***	-0.11**	-0.11**	0.85***	-0.03	1.00

Table 16: IR and firm's performance

This table presents the estimations from the equations below:

$$TOBIN'S_Q_{i,t} = a_0 + a_1DDS_{i,t} + a_2DUALITY_{i,t} + a_3BSIZE_{i,t} + a_4BOARDIND_{i,t} + a_5INST_{i,t} + a_6GROWTH_{i,t} + a_7TURNOVER_{i,t} + a_8SIZE_{i,t} + a_9LEVERAGE_{i,t} + a_{10}STDEV\Delta OI_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{i,t} \quad 7(a)$$

$$TOBIN'S_Q_{i,t} = a_0 + a_1DS_{i,t} + a_2DUALITY_{i,t} + a_3BSIZE_{i,t} + a_4BOARDIND_{i,t} + a_5INST_{i,t} + a_6GROWTH_{i,t} + a_7TURNOVER_{i,t} + a_8SIZE_{i,t} + a_9LEVERAGE_{i,t} + a_{10}STDEV\Delta OI_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{i,t} \quad 7(b)$$

The period of interest is 2011-2015. The sample consists of 82 international firms listed in the IR database (<http://examples.integratedreporting.org/reporters?start=A>). It uses the **TOBIN'S_Q** ratio as a proxy for the firm's performance. Specifically, **TOBIN'S_Q** is the ratio of the market value of assets to the replacement costs of assets (Cheng, 2008 ; Jermias and Gani, 2014). The (independent) variables of interest are the DDS and the DS. **DDS** is a dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise). For more details see section 4.5.5. **DS** is IR Disclosure Score Index. **DS** is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on **KING III checklist**). All other variables are defined in the footnotes of Table 6. T – statistic and p – values (in the parentheses) for each estimated variable are provided in columns to the right of these outputs. The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.

Dependent Variable: TOBIN'S_Q		Model 1(a)		Model 1(b)	
Variable	Predicted Sign	Coefficient	T –Statistic (P-values)	Coefficient	T –Statistic (P-values)
Intercept	?	41.6400***	14.57 (0.00)	39.9024***	18.86 (0.00)
DDS	+	2.1976***	8.99 (0.00)		
DS	+			5.0003***	3.55 (0.00)
DUALITY	-	-2.6488***	-7.93 (0.00)	-2.5211***	-9.12 (0.00)
BSIZE	-	-0.6605***	-6.71 (0.00)	-0.6611***	-6.67 (0.00)
BOARDIND	+	14.4302***	14.99 (0.00)	13.9629***	17.52 (0.00)
INST	+	6.8921***	6.21 (0.00)	7.1305***	5.55 (0.00)
GROWTH	+	-1.1512***	-3.49 (0.00)	-1.1347***	-3.13 (0.00)
TURNOVER	+	-3.4886***	-9.13 (0.00)	-3.7259***	-8.17 (0.00)
SIZE	+	-2.6598***	-20.05 (0.00)	-2.6964***	-20.16 (0.00)
LEVERAGE2	-	-10.7879***	-6.77 (0.00)	-11.3636***	-7.05 (0.00)
STDEVΔOI	?	1.16E-05***	14.49 (0.00)	1.31E-05***	7.39 (0.00)
Industry Fixed Effects		Yes		Yes	
Year Fixed Effects		Yes		Yes	
Adj. R ²		32.765%		32.248%	
N		375		375	

5.6. IR disclosures quality and value relevance

In table 17 the correlation matrix for all variables used in model (8) is presented. Consistent with the hypothesis regarding a positive association between the value relevance of summary accounting information and IR disclosure quality, there is a positive and significant (at the 10% level or better) correlation (by Pearson) between the variables DS and DDS and the market value per share (MVPS). As expected, the book value per share (BVPS) is correlated positively and significantly (at the 1% level) with the MVPS. Although these individual results are interesting, a multivariate analysis for making inferences is applied ([Kanagaretnam et al., 2011](#); [Magnis and Iatridis, 2017](#)). MVPS is significantly associated with SIZE, ROE and LEVERAGE2 both at Spearman and Pearson correlations. Pearson's results align with those of [Lourenco et al. \(2014\)](#).

In table 18, the estimation results of the second research hypothesis are illustrated. Two sub-models, model 8(a) and 8(b) were created, in which the IR disclosure quality were checked in two different ways. Model 8(a) uses the independent variable DDS and in model 8(b) the DS variable. In the first column of this table, the explanatory variables tested in models 8(a) and 8(b) are analyzed. In the next column the predicted signs of each variable are listed. Then, the values of the coefficients of models 8(a) and 8(b) are depicted in columns 3 and 5, respectively. The t-statistic and p-values results of models 8(a) and 8(b) are shown in columns 4 and 6, respectively.

The dependent variable is MVPS. The coefficients of interest are λ_1 - λ_3 . Firms with a high IR disclosure quality tend to display high market value per share because DDS (or DS) and MVPS are associated positively and significantly at the 1% level. Furthermore, the basic summary information focuses on the accounting variables BVPS and EBTPS, which are positive and highly significant at the 1% level. This finding can be interpreted as an increase in the book value of equity and earnings before taxes affecting positive market valuation of the firms during the five-year period (2011-2015). Additionally, it

is observed that the variables LEVERAGE2, ROE and CASH are positively and significantly associated at the 5% level or better with the dependent variable MVPS, implying that firms with high levels of leverage, profitability and liquidity display higher market valuation, confirming the findings of [Iatridis \(2012b\)](#) and [Lourenco et al. \(2014\)](#).

Firms with a large number of employees tend to exhibit higher market valuation levels in comparison with firms with smaller numbers of employees. Firms in which an audit committee is considered as a corporate governance mechanism, tend to relish higher valuation from the markets because the variable PERIDAU is associated positively and significantly at the 1% level with the MVPS. Stakeholders can more effectively evaluate large firms with a high proportion of fixed assets to total assets in comparison to firms without these characteristics. Finally, firms in which the CEO is also chairman of the board tend to display lower market valuation in comparison with firms in which the CEO and the chairman of the board are different persons.

Table 17: Correlation Matrix for H₅ Hypothesis

Spearman and Pearson correlations among value relevance and control variables are illustrated in the table below. Below the diagonal the Spearman correlations are reported while Pearson correlations are reported above the diagonal. **MVPS** is the market value of equity scaled by the number of common shares. **DDS** is a dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see [section 4.5.5](#). **DS** is IR Disclosure Score Index. **DS** is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on [KING III checklist](#)). **BVPS** is the book value of equity scaled by the number of common shares. **EBTPS** is earnings before interest and taxation scaled by the number of common shares. **LEVERAGE2** is another proxy for firm's leverage calculated as the ratio of total debt to total assets. **ROE** is the return on equity in fiscal year *t* calculated as net income during year *t* scaled by total equity at the begging of the year. **CASH** is the cash and short – term investments at the end of fiscal year *t* scaled by total assets at the begging of the year. **PPE** is net properties, plant and equipment divided into total assets at the end of fiscal year *t* ([Clarkson et al., 2008](#)). **SIZE** is the natural logarithm of total assets at the end of fiscal year *t*. **DUALITY** is a dummy variable which takes 1 when a firm's CEO is also the chairman of the board of directors and 0 otherwise. **PERIDAU** is the percentage of independent board members on the audit committee. The superscripts ***, **, and * denote significance at 1%, 5% and 10% respectively.

Correlations for H ₅	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) MVPS	1.00	0.09*	0.16**	0.46**	0.48**	0.06	0.00	0.02	-0.09*	0.22***	-0.13**	0.13**
(2) DDS	0.00	1.00	0.73**	-0.20**	-0.07	-0.04	-0.03	-0.20**	0.11**	-0.13***	0.21***	0.26**
(3) DS	0.04	0.82**	1.00	-0.14**	-0.06	-0.09*	-0.07	-0.18**	0.07	-0.11**	0.19***	0.34**
(4) BVPS	0.32**	-0.24**	-0.22**	1.00	0.79**	-0.05	0.01	0.11**	-0.15**	0.59**	0.00	-0.07
(5) EBTPS	0.27**	-0.13**	-0.11**	0.67**	1.00	-0.05	0.03	0.06	-0.08	0.42**	-0.03	-0.06
(6) LEVERAGE2	-0.16**	-0.07	-0.10*	-0.23**	-0.04	1.00	-0.09*	-0.32**	0.23**	0.09*	0.21**	-0.18**
(7) ROE	-0.15**	0.07	0.07	-0.31**	0.23**	0.14**	1.00	-0.01	0.03	0.00	0.07	0.06
(8) CASH	0.08	-0.21**	-0.21**	0.19**	0.13**	-0.26**	-0.11**	1.00	-0.30**	0.02	-0.14**	-0.10*
(9) PP_E	0.04	0.07	0.06	-0.12**	-0.16**	0.20**	-0.12**	-0.31**	1.00	-0.29**	0.29**	0.00
(10) SIZE	-0.21**	-0.14**	-0.15**	0.61**	0.50**	0.08	-0.05	0.10**	-0.22**	1.00	-0.01	-0.08
(11) DUALITY	0.07	0.21**	0.22**	0.00	0.09*	0.21**	0.15**	-0.18**	0.30**	0.00	1.00	0.03
(12) PERIDAU	0.10**	0.22**	0.32**	-0.12**	-0.18**	-0.15**	0.01	-0.15**	-0.01	-0.07	0.04	1.00

Table 18: IR and value relevance

$$MVPS_{it} = \lambda_0 + \lambda_1 DDS_{it} + \lambda_2 BVPS_{it} + \lambda_3 EBITPS_{it} + \lambda_4 LEVERAGE_{it} + \lambda_5 ROE_{it} + \lambda_6 CASH_{it} + \lambda_7 PPE_{it} + \lambda_8 SIZE_{it} + \lambda_9 DUALITY_{it} + \lambda_{10} PERIDAU_{it} + \lambda_{11} LN_EMPLOY_{it} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{it} \quad 2(a)$$

$$MVPS_{it} = \lambda_0 + \lambda_1 DS_{it} + \lambda_2 BVPS_{it} + \lambda_3 EBITPS_{it} + \lambda_4 LEVERAGE_{it} + \lambda_5 ROE_{it} + \lambda_6 CASH_{it} + \lambda_7 PPE_{it} + \lambda_8 SIZE_{it} + \lambda_9 DUALITY_{it} + \lambda_{10} PERIDAU_{it} + \lambda_{11} LN_EMPLOY_{it} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{it} \quad 2(b)$$

The period of interest is 2011-2015. The sample consists of 82 international firms listed in the IR database (<http://examples.integratedreporting.org/reporters?start=A>). *MVPS* is the market value of equity scaled by the number of common shares. The (independent) variables of interest are the DDS and the DS. *DDS* is a dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see [section 4.5.5](#). *DS* is IR Disclosure Score Index. *DS* is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on [KING III checklist](#)). All other variables are defined in the footnotes of the table6. *T* – statistic and *p* – values (in the parentheses) for each estimated variable are provided in columns (4) and (6). The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.

Dependent Variable: MVPS		Model 2(a)		Model 2(b)	
Variable	Predicted Sign	Coefficients	T –Statistic (P-values)	Coefficients	T –Statistic (P-values)
Intercept	?	-54.1924	-0.34 (0.73)	-526.2385*	-1.91 (0.06)
DDS	+	176.7375***	2.84 (0.00)		
DS	+			698.7813***	2.68 (0.01)
BVPS	+	0.4635**	2.57 (0.01)	0.4433**	2.58 (0.01)
EBTPS	+	1.5421*	1.72 (0.09)	1.6554*	1.87 (0.06)
LEVERAGE2	-	1048.4020***	3.01 (0.00)	1035.1190***	3.02 (0.00)
ROE	+	17.5671**	2.01 (0.04)	20.7386**	2.13 (0.03)
CASH	+	640.9936***	3.11 (0.00)	659.6236***	3.01 (0.00)
PPE	-	-273.6916**	-2.29 (0.02)	-212.1900*	-1.96 (0.05)
SIZE	+	-64.7998***	-2.75 (0.01)	-60.5224***	-2.76 (0.01)
DUALITY	-	-202.8197***	-2.98 (0.00)	-211.9690***	-2.97 (0.00)
PERIDAU	?	2.9593***	2.97 (0.00)	2.7332***	3.02 (0.00)
LN_EMPLOY	?	54.0869**	2.53 (0.01)	53.8607**	2.54 (0.01)
Industry Fixed Effects		Yes		Yes	
Year Fixed Effects		Yes		Yes	
Adj. R ²		37.573%		38.289%	
N		375		375	

5.7. Multiple-based valuation model (P/E) and IR disclosures quality

Table 19 depicts the correlation matrix for all variables used in model (9). Consistent with the argument, there is a positive correlation at the 1% level (according to Spearman's or Pearson's approach) between the P/E and the IR disclosure quality metrics (DDS and DS). Furthermore, in table 20 a negative and significant correlation is noticed at the 10% level among the P/E and the DAC, marginally confirming the argument that firms with higher earnings quality display a higher valuation by analysts in comparison to firms with lower earnings quality.

Table 20 reports the results from the estimation of equation (9). The dependent variable is the P/E. This model tests whether the firms with high IR disclosure quality create higher value. DDS and DS are used as proxies for IR disclosure quality. Parallel with the goal to test whether firms with high IR disclosure quality tend to exhibit higher valuation index compared to firms with lower IR disclosure quality, it is investigated whether firms with high earnings quality display high value. Using a sample of only IR firms, two proxies were created to measure earnings quality: accruals quality and smoothness (Francis et al., 2005; Eliwa et al., 2016). Hence, four different regression models 9(a) to 9(d) were created, in which the implications of IR disclosure quality and of the earnings quality in the firm's valuation are enhanced. Model 9(a) uses the independent variable DDS as a proxy of IR disclosure quality and DAC as a proxy of earnings quality. Model 9(b) uses the independent variable DDS as a proxy of IR disclosure quality and SMOOTHNESS as a proxy of earnings quality. Model 9(c) uses the independent variable DS as a proxy of IR disclosure quality and DAC as a proxy of earnings quality. Model 9(d) uses the independent variable DS as a proxy of IR disclosure quality and SMOOTHNESS as a proxy of earnings quality.

Table 20 depicts the results of the four models. In the first column the explanatory variables tested in the models are analyzed. The next column lists the predicted signs of each variable. Then, the values of the coefficients of models 9(a) to 9(d) are depicted in columns 3, 5, 7 and 9, respectively. The t-statistic and p-values of models 9(a) to 9(d) are shown in columns 4, 6, 8 and 10, respectively. The results suggest that the introduction of the IR regime in 2010 has statistically significant and positive impacts on the P/E multiple. The estimates of the impacts on DDS in models 9a and 9b are positive and statistically significant at the 5% level or better and the impacts on DS in models 9c and 9d are positive and statistically significant at the 1% level associated with the P/E. This finding implies that firms which display higher IR disclosure quality tend to exhibit higher price-to-earnings ratios, confirming H₆. Both earnings quality metrics (DAC and SMOOTHNESS) are negatively and significantly associated, at the

1% and 10% level, respectively, with the P/E, implying that firms with high earnings quality display high value. Moreover, in models 9c and in 9d, the explanatory variable DDS is replaced with DS but the same results are found as in models 9a and 9b. Further, firms which display a high debt ratio are related negatively and significantly at the 5% level or better with the P/E ratio. Finally, it is observed that the variable DEBT_RATIO is negatively and statistically significantly associated at the 5% level or better with the dependent variable P/E, implying that firms with high levels of leverage display lower P/E indexes.

Table 19: Correlation Matrix for H₆ Hypothesis

Spearman and Pearson correlations among cost of equity and control variables are illustrated in the table below. Below the diagonal the Spearman correlations are reported while Pearson correlations are reported above the diagonal. This table presents descriptive statistics for the sample of firms. The period of interest is 2011-2015 and the sample consists of 82 international firms from around the world listed in the Integrated Reporting (IR) database (<http://examples.integratedreporting.org/reporters?start=A>). **P/E** is the price to earnings ratio which is calculated by dividing the market value price per share by the earnings per share. **DAC** are the discretionary accruals. The normal proportion of accruals estimated by the Jones (1991) model. **DAC** are the residuals that derived from the estimation of the normal accruals equation {DeFond and Subramanyam, 1998; Bartov et al., 2001; Kothari et al., 2004; Garza – Gomez et al., 2006}. **SMOOTHNESS** is the ratio of the standard deviation of operating income divided by the standard deviation of cash flow from operations. **DDS** is a dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see section 4.5.5. **DS** is the IR Disclosure Score Index. **DS** is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on KING III checklist). **GROWTH** is the growth in total assets from the begging to the end of year *t*. **BETA** is the market beta coefficient obtained from Datastream for each firm and for each year. **SIZE** is the natural logarithm of total assets at the end of fiscal year *t*. **DEBT_RATIO** is a proxy of leverage equals with total liabilities to total assets at the end of fiscal year *t*. **BVPS** is the book value of equity scaled by the number of common shares. The superscripts ***, ** and * denote significance at 1%, 5% and 10% respectively

Correlations for H ₆	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) P/E	1.00	-0.04	-0.02	0.10*	0.02	-0.08	-0.07	-0.31***	-0.20***
(2) DAC	-0.10*	1.00	0.05	0.09	0.07	0.04	0.00	-0.12**	-0.19***
(3) SMOOTHNESS	-0.07	0.06	1.00	0.09	-0.02	0.06	-0.01	-0.02	0.02
(4) DDS	0.15***	0.04	0.01	1.00	0.72***	-0.02	-0.21***	-0.15***	0.09*
(5) DS	0.21***	0.05	-0.11*	0.81***	1.00	-0.01	-0.28***	-0.13**	0.05
(6) GROWTH	0.11*	0.01	-0.11*	-0.01	0.07	1.00	0.05	0.08	0.06
(7) BETA	-0.14**	-0.06	0.00	-0.21***	-0.25***	-0.07	1.00	0.36***	0.02
(8) SIZE	-0.73***	-0.16***	-0.04	-0.17***	-0.20***	-0.09	0.35***	1.00	0.09
(9) DEBT_RATIO	-0.02	-0.27***	-0.05	0.06	0.04	0.04	0.01	0.07	1.00

Table 20: Multiple – based valuation model (P/E) and IR disclosures quality

This table summarizes the equation's results using Fixed Effects OLS:

$$P/E_{i,t} = \kappa_0 + \kappa_1 DAC_{i,t} + \kappa_2 DDS_{i,t} + \kappa_6 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_7 DEBT_RATIO_{i,t} + v_{i,t} \quad 3(a)$$

$$P/E_{i,t} = \kappa_0 + \kappa_1 SMOOTHNESS_{i,t} + \kappa_2 DDS_{i,t} + \kappa_6 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_7 DEBT_RATIO_{i,t} + v_{i,t} \quad 3(b)$$

$$P/E_{i,t} = \kappa_0 + \kappa_1 DAC_{i,t} + \kappa_2 DS_{i,t} + \kappa_6 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_7 DEBT_RATIO_{i,t} + v_{i,t} \quad 3(c)$$

$$P/E_{i,t} = \kappa_0 + \kappa_1 SMOOTHNESS_{i,t} + \kappa_2 DS_{i,t} + \kappa_6 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_7 DEBT_RATIO_{i,t} + v_{i,t} \quad 3(d)$$

The period of interest is 2011-2015. The sample consists of 82 international firms listed in IR database (<http://examples.integratedreporting.org/reporters?start=A>). *P/E* is the price to earnings ratio which is calculated by dividing the market value price per share by the earnings per share. *DAC* are the discretionary accruals. The normal proportion of accruals estimated by the *Jones (1991)* model. *DAC* are the residuals that derived from the estimation of the normal accruals equation {*DeFond and Subramanyam, 1998; Bartov et al., 2001; Kothari et al., 2004; Garza – Gomez et al., 2006*}. *SMOOTHNESS* is the ratio of the standard deviation of operating income divided by the standard deviation of cash flow from operations. The (independent) variables of interest are the *DDS* and the *DS*. *DDS* is a dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see [section 4.5.5](#). *DS* is the IR Disclosure Score Index. *DS* is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on [KING III checklist](#)). All other variables are defined in the footnotes of the table 6. The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.

Dependent Variable: P/E		Model 3(a)		Model 3(b)		Model 3(c)		Model 3(d)	
Variable	Predicted Sign	Coefficient	T –Statistic (P-values)	Coefficient	T –Statistic (P-values)	Coefficient	T –Statistic (P-values)	Coefficient	T –Statistic (P-values)
Intercept	?	44.1269***	2.86 (0.00)	42.8036***	5.66 (0.00)	41.5468***	4.83 (0.00)	40.7740***	4.86 (0.00)
DAC	-	-60.7901**	-2.08 (0.04)			-56.5646***	-3.12 (0.00)		
SMOOTHNESS	-			-0.1265***	-3.64 (0.00)			-0.1017***	-3.12 (0.00)
DDS	+	4.6844**	2.16 (0.03)	4.7202***	6.06 (0.00)				
DS	+					8.8132***	3.99 (0.00)	8.3519***	3.65 (0.00)
GROWTH	+	-2.0161	-1.37 (0.17)	-1.9721***	-5.21 (0.00)	-2.0868***	-5.35 (0.00)	-2.0627***	-5.73 (0.00)
BETA	-	3.3522*	1.70 (0.09)	2.8896***	11.36 (0.00)	3.1430***	7.87 (0.00)	2.6803***	7.29 (0.00)
SIZE	+	-2.6755***	-2.82 (0.01)	-2.5732***	-7.24 (0.00)	-2.7131***	-6.88 (0.00)	-2.6219***	-7.30 (0.00)
DEBT_RATIO	-	-34.0365**	-2.49 (0.01)	-32.9486***	-4.87 (0.00)	-33.3307***	-5.68 (0.00)	-32.2496***	-5.22 (0.00)
Industry Fixed Effects		Yes		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes		Yes	
Adj. R ²		14.234%		13.410%		13.440%		12.609%	
N		338		317		338		317	

6. Robustness checks

6.1. IR Disclosures quality and corporate governance

Additional analyses were performed to check the robustness of the results reported in the previous section. Initially, the estimation results of equation (1) were verified using the natural logarithm of the checklist score (DIS_QUALITY) to estimate the IR disclosure quality for each firm. The results are reported in table 21 and are similar to those reported in table 8. The following equation is estimated:

$$\begin{aligned} DIS_QUALITY_{i,t} = & a_0 + a_1 IR_{i,t} + a_2 PPE_{i,t} + a_3 AS_TURN_{i,t} + a_4 DER_{i,t} + a_5 DIVPAY_{i,t} + \\ & a_6 MBR_{i,t} + a_7 SIZE_{i,t-1} + a_8 LNMV_{i,t} + a_9 DEBT_RATIO_{i,t} + a_{10} ROE_{i,t} + a_{11} BIG_4_{i,t} + a_{12} PAR_{i,t} \\ & + a_{13} PERIDNC_{i,t} + a_{14} PERINBB_{i,t} + a_{15} PERNEAC_{i,t} + a_{16} PERNENC_{i,t} + a_{17} DUALITY + \\ & a_{18} CGC_{i,t} + a_{19} NC_{i,t} + a_{20} INST_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{it} \quad (11) \end{aligned}$$

Specifically, IR and DIS_QUALITY are positively and significantly associated at the 1% level. This finding indicates that firms that compose their financial reports containing most “Integrated Reporting Principles” tend to exhibit higher IR disclosure quality compared to firms that illustrate basic IR information in their reports. Furthermore, the PERIDNC and PERNEAC variables are positively and significantly associated (at the 1% level) with DIS_QUALITY, indicating that firms with a high proportion of independent board members on the nomination committee and non-executive board members on the audit committee tend to display higher IR disclosures compared to firms without these corporate governance characteristics.

Table 21: Corporate governance and IR

The table below summarizes the equation's results using Pooled and Fixed Effects OLS:

$$DIS_QUALITY_{it} = a_0 + a_1 IR_{it} + a_2 PPE_{it} + a_3 AS_TURN_{it} + a_4 DER_{it} + a_5 DIVPAY_{it} + a_6 MBR_{it} + a_7 SIZE_{it-1} + a_8 LNMV_{it} + a_9 DEBT_RATIO_{it} + a_{10} ROE_{it} + a_{11} BIG_4_{it} + a_{12} PAR_{it} + a_{13} PERIDNC_{it} + a_{14} PERINBB_{it} + a_{15} PERNEAC_{it} + a_{16} PERNENC_{it} + a_{17} DUALITY_{it} + a_{18} CGC_{it} + a_{19} NC_{it} + a_{20} INST_{it} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{it} \quad (11)$$

*The period of interest is 2011-2015. the sample consists of 82 international firms listed in the IR database (<http://examples.integratedreporting.org/reporters?start=A>). The dependent variable is the disclosure quality (*DIS_QUALITY*) which is the natural logarithm of the disclosure score of each firm. The definitions for the other variables are provided in the notes of [table 5](#). The columns (4) and (6) contain the z – statistic values and the p – values (in the parentheses) for each estimated variable. The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively*

Dependent Variable: DIS_QUALITY		Results			
Variable	Predictions	Model (A) (Pooled OLS)		Model (B) (Fixed Effects)	
		Estimations	Z –Statistic (P-values)	Estimations	Z –Statistic (P-values)
Intercept	?	2.2256***	32.55 (0.00)	2.3865***	25.53(0.00)
IR	+	0.0817***	4.81 (0.00)	0.0794***	4.58(0.00)
PPE	?	0.0083	0.26(0.80)	-0.0450	-1.18 (0.24)
AS_TURN	+	0.0694***	3.52 (0.00)	0.0680***	3.39(0.00)
DER	-	-0.0424***	-2.61 (0.01)	-0.0442***	-2.69(0.01)
DIVPAY	+	0.0091*	1.92 (0.06)	0.0088*	1.86(0.06)
MBR	?	-0.0006**	-2.16 (0.03)	-0.0005*	-1.94(0.05)
SIZE	+	0.0374**	2.16 (0.03)	0.0383**	2.19(0.03)
LNMV	+	0.0145***	3.04 (0.00)	0.0143***	2.94(0.00)
DEBT_RATIO	+	0.1050***	2.60 (0.01)	0.0913**	2.12(0.03)
ROE	?	-0.0249***	-4.09 (0.00)	-0.0256***	-4.23(0.00)
BIG_4	+	0.0138	0.81(0.42)	0.0274	1.56 (0.12)
PAR	+	0.0461***	4.07 (0.00)	0.0319***	2.60(0.01)
PERIDNC	+	0.0020***	5.70 (0.00)	0.0019***	5.45(0.00)
PERINBB	+	-0.0010**	-2.07 (0.04)	-0.0009	-1.54 (0.12)
PERNEAC	+	0.0015***	4.62 (0.00)	0.0016***	4.92(0.00)
PERNENC	+	0.0003	0.69(0.49)	0.0004	0.96 (0.34)
DUALITY	-	0.1107***	7.57 (0.00)	0.1224***	7.96(0.00)
CGC	+	0.0164	0.85(0.40)	0.0156	0.80 (0.42)
NC	+	0.0064	0.31(0.76)	-0.0037	-0.17 (0.86)
INST	+	0.1348**	2.47 (0.01)	0.1173**	2.04 (0.04)
Industry Fixed Effects		No		Yes	
Year Fixed Effects		No		Yes	
Adj.R ²		0.6410		0.6407	
Rn ² statistic		898.64***		953.64	
N		322		322	

6.2 IR and earnings quality

Second, the estimation results of equation (3) were verified using an alternative model, in which the calculation of normal accruals was based on Ball and Shivakumar (2006, 2008). Dechow et al., (1995), Kothari et al., (2004) and Ball and Shivakumar (2006) found that in Jones (1991) model the estimation of normal accruals on change in revenues and on property, plant and equipment is mis – specified. This model ignores the roles of accruals in reducing noise in earnings (Dechow, 1994; Dechow and Schrand, 2010) and its timely loss recognition (Ball and Shivakumar, 2006). Thus, normal accruals using Jones’ model are estimated and a piecewise linear variant to capture the contribution of accruals in noise reduction and in timely loss recognition (Chahine et al., 2015):

$$ACC_{it} = \rho_0 + \rho_1 \Delta sales_{it} + \rho_2 PPE_{it} + \rho_3 CFO_{it} + \rho_4 DCFO_{it} + \rho_5 (DCFO * CFO)_{it} + v_{it} \quad (12)$$

Where,

Variable Explanation of Equation (12)	
Variable	Description
ACC	The total accruals estimated as the difference between net income and cash flow from operating activities
Δsales	The change in revenues during period t, PPE is property, plant and equipment).
CFO	Operating cash flow in fiscal year t scaled by total assets at the beginning of the year.
DCFO	A dummy variable that takes the value one if CFO<0 and zero otherwise

DAC2 is the discretionary accruals that are estimated using the above model (12) and are the residuals from that model (Chahine et al., 2015).

To test the main hypothesis 2a, the model below was created:

$$DAC2_{i,t} = \gamma_0 + \gamma_1 DS_{i,t} + \gamma_2 IR_{i,t} + \gamma_3 (IR * DS)_{i,t} + \gamma_4 LEV_{i,t} + \gamma_5 SIZE_{i,t} + \gamma_6 MBR_{i,t} + \gamma_7 BIG_4_{i,t} + \gamma_8 ROA_{i,t} + \gamma_9 CFO_{i,t} + \gamma_{10} CASH_{i,t} + \gamma_{11} DUALITY_{i,t} + \gamma_{12} CGC_{i,t} + \gamma_{13} INST_{i,t} + \{Industry Effects\} + \{Year Effects\} + u_{i,t} \quad (13)$$

In table 22 it is observed that the H₂ holds, implying that firms which display a high level of IR disclosures are likely to exhibit lower discretionary accruals (DAC2 and DS are associated negatively and significantly at the 5% level). Additionally, firms that title reports IR “Integrated Report” tend to display higher IR disclosure quality compared to those using the title “Annual Reports” (DAC2 and IR are associated negatively and significantly at the 1% level).

Table 22: IR and earnings quality

The table below summarizes the equation’s results using Pooled and Fixed Effects OLS:

$$DAC2_{it} = \gamma_0 + \gamma_1 DS_{it} + \gamma_2 IR_{it} + \gamma_3 (IR*DS)_{it} + \gamma_4 LEV_{it} + \gamma_5 SIZE_{it} + \gamma_6 MBR_{it} + \gamma_7 BIG_4_{it} + \gamma_8 ROA_{it} + \gamma_9 CFO_{it} + \gamma_{10} CASH_{it} + \gamma_{11} DUALITY_{it} + \gamma_{12} CGC_{it} + \gamma_{13} INST_{it} + \{Industry\ Effects\} + \{Year\ Effects\} + u_{it} \quad (13)$$

*The period of interest is 2011-2015. The sample consists of 82 international firms listed in IR database (<http://examples.integratedreporting.org/reporters?start=A>). Discretionary accruals (DAC2) is the dependent variable and obtained from the Ball and Shivakumar (2006, 2008) model. Definitions of the rest of the variables are provided in notes to Table 5. Z – statistic and p – values (in the parentheses) for each estimated variable are provided in columns (4) and (6). The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively*

Dependent Variable: DAC2		Results			
Variable	Predictions	Model (A) (Pooled OLS)		Model (B) (Fixed Effects)	
		Estimations	Z –Statistic (P-values)	Estimations	Z –Statistic (P-values)
Intercept	?	0.0293***	4.14 (0.00)	0.0433***	6.07(0.00)
DS	-	-0.0207**	-2.05 (0.04)	-0.0245***	-2.67 (0.01)
IR	-	-0.0268***	-3.33 (0.00)	-0.0209***	-2.83 (0.00)
IR_DS	-	0.0403***	3.59 (0.00)	0.0294***	2.86 (0.00)
LEV	-	0.0036	0.77(0.44)	0.0058	1.32(0.19)
SIZE	-	-0.0022***	-7.88 (0.00)	-0.0023***	-8.75 (0.00)
MBR	-	-4.28E-05**	-2.01 (0.04)	-8.95E-05	-0.45(0.65)
BIG_4	-	0.0017	1.06(0.29)	0.0053***	3.53 (0.00)
ROA	+	0.8962***	75.00 (0.00)	0.9074***	80.81 (0.00)
CFO	+	-0.3483***	-29.47(0.00)	-0.3728***	-34.27 (0.00)
CASH	-	-0.0345***	-5.59 (0.00)	-0.0234***	-4.16 (0.00)
DUALITY	+	0.0054***	3.90 (0.00)	0.0059***	4.75 (0.00)
CGC	-	-0.0041**	-2.53 (0.01)	-0.0047***	-3.19 (0.00)
INST	-	-0.0184***	-3.70 (0.00)	-0.0203***	-4.33 (0.00)
Industry Fixed Effects		No		Yes	
Year Fixed Effects		No		Yes	
Adj.R ²		0.7088		0.7151	
Rn ² statistic		6344.62***		7885.18***	
N		376		376	

Holthausen et al. (1995) and Kothari et al. (2004) suggest ways to combat concerns about the potential correlations among performance and the residuals from the Jones model and modified Jones (Jones, 1991) model (DeChow et al., 1995). Jones’ model

consists of regressing total accruals (ACC) on three variables : the change in revenues (ΔREV), which models the normal component of working capital accruals; and the level of gross property, plant and equipment (PPE), included to control for the non-discretionary component of depreciation and amortization expense, the main component of long-term accruals and return on assets (ROA). All three variables and the intercept are divided by lagged total assets in order to avoid problems of heteroskedasticity. The discretionary accruals (DAC2) are the residuals that derived from the estimation of the equation (14) (Kothari et al., 2004). Then, the model below is employed:

$$\frac{ACC_{i,t}}{TA_{i,t-1}} = \beta_0 + \beta_1 \left(\frac{1}{TA_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}} \right) + \beta_3 \left(\frac{PPE_{i,t}}{TA_{i,t-1}} \right) + \beta_4 \left(\frac{ROA_{i,t}}{TA_{i,t-1}} \right) + \varepsilon_{i,t} \quad (14)$$

Variable Explanation of Equation (14)	
Variable	Description
ACC	The total accruals equals with the net income minus the operating cash flow at the end of fiscal year t.
TA	Book value of total assets at the begging of year t.
ΔREV	The change in sales revenue from the preceding year.
ΔREC	The change in receivables from the preceding year.
PPE	Net properties, plant and equipment divided into total assets at the end of fiscal year t (Clarkson et al., 2008).
ROA	Return on Assets in fiscal year t-1 , calculated as net income during year t scaled by total assets at the begging of the year.

To test main hypothesis 2b, the two sub-models below were created:

$$DAC2_{i,t} = \gamma_0 + \gamma_1 DS_{i,t} + \gamma_2 IR_{i,t} + \gamma_3 (IR*DS)_{i,t} + \gamma_4 LEV_{i,t} + \gamma_5 SIZE_{i,t} + \gamma_6 MBR_{i,t} + \gamma_7 BIG_4_{i,t} + \gamma_8 ROE_{i,t} + \gamma_9 CFO_{i,t} + \gamma_{10} CASH_{i,t} + \gamma_{11} BSIZE_{i,t} + \gamma_{12} BOARDIND_{i,t} + \gamma_{13} DUALITY_{i,t} + \gamma_{14} INST_{i,t} + \{Industry Effects\} + \{Year Effects\} + u_{i,t} \quad (15a)$$

$$DAC2_{i,t} = \gamma_0 + \gamma_1 DDS_{i,t} + \gamma_2 IR_{i,t} + \gamma_3 LEV_{i,t} + \gamma_4 SIZE_{i,t} + \gamma_5 MBR_{i,t} + \gamma_6 BIG_4_{i,t} + \gamma_7 ROE_{i,t} + \gamma_8 CFO_{i,t} + \gamma_9 CASH_{i,t} + \gamma_{10} BSIZE_{i,t} + \gamma_{11} BOARDIND_{i,t} + \gamma_{12} DUALITY_{i,t} + \gamma_{13} INST_{i,t} + \{Industry Effects\} + \{Year Effects\} + u_{i,t} \quad (15b)$$

Where, DAC2 are the residuals that derived from the estimation of the equation (14).

Table 23: IR and discretionary accruals

The table below summarizes the equation's results using Fixed Effects OLS:

$$DAC2_{it} = \gamma_0 + \gamma_1 DS_{it} + \gamma_2 IR_{it} + \gamma_3 (IR * DS)_{it} + \gamma_4 LEV_{it} + \gamma_5 SIZE_{it} + \gamma_6 MBR_{it} + \gamma_7 BIG_4_{it} + \gamma_8 ROE_{it} + \gamma_9 CFO_{it} + \gamma_{10} CASH_{it} + \gamma_{11} BSIZE_{it} + \gamma_{12} BOARDIND_{it} + \gamma_{13} DUALITY_{it} + \gamma_{14} INST_{it} + \{Industry\ Effects\} + \{Year\ Effects\} + u_{it} \quad 15(a)$$

$$DAC2_{it} = \gamma_0 + \gamma_1 DDS_{it} + \gamma_2 IR_{it} + \gamma_3 LEV_{it} + \gamma_4 SIZE_{it} + \gamma_5 MBR_{it} + \gamma_6 BIG_4_{it} + \gamma_7 ROE_{it} + \gamma_8 CFO_{it} + \gamma_9 CASH_{it} + \gamma_{10} BSIZE_{it} + \gamma_{11} BOARDIND_{it} + \gamma_{12} DUALITY_{it} + \gamma_{13} INST_{it} + \{Industry\ Effects\} + \{Year\ Effects\} + u_{it} \quad 15(b)$$

The period of interest is 2011-2015. The sample consists of 82 international firms listed in IR database (<http://examples.integratedreporting.org/reporters?start=A>). The dependent variable is discretionary accruals (DAC) and obtained from the Jones (1991) model. Definitions of the rest of the variables are provided in notes to Table 5. T – statistic and p – values (in parentheses) for each estimated variable are provided in columns (4) and (6). The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.

Dependent Variables: DAC2		Estimations			
Variable	Predicted Sign	Model 1	T –Statistic (P-values)	Model 2	T –Statistic (P-values)
Intercept	?	0.1457***	9.82 (0.00)	0.1025***	8.12 (0.00)
DS	-	-0.0680***	-4.02 (0.00)		
DDS	-			-0.0060**	-2.09 (0.04)
IR	-	-0.0656***	-4.58 (0.00)	-0.0074**	-2.54 (0.01)
IR_DS	-	0.0841***	4.16 (0.00)		
LEV	-	-0.0383***	-4.11 (0.00)	-0.0392***	-4.04 (0.00)
SIZE	-	-0.0047***	-5.64 (0.00)	-0.0046***	-5.28 (0.00)
MBR	-	-0.0018**	-2.30 (0.02)	-0.0022***	-2.78 (0.01)
BIG_4	-	0.0097***	3.22 (0.00)	0.0091***	3.03 (0.00)
ROE	+	0.2367***	213.74 (0.00)	0.2501***	217.99 (0.00)
CFO	+	-0.8593***	-39.33 (0.00)	-0.8608***	-37.77 (0.00)
CASH	-	0.0220**	1.98 (0.05)	0.0060	0.52 (0.60)
BSIZE	-	-0.0003	-0.68 (0.50)	0.0000	-0.08 (0.94)
BOARDIND	-	0.0058	0.91 (0.36)	0.0067	1.02 (0.31)
DUALITY	+	0.0162***	6.47 (0.00)	0.0152***	5.91 (0.00)
INST	-	-0.0342***	-3.55 (0.00)	-0.0279***	-2.95 (0.00)
Industry Fixed Effects		Yes		Yes	
Year Fixed Effects		Yes		Yes	
Adj. R ²		56.295%		58.021%	
N		377		377	

In order to check the robustness of earnings quality measurement a different approach to Jones' (1991) method is included for the calculation of accruals. The Kothari et al. (2004) method is employed instead of the Ball and Shivakumar (2006, 2008) method. It is observed in table 23 that H_{2b} holds. Specifically both the disclosure quality measures – DS and DDS – are negatively and significantly (at the 5% level or better) associated with the discretionary accruals index (DAC2). These findings imply that firms with high IR quality tend to exhibit lower discretionary accruals in comparison

with firms with lower IR quality. The other results remain the same as reported in [section 5.3](#).

6.3. IR and agency cost

Thirdly, the relation between high accounting disclosures due to the adoption of the IR principles and the agency cost are investigated, modifying the variable that represents this cost. To test main hypothesis 3, the model below was created:

$$AGENCY_C = \lambda_0 + \lambda_1 DS_{i,t} + \lambda_2 REP_IMPR_{i,t} + \lambda_3 DAC2_{i,t} + \lambda_4 DEBT_RATIO_{i,t} + \lambda_5 ROE_{i,t} + \lambda_6 SIZE_{i,t} + \lambda_7 LNMV_{i,t} + \lambda_8 MBR_{i,t} + \lambda_9 DUALITY_{i,t} + \lambda_{10} INST_{i,t} + \lambda_{11} BETA_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{i,t} \quad (16)$$

Thus, $AGENCY_C = Q \cdot FCF$ is introduced, which measures the growth opportunities using the industry adjusted Tobin's Q ([Iatridis, 2012b](#)). Tobin's Q is defined as market capitalization plus total debt scaled by total assets ([McConnell and Servaes, 1990](#)). A dummy variable is subsequently constructed, which takes 1 if the firm's industry adjusted Tobin's Q is less than the sample mean (i.e. low growth firms) and zero otherwise (i.e., high growth firms) ([Doukas et al., 2005](#)). Free cash flows (FCF) equal operating income before depreciation minus tax charge plus interest expense and dividends paid scaled by total assets ([Lehn and Poulsen, 1989](#)).

Table 24: IR and agency cost

The table below summarizes the equation's results using Pooled and Fixed Effects OLS:

$$AGENCY_C = \lambda_0 + \lambda_1 DS_{it} + \lambda_2 REP_IMPR_{it} + \lambda_3 DAC2_{it} + \lambda_4 DEBT_RATIO_{it} + \lambda_5 ROE_{it} + \lambda_6 SIZE_{it} + \lambda_7 LNMV_{it} + \lambda_8 MBR_{it} + \lambda_9 DUALITY_{it} + \lambda_{10} INST_{it} + \lambda_{11} BETA_{it} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{it}$$

The period of interest is 2011-2015. The sample consists of 82 international firms listed in the IR database (<http://examples.integratedreporting.org/reporters?start=A>). Agency Cost (*AGENCY_C*) is the dependent variable and generated by multiplying *Q* with the FCF. *Q* is the Tobin's *Q* variable which is defined as market capitalization plus total debt scaled by total assets (McConnel and Servaes, 1995). A dummy variable is subsequently constructed, which takes 1 if the firm's industry adjusted Tobin's *Q* is less than the sample mean (i.e. low growth firms) and zero otherwise (i.e., high growth firms) (Doukas et al, 2005). FCF are the free cash flows which is the operating income before depreciation minus tax charge plus interest expense and dividends paid scaled by total assets (Lehn and Poulsen, 1989). DAC2 are the discretionary accruals obtained from the Ball and Shivakumar (2006,2008) model. Definitions of the rest of the variables are provided in notes to Table 5. Z – statistic and p – values (in parentheses) for each estimated variable are provided in columns (4) and (6). The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.

Dependent Variable: AGENCY_C		Results			
Variable	Predictions	Model (A) (Pooled OLS)		Model (B) (Fixed Effects)	
		Estimations	Z –Statistic (P-values)	Estimations	Z –Statistic (P-values)
Intercept	?	0.0634***	3.57 (0.00)	0.1029***	4.53 (0.00)
DS	-	-0.0390**	-2.29 (0.02)	-0.0482**	-2.51 (0.01)
REP_IMPROVE	-	-0.0010	-0.22(0.83)	-0.0025	-0.52 (0.60)
DAC2	+	0.7481***	16.50 (0.00)	-0.7782***	-16.32 (0.00)
DEBT_RATIO	-	-0.1050***	-7.49 (0.00)	-0.0893***	-5.80 (0.00)
ROE	+	0.3327***	146.55 (0.00)	0.3359***	143.57 (0.00)
SIZE	?	-0.0055***	-4.70(0.00)	0.0057***	4.75 (0.00)
LNMV	?	0.0020	1.20(0.23)	-0.0042**	-2.30 (0.02)
MBR	+	0.0003***	3.06 (0.00)	-0.0002**	-2.05 (0.04)
DUALITY	+	0.0073	1.58(0.11)	0.0114**	2.39 (0.02)
INST	-	-0.0232	-1.36(0.18)	-0.0169	-0.91 (0.36)
BETA	?	0.0101**	1.96 (0.05)	0.0062	1.17 (0.24)
Industry Fixed Effects		No		Yes	
Year Fixed Effects		No		Yes	
Adj.R ²		0.2769		0.2819	
Rn ² statistic		25366.75***		24997.04***	
N		382		382	

6.4. IR and firm's performance

Following Lee and Yeo's (2016) and Jermias and Gani's (2014) methodology of sensitivity analysis, operating profitability is used as an alternative measure of firm performance instead of Tobin's *Q* index, which was tested in section 5.5. The relation between IR disclosure quality and the subsequent profitability of the sample are examined. Specifically, whether the accounting return on assets (ROA) is associated with IR disclosure quality is tested. Table 25 depicts the results of models 14(a) and

14(b). From the table it is noticed that H₂ holds. Both DS and DDS are positively and significantly associated at the 5% level or better with the ROA, implying that firms which exhibit higher IR disclosure quality are outperforming. The remainder of the results are similar to those in table 16. The following equation is estimated:

$$ROA_{i,t} = a_0 + a_1 DISCLOSURE_QUALITY_{i,t} + a_2 DUALITY_{i,t} + a_3 BSIZE_{i,t} + a_4 BOARDIND_{i,t} + a_5 INST_{i,t} + a_6 GROWTH_{i,t} + a_7 FIRM_SIZE_{i,t} + a_8 DEBT_RATIO_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{i,t} \quad (14)$$

Two sub-models were created, model 14(a) and 14(b), which tested the IR disclosure quality in two different ways. In model 14(a) the independent variable DDS is used and in model 14(b) DS is used.

$$ROA_{i,t} = a_0 + a_1 DDS_{i,t} + a_2 DUALITY_{i,t} + a_3 BSIZE_{i,t} + a_4 BOARDIND_{i,t} + a_5 INST_{i,t} + a_6 GROWTH_{i,t} + a_7 FIRM_SIZE_{i,t} + a_8 DEBT_RATIO_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{i,t} \quad 14(a)$$

$$ROA_{i,t} = a_0 + a_1 DS_{i,t} + a_2 DUALITY_{i,t} + a_3 BSIZE_{i,t} + a_4 BOARDIND_{i,t} + a_5 INST_{i,t} + a_6 GROWTH_{i,t} + a_7 FIRM_SIZE_{i,t} + a_8 DEBT_RATIO_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{i,t} \quad 14(b)$$

In the first column of table 25, the explanatory variables tested in models 14(a) and 14(b) are mentioned. The next column lists the predicted signs of each variable. Then, the values of the coefficients of models 14(a) and 14(b) are depicted in columns 3 and 5, respectively. The t-statistic and p-values results of models 14(a) and 14(b) are shown in columns 4 and 6, respectively.

Additionally, firms with a large number of board members tend to exhibit lower performance in comparison with firms whose board size is limited. This result is based on the fact that BSIZE is associated negatively and significantly at the 1% level with the ROA, confirming the findings of [Weisbach \(1988\)](#) and [Jermias and Gani \(2014\)](#). Firms in which the CEO and the chairman are the same person tend to exhibit lower performance in comparison with firms in which the CEO is not simultaneously

chairman of the board. In both models 14(a) and 14(b), it is found that boards with a high percentage of independent directors tend to exhibit higher performance since the BOARDIND and the ROA are associated positively and significantly at the 1% level. Moreover, similar to models 7(a) and 7(b), it is observed that institutional ownership (INST) is positively and significantly associated at the 1% level with the ROA, which suggests that the sample firms benefit from the monitoring activities of institutional shareholders. In this robust model, the results predict that firm size is positively and significantly associated with performance both in models 14(a) and 14(b). This result is opposite to the result of the basic model tested in [section 5.5](#). Nevertheless, this result is consistent with the findings of previous studies (e.g., [Lee and Yeo, 2016](#)). Finally, in the sensitivity analysis an alternative proxy of leverage is used. DEBT_RATIO is used, which equals total liabilities to total assets at the end of fiscal year t . As expected, firms which are highly leveraged tend to display high performance because DEBT_RATIO is negatively and significantly associated at the 1% level with the ROA.

Table 25: IR and firm's performance

$$ROA_{i,t} = a_0 + a_1DS_{i,t} + a_2DUALITY_{i,t} + a_3BSIZE_{i,t} + a_4BOARDIND_{i,t} + a_5INST_{i,t} + a_6GROWTH_{i,t} + a_7FIRM_SIZE_{i,t} + a_8DEBT_RATIO_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{i,t} \quad 14(a)$$

$$ROA_{i,t} = a_0 + a_1DDS_{i,t} + a_2DUALITY_{i,t} + a_3BSIZE_{i,t} + a_4BOARDIND_{i,t} + a_5INST_{i,t} + a_6GROWTH_{i,t} + a_7FIRM_SIZE_{i,t} + a_8DEBT_RATIO_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + v_{i,t} \quad 14(b)$$

The period of interest is 2011-2015. The sample consists of 82 international firms listed in IR database (<http://examples.integratedreporting.org/reporters?start=A>). **ROA** is the return on assets in fiscal year t calculated as net income during year t scaled by total assets at the beginning of the year. **DDS** is a dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see [section 4.5.5](#). **DS** is IR Disclosure Score Index. **DS** is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on [KING III checklist](#)). **DUALITY** is a dummy variable which takes 1 when a firm's CEO is also the chairman of the board of directors and 0 otherwise. **BSIZE** is the number of director on the Board. **BOARDIND** is the board independence ratio measured as the number of independent directors divided by total board size. **INST** is the ratio of number of shares owned by institutional shareholders to total outstanding common shares. **GROWTH** is the growth in total assets from the beginning to the end of year t . **FIRM_SIZE** is the natural logarithm of total revenue at the end of fiscal year t . **DEBT_RATIO** is a proxy of leverage equals with total liabilities to total assets at the end of fiscal year t . T – statistic and p – values (in parentheses) for each estimated variable are provided in the columns to the right of each estimated coefficient. The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.

Dependent Variable: ROA					
Variable	Predicted Sign	Model 6(a)		Model 6(b)	
		Coefficient	T –Statistic (P-values)	Coefficient	T –Statistic (P-values)
Intercept	?	-0.0719***	-3.07 (0.00)	-0.0515**	-2.13 (0.03)
DDS	+	0.0324***	3.13 (0.00)	0.0324***	3.13 (0.00)
DS	+			0.0392***	2.98 (0.00)
DUALITY	-	-0.0164***	-2.98 (0.00)	-0.0182***	-3.21 (0.00)
BSIZE	-	-0.0012***	-3.77 (0.00)	-0.0014***	-4.23 (0.00)
BOARDIND	+	0.0768***	10.08 (0.00)	0.0736***	9.62 (0.00)
INST	+	0.0755***	5.90 (0.00)	0.0887***	7.58 (0.00)
GROWTH	+	-0.0107**	-1.99 (0.05)	0.0105**	1.98 (0.05)
FIRM_SIZE	+	0.0020**	2.19 (0.03)	0.0019**	2.10 (0.04)
DEBT_RATIO	-	-0.0442***	-3.80 (0.00)	-0.0389***	-3.36 (0.00)
Industry Fixed Effects		Yes		Yes	
Year Fixed Effects		Yes		Yes	
Adj. R ²		18.028%		17.476%	
N		388		388	

6.5. IR disclosures quality and value relevance

To test the robustness of the value relevance of the summary accounting information of section 5.6, a different dependent variable was introduced to capture the market predictions of a firm's growth opportunities. Hence, the market-to-book ratio (MBR) is used as a value relevance of the summary accounting information metric and is calculated by dividing the market capitalization to the net book value. Model 15 is estimated based on [Cormier and Magnan's \(2007\)](#) approach. It tests whether firms with

high IR disclosure quality are related positively to MBR. The following equation is estimated:

$$MBR_{i,t} = \lambda_0 + \lambda_1 DISCLOSURE_QUALITY_{i,t} + \lambda_2 (1/BV)_{i,t} + \lambda_3 (EBIT/BV)_{i,t} + \lambda_4 DEBT_RATIO_{i,t} + \lambda_5 CFO_{i,t} + \lambda_6 TURNOVER_{i,t} + \lambda_7 SIZE_{i,t} + \lambda_8 DUALITY_{i,t} + \lambda_9 BIG4_{i,t} + \lambda_{10} PAR_{i,t} + \lambda_{11} LN(EMPLOYEES)_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{it} \quad (15)$$

Two sub-models, 15(a) and 15(b) were created, which test the IR disclosure quality in two different ways. Model 15(a) uses the independent variable DDS and model 15(b) uses DS.

$$MBR_{i,t} = \lambda_0 + \lambda_1 DDS_{i,t} + \lambda_2 (1/BV)_{i,t} + \lambda_3 (EBIT/BV)_{i,t} + \lambda_4 DEBT_RATIO_{i,t} + \lambda_5 CFO_{i,t} + \lambda_6 TURNOVER_{i,t} + \lambda_7 SIZE_{i,t} + \lambda_8 DUALITY_{i,t} + \lambda_9 BIG4_{i,t} + \lambda_{10} PAR_{i,t} + \lambda_{11} LN(EMPLOYEES)_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{it} \quad 15(a)$$

$$MBR_{i,t} = \lambda_0 + \lambda_1 DS_{i,t} + \lambda_2 (1/BV)_{i,t} + \lambda_3 (EBIT/BV)_{i,t} + \lambda_4 DEBT_RATIO_{i,t} + \lambda_5 CFO_{i,t} + \lambda_6 TURNOVER_{i,t} + \lambda_7 SIZE_{i,t} + \lambda_8 DUALITY_{i,t} + \lambda_9 BIG4_{i,t} + \lambda_{10} PAR_{i,t} + \lambda_{11} LN(EMPLOYEES)_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{it} \quad 15(b)$$

Table 26 illustrates the sensitivity analysis results based on the second research hypothesis. In the first column of this table, the explanatory variables tested in models 15(a) and 15(b) are tested. The next column lists the predicted signs of each variable. Then, the values of the coefficients in models 15(a) and 15(b) are depicted in columns 3 and 5, respectively. The t-statistic and p-values results of models 15(a) and 15(b) are shown in columns 4 and 6, respectively.

Table 26 depicts the results of models 15(a) and 15(b). In that table it is observed that firms which disclose higher IR accounting information are linked with increased value relevance, shown by the fact that both DDS and DS are positively and significantly associated at the 5% level with the MBR. The remainder of the results are similar to those in [table 18](#) in [section 5.6](#).

Furthermore, the basic summary information focuses on the accounting variables 1/BV and EBIT/BV, which are positive and highly significant at the 1% level. This finding

can be interpreted as an increase in the book value of equity scaled by the number of common shares and the earnings before interest and taxation scaled by the number of common shares that positively affect the market valuation of the firms during the five-year period (2011-2015).

Table 26: IR and value relevance

$$MBR_{i,t} = \lambda_0 + \lambda_1 DDS_{i,t} + \lambda_2 (1/BV)_{i,t} + \lambda_3 (EBIT/BV)_{i,t} + \lambda_4 DEBT_RATIO_{i,t} + \lambda_5 CFO_{i,t} + \lambda_6 TURNOVER_{i,t} + \lambda_7 SIZE_{i,t} + \lambda_8 DUALITY_{i,t} + \lambda_9 BIG4_{i,t} + \lambda_{10} PAR_{i,t} + \lambda_{11} LN_EMPLOY_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{it} \quad 15(a)$$

$$MBR_{i,t} = \lambda_0 + \lambda_1 DS_{i,t} + \lambda_2 (1/BV)_{i,t} + \lambda_3 (EBIT/BV)_{i,t} + \lambda_4 DEBT_RATIO_{i,t} + \lambda_5 CFO_{i,t} + \lambda_6 TURNOVER_{i,t} + \lambda_7 SIZE_{i,t} + \lambda_8 DUALITY_{i,t} + \lambda_9 BIG4_{i,t} + \lambda_{10} PAR_{i,t} + \lambda_{11} LN_EMPLOY_{i,t} + \{Industry\ Effects\} + \{Year\ Effects\} + e_{it} \quad 15(b)$$

The period of interest is 2011-2015. The sample consists of 82 international firms listed in IR database (<http://examples.integratedreporting.org/reporters?start=A>). **MBR** is the market capitalization to the net book value. **DDS** is a dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see section 4.5.5. **DS** is IR Disclosure Score Index. **DS** is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on **KING III checklist**). **1/BV** is the book value of equity scaled by the number of common shares. **EBIT/BV** is earnings before interest and taxation scaled by the number of common shares. **DEBT_RATIO** is a proxy of leverage equals with total liabilities to total assets at the end of fiscal year *t*. **CFO** is the Operating cash flow in fiscal year *t* scaled by total assets at the beginning of the year. **TURNOVER** is a measure of asset utilization that captures how efficiently the firm's assets are used and is estimated as the ratio of annual sales to total assets at the end of fiscal year *t*. **SIZE** is the natural logarithm of total assets at the end of fiscal year *t*. **DUALITY** is a dummy variable which takes 1 when a firm's CEO is also the chairman of the board of directors and 0 otherwise. **BIG_4** is a dummy variable equal to 1 if a firm is audited by a Big 4 accounting firm and 0 if otherwise. **PAR** is the natural logarithm of the number of pages ~~number~~ of the annual reports. **LN_EMPLOY** is the natural logarithm of the number of ~~the~~ employees. The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.

Dependent Variable: MBR		Model 7(a)		Model 7(b)	
Variable	Predicted Sign	Coefficient	T –Statistic (P-values)	Coefficient	T –Statistic (P-values)
Intercept	?	0.3508	0.47 (0.64)	0.2244	0.29 (0.77)
DDS	+	0.2474**	2.49 (0.01)		
DS	+			0.7546**	2.14 (0.03)
1/BV	+	552.1458***	6.69 (0.00)	547.4455***	6.76 (0.00)
EBIT/BV	+	0.4476***	6.38 (0.00)	0.4399***	6.52 (0.00)
DEBT_RATIO	-	0.7671**	2.32 (0.02)	0.1961	0.59 (0.56)
CFO	+	1.67E-06**	2.49 (0.01)	1.61E-06**	2.37 (0.02)
TURNOVER	+	-0.1263*	-1.93 (0.05)	-0.2108***	-2.81 (0.01)
SIZE	+	-0.0538	-1.51 (0.13)	-0.0548	-1.55 (0.12)
DUALITY	-	-0.3470***	-2.82 (0.01)	-0.3147***	-2.63 (0.01)
BIG_4	?	-0.4760***	-2.92 (0.00)	-0.4607***	-2.76 (0.01)
PAR	+	0.2020**	2.45 (0.01)	0.1878**	2.44 (0.02)
LN_EMPLOY	?	0.0024	0.09 (0.93)	-0.0025	-0.10 (0.92)
Industry Fixed Effects		Yes		Yes	
Year Fixed Effects		Yes		Yes	
Adj. R ²		61.630%		61.118%	
N		378		378	

Additionally, it is observed that the variables DEBT_RATIO and CFO are positively and significantly associated at the 10% level or better with high levels of leverage, and operating cash flows display higher market valuation, confirming the findings of Iatridis (2012b) and Lourenco et al. (2014). Stakeholders can better evaluate firms whose integrated reports contain a large number of pages. Finally, firms in which the CEO is also chairman of the board tend to display lower market valuation in comparison with firms in which the CEO and the chairman are different persons.

6.6. Multiple-based valuation model (P/BV) and IR disclosures quality

To test the robustness of the firms' value creation model in section 5.7, another multiple-based valuation model is used based on P/BV. Specifically, in these robustness checks the following model is estimated:

$$P/BV_{i,t} = \kappa_0 + \kappa_1 EARNINGS_QUALITY_{i,t} + \kappa_2 DISCLOSURE_QUALITY_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad (16)$$

Because two proxies are used for the DISCLOSURE_QUALITY, DDS and DS, and two proxies for EARNINGS_QUALITY, the following four sub-models are estimated:

$$P/BV_{i,t} = \kappa_0 + \kappa_1 DAC_{i,t} + \kappa_2 DDS_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad 16(a)$$

$$P/BV_{i,t} = \kappa_0 + \kappa_1 SMOOTHNESS_{i,t} + \kappa_2 DDS_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad 16(b)$$

$$P/BV_{i,t} = \kappa_0 + \kappa_1 DAC_{i,t} + \kappa_2 DS_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad 16(c)$$

$$P/BV_{i,t} = \kappa_0 + \kappa_1 SMOOTHNESS_{i,t} + \kappa_2 DS_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad 16(d)$$

Table 27 reports the results from the estimation of equation (9). This robust model checks whether firms which depict high disclosure quality accounting information based on the King III report principles and the IIRC framework are evaluated better by

analysts. It tests the same hypothesis, replacing the dependent variable with the P/BV ratio. As in section 5.7, two earnings quality proxies are considered, discretionary accruals and earnings smoothness, and two metrics for IR, disclosure quality DDS and DS.

Four different regression models - models 16(a) to 16(d)- were created to enhance the implications of IR disclosure quality and earnings quality in a firm's valuation. In model 16(a) the independent variable DDS is used as a proxy of IR disclosure quality and DAC as a proxy of earnings quality. Model 16(b) uses the independent variable DDS as a proxy of IR disclosure quality and SMOOTHNESS as a proxy of earnings quality. In model 16(c) the independent variable DS is used as a proxy of IR disclosure quality and DAC as a proxy of earnings quality. Model 16(d) uses the independent variable DS as a proxy of IR disclosure quality and SMOOTHNESS as a proxy of earnings quality. Table 27 depicts the results of the four models. In the first column of this table, the explanatory variables tested in models 16(a) to 16(d) are analyzed. The next column lists the predicted signs of each variable. Then, the values of the coefficients of models 16(a) to 16(d) are depicted in columns 3, 5, 7 and 9, respectively. The t-statistic and p-values results of models 16(a) to 16(d) are shown in columns 4, 6, 8 and 10, respectively. In the regression outputs of models 16a and 16b, the DDS is positively and significantly associated at the 1% level with the P/BV. This finding suggests that firms which exhibit higher IR disclosure quality tend to display higher price-to-book value ratios, again confirming H₄. Both earnings quality measures (DAC and SMOOTHNESS) are negatively and significantly associated at the 1% level with the P/BV, implying that firms which display lower earnings management techniques tend to create more value. Moreover, in models 16c and 16d, IR disclosure quality is considered using the variable DS and DDS , reaching the same results as models 16a and 16b. To sum up, firms which are highly leveraged are linked to lower valuation by investors.

Table 27: Multiple – based valuation model (P/BV) and IR disclosures quality

This table summarizes the equation's results using Fixed Effects OLS:

$$P/BV_{i,t} = \kappa_0 + \kappa_1 DAC_{i,t} + \kappa_2 DDS_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad 16(a)$$

$$P/BV_{i,t} = \kappa_0 + \kappa_1 SMOOTHNESS_{i,t} + \kappa_2 DDS_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad 16(b)$$

$$P/BV_{i,t} = \kappa_0 + \kappa_1 DAC_{i,t} + \kappa_2 DS_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad 16(c)$$

$$P/BV_{i,t} = \kappa_0 + \kappa_1 SMOOTHNESS_{i,t} + \kappa_2 DS_{i,t} + \kappa_3 GROWTH_{i,t} + \kappa_4 BETA_{i,t} + \kappa_5 SIZE_{i,t} + \kappa_6 DEBT_RATIO_{i,t} + v_{i,t} \quad 16(d)$$

The period of interest is 2011-2015. The sample consists of 82 international firms listed in the IR database (<http://examples.integratedreporting.org/reporters?start=A>). *P/BV* is the price to book ratio which is calculated by dividing the market price per share by book value per share. *DAC* are the discretionary accruals. The normal proportion of accruals estimated by the *Jones (1991)* model. *DAC* are the residuals that derived from the estimation of the normal accruals equation {*DeFond and Subramanyam, 1998; Bartov et al., 2001; Kothari et al., 2004; Garza – Gomez et al., 2006*}. *SMOOTHNESS* is the ratio of the standard deviation of operating income divided by the standard deviation of cash flow from operations. *DDS* is a dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see [section 4.5.5](#). *DS* is IR Disclosure Score Index. *DS* is derived from the scale of total received score of each firm to the maximum score (equals with 28 observations based on *KING III checklist*). *GROWTH* is the growth in total assets from the begging to the end of year *t*. *BETA* is the market beta coefficient obtained from Datastream for each firm and for each year. *SIZE* is the natural logarithm of total assets at the end of fiscal year *t*. *DEBT_RATIO* is a proxy of leverage equals with total liabilities to total assets at the end of fiscal year *t*. *T* – statistic and *p* – values (in the parentheses) for each estimated variable are provided in columns to the right of these outputs. The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.

Dependent Variable: P/BV									
Variable	Predicted Sign	Model 8(a)		Model 8(b)		Model 8(c)		Model 8(d)	
		Coefficient	T –Statistic (P-values)	Coefficient	T –Statistic (P-values)	Coefficient	T –Statistic (P-values)	Coefficient	T –Statistic (P-values)
Intercept	?	2.6711***	21.49 (0.00)	2.5509***	20.06 (0.00)	2.3531***	14.66 (0.00)	2.2753***	15.41 (0.00)
DAC	-	-2.4570***	-3.90 (0.00)			-2.4118***	-3.89 (0.00)		
SMOOTHNESS	-			-0.0083***	-10.79 (0.00)			-0.0064***	-7.96 (0.00)
DDS	+	0.2866***	14.85 (0.00)	0.2955***	12.46 (0.00)				
DS	+					0.7137***	5.30 (0.00)	0.6554***	5.18 (0.00)
GROWTH	+	0.0462**	2.14 (0.03)	0.0437	1.49 (0.14)	0.0398*	1.86 (0.06)	0.0357	1.22 (0.22)
BETA	-	-0.2674***	-3.53 (0.00)	-0.2416***	-3.55 (0.00)	0.2737***	3.89 (0.00)	0.2444***	3.94 (0.00)
SIZE	+	0.1657***	16.72 (0.00)	0.1575***	30.03 (0.00)	-0.1681***	-17.62 (0.00)	-0.1605***	-30.45 (0.00)
DEBT_RATIO	-	-1.9479***	-12.16 (0.00)	-1.8385***	-10.02 (0.00)	-1.9349***	-13.39 (0.00)	-1.8117***	-11.02 (0.00)
Industry Fixed Effects		Yes		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes		Yes	
Adj. R ²		17.419%		15.817%		16.811%		15.067%	
N		377		354		377		354	

6.7 Heckman's endogeneity test

Additionally, [Heckman's \(1979\)](#) two-stage model is implemented to address endogeneity concerns. Firms with a high disclosure quality may systematically exhibit high value, a high value relevance of summary accounting information and better valuation from the markets. Conversely, firms with a financial identity characterized by high value, a high value relevance of summary accounting information and better valuation from the markets may adopt a more integrated method to disclose their financial information.

In the first stage of the Heckman approach, the following Probit model to derive the inverse Mills ratio (IMILLS) is estimated:

$$DDS_{i,t} = \varphi_0 + \varphi_1 FIRM_SIZE_{i,t} + \varphi_2 LEVERAGE_RATIO_{i,t} + \varphi_3 FCF_{i,t} + \varphi_4 ROA_{i,t} + \varphi_5 MBR_{i,t} + \varepsilon_{i,t} \quad (17)$$

Where,

Variable Explanations of Equation (17)	
Variable	Description
DDS	A dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see section 4.5.5
FIRM_SIZE	A firm's size at the end of fiscal year t. It is calculated as the natural logarithm of the annual revenue.
LEVERAGE_RATIO	A leverage ratio in fiscal year t. Calculated as total long – term debt scaled by total assets at the end of year t.
FCF	Free Cash Flows equal with the operating income before depreciation minus tax charge plus interest expense and dividends paid scaled by total assets (Lehn and Poulsen, 1989).
ROA	Return on Assets in fiscal year t, calculated as net income during year t scaled by total assets at the beginning of the year.
MBR	Market – to – Book ratio at the end of fiscal year t. Calculated as the market value of equity divided by the book value of equity at the end of the year.
IMILLS	Inverse Mills Ratio (see Appendix).

In the second stage, IMILLS is included as an independent variable in equations (7), (8) and (9). [Francis and Lennox \(2008\)](#) discuss concerns regarding the application of the [Heckman \(1979\)](#) procedure in an accounting context. Following their suggestion, in model (17) variables were created that differ from those used in the second-stage

models. It is also tested for multicollinearity when including IMILLS in the second stage. The variance inflation factor (VIF) for each variable to the second-stage models does not exceed 10; thus, multicollinearity does not impede the interpretation of the second- stage results ([Dielman, 2001](#)).

In the second stage, the coefficient of IMILLS in all models is statistically significant at the 5% level or better, suggesting that self-selection may be a problem in the analysis. Despite the fact that IMILLS is included in the regression model as an independent variable, the results of the second-stage regression are similar to those reported in tables 5.5, 5.6 and 5.7.

Table 28: Heckman's test

This table summarizes the results from the 2SLS Estimation of the [Heckman \(1979\)](#) procedure to address the potential endogeneity issues of the sample selection:

1st Stage Equation: $DDS_{it} = \varphi_0 + \varphi_1 FIRM_SIZE_{it} + \varphi_2 LEVERAGE_RATIO_{it} + \varphi_3 FCF_{it} + \varphi_4 ROA_{it} + \varphi_5 MBR_{it} + e_{it}$

2nd Stage Equations: Equations (7), (8), 9(a) and 9(b) with the addition of the IMILLS as an independent variable.

DDS is a dummy variable equal to 1 if a firm has gathered an IR disclosure score which is equal or greater than the median price notifications percentage of all sampled firms and 0 if otherwise. For more details see [section 4.5.5](#). *FIRM_SIZE* is a firm's size at the end of fiscal year *t*. It is calculated as the natural logarithm of the annual revenue. *FCF* Free Cash Flows equal with the operating income before depreciation minus tax charge plus interest expense and dividends paid scaled by total assets ([Lehn and Poulsen, 1989](#)). *ROA* is the net income during year *t* scaled by total assets at the beginning of the year. *MBR* is the Market – to – Book ratio at the end of fiscal year *t*. It is calculated as the market value of equity divided by the book value of equity at the end of the year. All other variables are defined in the footnotes of [table 5](#) and [table 6](#). *IMILLS* is the Inverse Mills Ratio. In the 2nd Stage all models have been estimated with the fixed effects approach. In model 4 the leverage ratio is the total debt to total assets at the end of year *t*, in the model 5 the leverage ratio is the total debt to the total assets at the end of year *t* and in models 6a and 6b the leverage ratio is total liabilities to total assets at the end of fiscal year *t*. The superscripts *, ** and *** denote significance at 10%, 5% and 1% respectively.

	Probit		Model 4		Model 5		Model 6a		Model 6b	
variables	Coefficient	Wald –Statistic (P-values)	Coefficient	Wald –Statistic (P-values)	Coefficient	Wald –Statistic (P-values)	Coefficient	Wald –Statistic (P-values)	Coefficient	Wald –Statistic (P-values)
Intercept	0.5952	1.47 (0.23)	3.8905 ***	220.41(0.00)	21.1407	0.02 (0.89)	79.9595***	10.41 (0.00)	72.8970***	45.65 (0.00)
FIRM_SIZE	-0.1038**	6.47 (0.01)								
LEVERAGE_RATIOS	0.9071**	4.73 (0.03)	0.1780	0.70 (0.40)	914.885***	7.67 (0.01)	-76.4951 ***	9.06 (0.00)	-68.6738***	26.76 (0.00)
FCF	1.71E-06	2.36 (0.12)								
ROA	2.1464*	3.69 (0.05)								
MBR	0.0089***	9.80 (0.00)								
IMILLS			-2.1302***	129.26 (0.00)	-317.6606**	6.23 (0.01)	-73.3682***	8.50 (0.00)	-65.1807***	29.70 (0.00)
DDS			-0.1965***	11.40 (0.00)	157.4986***	6.75 (0.01)	0.7442	0.50 (0.48)	0.6154	0.72 (0.40)
DUALITY			0.2032***	14.51 (0.00)	-202.9229***	8.96 (0.00)				
BSIZE			-0.0129	1.86 (0.17)						
BOARDIND			-0.1904	2.08 (0.15)						
INST			0.3974**	3.97 (0.05)						
GROWTH			0.0273	0.28 (0.60)			-1.0578	0.31 (0.58)	-1.3245	1.35 (0.25)
TURNOVER			-0.0641	2.16 (0.14)						
SIZE			-0.1163***	47.91 (0.00)	-45.6230*	3.81 (0.05)	1.0435	2.39 (0.12)	0.8054*	2.85 (0.09)
STDEVΔOI			6.48E-07	1.66 (0.20)						
BVPS					0.4774***	6.79 (0.01)				
EBTPS					1.3895	2.42 (0.12)				
ROE					20.8353**	4.03 (0.05)				
CASH					731,5187***	10.79 (0.00)				
PPE					-204,3387*	3.10 (0.08)				
PERIDAU					2.8255***	8.34 (0.00)				
LN_EMPLOY					50.5243**	5.85 (0.02)				
EARNINGS QUALITY							-118.7740***	8.26 (0.00)	-0.0934	2.34 (0.13)
BETA							3.7256*	3.36 (0.07)	2.4874***	189.51 (0.00)
N	382		369		375		338		317	
R ² McFadden R ²	5.372%		19.261%		37.957%		29.699%		26.204%	

7. Conclusion

This study examines whether firms that include IR in their annual reports behave differently, delivering more transparent financial and non-financial information to investors. The latter can help manage various risks and identify investment opportunities more clearly. It is hypothesized that highly integrated firms provide high-quality accounting disclosure and exhibit more effective corporate governance mechanisms. Better quality is observed in the released profits, and they reveal lower agency costs, due to the reduction of information asymmetry among stakeholders to managers. Here, some similarities are found with previous studies because IR is a tool that empowers the level of accounting (financial and non-financial) information. However, [Chaidali and Jones \(2017\)](#) state that IR preparers report problems arising from a lack of adequate and clear guidance, high preparation costs, the format, and the length of the integrated report. As a result, IR preparers believe these problems undermine the credibility of IR. The results of this thesis prove that the advantages of IR are greater than the disadvantages ([Lee and Yeo, 2016](#); [De Villiers et al., 2017](#); [Maroun, 2017](#)).

This analysis concludes that the quality of accounting information is increased when firms employ specific board characteristics, such as independence, duality, and diversity ([Prado-Lorenzo and Garcia-Sanchez, 2010](#)). Therefore, according to the thesis findings, the higher the percentage of independent directors on the board is, the more it is likely to be aligned with integrated reporting disclosure principles and to be in accordance with the IIRC framework. It is found that firms should create nomination committees and include on their boards a high number of independent and non-executive board members, as [Donnelly and Mulcahy \(2008\)](#) conclude in their report. A positive linkage between the firm's environmental performance and the number of independent directors and boards is also found ([De Villiers et al., 2011](#)). All of the

previous results are in favor of the long-term goal of the IRCC, helping clarify the company's approach to its long-term strategic opportunities.

The findings of this thesis support the hypothesis that IR firms are less likely to engage in aggressive earnings management through discretionary accruals. A negative and significant association between discretionary accruals, profitability, operating cash flows, liquidity levels and the proportion of common shares owned by institutional shareholders is proven, confirming the findings of [Chevis et al. \(2007\)](#) and [Iatridis \(2011\)](#). Moreover, firms that improve their disclosure quality by adopting IR principles, engage less in earnings management and exhibit high levels of leverage, tending to display lower agency costs. In contrast, firms in which the CEO is also the chairman of the board tend to exhibit higher agency costs compared to those in which the CEO is a non-executive director. Large firms with high growth opportunities and applying more IR principles, display more effective corporate governance mechanisms and less discretionary accruals and limit information asymmetry. This can improve the quality of information available to providers of financial capital, leading to a more efficient and productive allocation of capital. The results of this thesis are also robust in alternative definitions of the dependent variables by hypothesis. Thus, outputs are characterized by reliability and validity.

Moreover, the relation between IR and firm market valuation are examined. The IR disclosure level in an international sample of 82 non-financial firms that complied with IR, in the period of the application year (2011) and four years later (until 2015) were exploited. The IR disclosure quality is interpreted by applying two different estimated indexes, which are symbolized as DS and DDS, based on the King III report and the IIRC framework. Consistent with the initial predictions, it is found that the positive association between firm performance and IR disclosure quality is stronger in firms with a high percentage of institutional shareholders, suggesting that IR improves the information environment in complex firms, such as firms with low leverage levels and

in which the CEO is not simultaneously chairman of the board. The results align with [Lee and Yeo \(2016\)](#), and a study conducted by [Nanyang Business School \(2014\)](#) ([IIRC,2015](#)). Similarly, a positive and statistically significant association is found between the IR disclosure quality index (DS and DDS) and Tobin's Q, after controlling for various firm characteristics, such as firm size, sales growth, and leverage, and corporate governance mechanisms, such as the number of directors on the board, the ratio of number of shares owned by institutional shareholders to total outstanding common shares, and the board independence ratio, which is measured as the number of independent directors divided by total board size. This study highlights the corporate disclosure philosophy behind IR, the goal of which is to provide information about a firm's future value creation, related to the firm's long-term strategy ([De Villiers et al.,2017](#)).

It is found that firms with a high IR disclosure quality tend to display high market value per share. The findings suggest that higher market valuation appears in firms with high levels of leverage, profitability and liquidity. More valid and effective valuation occurs in large firms with a high proportion of fixed assets to total assets, in firms with a large number of employees, and in firms that establish audit committees. The findings also suggest a change in value relevance with permanent characteristics, which supports the long-term goal of the IIRC, by clarifying a company's approach to its long-term strategic opportunities and risks, securing long-term funding and developing long-term endorsements from supra-national bodies. These integrated approaches not only enable a complete estimation of fair value but also improve valuation models.

Finally, the impact of IR implementation on a multiple valuation model is investigated. Considering that IR is intended to link King III report principles and financial performance, it is theorized that if there is any effect, it will be higher for firms that do not converge with the King III report principles and apply the principles strictly. Further, if there is a need for the link provided by IR, IR disclosure quality based on

the King III report principles will not be associated with P/E and P/BV multiples before IR is implemented, whereas it will be integrated once reports are provided. Similar to [Bernardi and Stark \(2016\)](#), it is concluded that firms displaying a higher IR disclosure quality tend to exhibit higher P/E ratios. It is expanded this survey and test the relation between a multiple-based valuation model and earnings management. The models employed two different proxies, capturing a range of earnings management activities, such as the magnitude of total accruals, the smoothness of earnings relative to cash flows and the association between accounting accruals and operating cash flows, implying that firms with high earnings quality display high value. Moreover, the results match those of [KPMG \(2015\)](#), which tested the behavior of 80 firms from the Asia Pacific region that used IR and found a significant association between higher IR disclosure quality and higher P/BV ratio. It is predicted that IR implementation will helps firms focus on aspects that materially affect their long-term ability to create value.

7.1. Implications

Previous literature argued that regulators and standard setters do not fully understand the reasons for and consequences of IR implantation (i.e. [De Villiers et al., 2017](#); [Chaidali and Jones, 2017](#)). Hence, this thesis has implications for regulators and accounting standards setters when they are faced by firms applying IR. In other words, the findings of this research give insights to policy makers and accounting regulators, in aiding their understanding of the effects of IR on corporate governance, earnings quality, agency cost, firm's performance, value relevance and multiple-based valuation models. The results will be useful for European and international accounting standard setters and other authorities. This study provides insight into how a satisfactory level of economic integration can be achieved through the better use of IR disclosures. These interdependent changes will reflect the trends of globalization and higher expectations for corporate transparency and accountability as defined by IR concepts.

At the theoretical level, this thesis adds to the new and limited body of interpretive research, which illustrates the assurance implications of an emerging reporting practices (see [De Villiers et al., 2014](#); [Simnett and Huggins, 2015](#); [Maroun, 2017](#)). IR is a new reporting method that proposes the integration of financial and non-financial information in a single report ([De Villiers et al., 2017](#)), and as mentioned in previous sections it was established in 2011. This thesis provides a first step to researchers and investors to acquire an idea about the association between IR disclosure quality (based on King III report) and corporate governance mechanisms, earnings quality, agency costs, value relevance and firm's valuation.

In addition to the creation of more accurate non-financial information available for data vendors, IR provides a higher level of stakeholder trust, a better identification of opportunities and better resource allocation decisions, including cost reductions ([Dixon et al., 2004](#); [Moroney et al., 2012](#)). IR creates closer engagement with investors and other stakeholders and includes the current and prospective progress of employees, which can help them to upgrade their skills ([Simnett et al., 2009](#)). IR is in its early stages and is still under development in practice. Nevertheless, this type of reporting can be used in all industries, in private and public firms and in all types of organizations. Its application is intended to improve communication between companies and capital markets. Combining financial and non-financial information highlights firm strategy performance, underscores the interdependency of information ([KPMG, 2011](#)) and can be a useful mechanism for firms ([Adams and Frost, 2008](#)). The use of IR by both firms and organizations will enhance their ability to attract new long-time investors with ESG consciousness, to raise capital. This should improve their capital adequacy and financial and non-financial profile.

IR implementation will create expectations regarding a higher degree of economic integration. In the future, IR could eventually replace existing corporate reports. Organizations should be able to decide the way in which information will be presented;

for instance, information could include an overarching document with various other reports or a single stand-alone document covering all material aspects ([Ernst and Young, 2014](#)). Other groups that benefit from this research are professional accountants and academics.

7.2. Contributions

This thesis includes several contributions and contributes to the global literature because it provides evidences for a higher degree of economic integration through IR implementation. It is contributes to the growing evidence that IR is an effective accounting tool and its use is likely to be rewarded by capital markets because it helps firms to rethink and integrate their strategies and business models in line with stakeholder expectations. Through communication and transparency, IR can be used effectively to interpret the advantages of using the King III report principles and to explain to investors how an organization creates value over time. Moreover, the use of IR provides firms with the ability to tell their own story, preventing analysts from making assumptions on their behalf. This study concludes that when the IIRC Framework was introduced, firms disclosed more than just financial information and began to outperform ([IIRC, 2015](#)).

To the best of knowledge, the thesis provides large-sample empirical evidence on the association between IR and corporate governance variables, earnings quality and agency costs based on the most recent IIRC Framework (2013), using two different approaches of OLS estimation (Pooled and Fixed Effects OLS) in the panel data analysis from the 2011-2015 period. The findings of the thesis are based on a positive relation between corporate governance mechanisms and a negative association between earnings management and agency costs providing evidence that the disclosure accounting quality increases and the benefits of IR exceed the costs of IR.

Focusing on the hypotheses of firm valuation, the contributions of this thesis extend in several directions. In addition, it examines how the level of IR disclosure quality improves the view of value relevance of summary accounting information (i.e., the market value of equity). The thesis explored how the use of integrated analysis can create value by testing the behavior of a multiple-based valuation model. In addition to contributing to the academic debate on the market valuation implications of IR performance, the findings of this study support the calls for more IR, showing that the interaction of financial and non-financial information has market valuation implications (Baboukardos, 2017).

In particular, this study provides evidence that a high level of IR disclosure and high earnings quality tend to produce higher valuation indexes (P/E and P/BV), compared to firms with lower earnings and IR disclosure quality. This survey is accepted as valid, the results suggest that IR provides useful accounting information on links between King III report principles and financial performance. In addition, it supports the theory that the value of these links will improve the level of IR disclosure and encourage the introduction of integrated reports. The results complement the findings of Bernardi and Stark (2016), who found a positive relation between the high level of ESG disclosures and the IR disclosure level, concluding that IR improves analysts' estimations regarding the value and performance of a firm. In essence, keeping other factors constant, it is concluded that high IR disclosure quality is linked to an increase in market valuation, not only in firms that use IR on a mandatory basis (see Bernardi and Stark, 2016; Lee and Yeo, 2016; Atkins and Maroun, 2015) but also in firms that voluntarily decide to implement IR.

7.3. Limitation and future research

The size of this sample is a limitation of this thesis. A sample of 173 listed firms was collected from the official website of IIRC. However, from the 173 firms, 34 did not provide adequate data in Datastream, 57 were firms from the financial, insurance and

real estate sector and were removed from the sample¹⁹. Finally, the sample consisted of 82 listed firms from 25 countries. Because the treatment of IR is not perceived to the same degree between countries, this is another limitation of this thesis. The compliance IR rate is different from country to country and this is mainly due to the different applicable institutional and legislative frameworks they apply. Hence, future papers should extend this research by investigating the level of IR implementation in common and code law countries. Another idea is to compare the voluntary with the mandatory IR implantation. Moreover, a future survey should contain some macroeconomic variables, which can outline the institutional and legislative framework of each country and can better define the voluntary application of IR.

Furthermore, there are two limitations in using self-constructed disclosure scores (Healy and Palepu, 2001). First, there is considerable researcher judgment involved in data collection and checklist creation. Second, these disclosure scores are constructed using data from available documents, such as published annual reports and websites (Lee and Yeo, 2016). Future papers should extend this research by testing several other disclosure score indexes, based either on King III report or on King IV report, which may affect the earnings quality, agency cost, firm's performance, value relevance and multiple-based valuation models.

Finally, a future research survey should investigate the association between dividend policy and the level of IR disclosure quality.

¹⁹ These firms use accounting methods that are not comparable with those of industrial firms (Iatridis, 2012a).

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Appendix

A.1. King Report on Corporate Governance

The committee that issued the Report on Corporate Governance is King Committee on Corporate Governance. The Report on Corporate Governance is a statement which gives guidelines for the corporate governance techniques and operation of firms in South Africa. Three reports were published in 1994 the King I report, 2002 the King II report, and 2009 the King III report and a fourth revision, the King IV report in 2016. The Institute of Directors in Southern Africa (IoDSA) owns the copyright of the King Report on Corporate Governance and the King Code of Corporate Governance. The listed firms in Johannesburg Stock Exchange obligatory should apply the King III report. The King Report on corporate governance has been reported as "the most effective summary of the best international practices in corporate governance" (Iod, 2009, 2016).

In contrast other corporate governance codes such as Sarbanes-Oxley, King Report on Corporate Governance and the King Code of Corporate Governance are non-legislative and is based on principles and practices. It listed on the 2010 Combined Code from the United Kingdom and is made a trial to set up in Netherlands. The basic idea of the code sources of the three key elements of leadership, sustainability and good corporate citizenship. It fronts good governance as essentially being effective, ethical leadership. King Report on Corporate Governance and the King Code of Corporate Governance are intended to convey the impression that leaders should direct the firm to implement sustainable economic, social and environmental performance. It expects sustainability as the most important moral and economic imperative of this century (Iod, 2009, 2016).

A.1.1. King I report

The King I report on corporate governance was published in 1994 in South Africa. It contained an integrated guide of recommended standards of conduct for boards and

directors of listed financial and non-financial firms. It analyzes either the financial and regulatory aspects or the non financial data with an integrated approach that involved all stakeholders ([Iod, 1994, 2016](#)).

It was applied to all South Africa listed firms and generally large public and private entities and organizations, such as banks, insurance firms. The size “large” is mentioned to firms with shareholder equity over R50 million, but encouraged all entities to adopt the King I report. The principles which are contained to the King I report are analyzed below. The first principle focuses on board of directors which makes-up and mandates them, giving explicit information about the role of non-executive directors and the categories of people who should constitute the non-executive directors. Second, it sets the appointments to the board and guidance on the maximum term for executive directors. Third, it determines and informs investors about the remuneration of the executive and non-executive director’s, the frequency of meetings of Board. Finally, it is responsible for creating a balanced annual reporting and the requirement for effective auditing, the creation of affirmative action programs and the existence of the firms’ code of ethics ([Iod, 1994](#)).

A.1.2. King II report

King II report is a revision of King I report, enriching with new sections relevant to the sustainability, the role of corporate board and risk management. The King II report was issued on March 2002. It is used by departments of State or national, provincial or local government administration falling under the Local Government: Municipal Finance Management Act, and public institutions. Also, the King II report encourages all firms to adopt the applicable principles from the code. The most important principles of King II report examine the internal audit and risk management policies and illustrate the integrated sustainability reporting. It focuses on the firm’s directors and on their

responsibilities. The King II report is not enforced through legislation but exist with a number of laws that used to firms and directors including the Firms Act ([Iod, 2002](#)).

A.1.3. King III report

The King II report had some imperfections, such as the King II report was not correct to include sustainability as a separate chapter, pushing firms to report on it separately from other factors. In 2009 a new revised King III report issued and governance, strategy and sustainability were integrated. The King III report introduces an integrated report which merges an annual financial report with a sustainability report and recommends entities to apply it and create sustainability reports based on the Global Reporting Initiative's Sustainability Reporting Guidelines. The innovation of King III report is that this report is applicable to all entities, public, private and non-profit. It encourages all entities to apply the King III report principles by using IR and explains how its principles can be applied. The code of governance was available from March 2010 ([Iod, 2009](#)). In the table below it is mentioned the summary of the nine topics of King III report that used in the checklist of this thesis.

Table A1 Nine topics of King III report ([Deloitte, 2009](#); [Iod, 2009](#); [PWC, 2009](#); [IIRC, 2015](#); [ACCA, 2016](#)).

<i>Topics</i>	Summary of the topic
Ethical leadership and corporate citizenship	<p>The board should:</p> <ul style="list-style-type: none"> ▪ provide effective leadership based on an ethical foundation ▪ ensure that the company is and is seen to be a responsible corporate citizen ▪ ensure that the company's ethics are managed effectively ▪ appreciate that strategy, risk, performance and sustainability are inseparable ▪ ensure that the company has an effective and independent audit committee ▪ be responsible for risk and IT governance ▪ ensure compliance with applicable laws and regulations

- ensure an effective risk based internal audit function
- appreciate that stakeholders' perceptions affect the company's reputation
- ensure integrity of the company's integrated report
- report on the effectiveness of internal controls
- consider business rescue proceedings as soon as the company is financially distressed
- appoint the CEO and establish a framework for the delegation of authority
- comment on the independence of the independent non-executive directors in the integrated report
- formalize a process for induction and ongoing training and development of directors
- be assisted by a competent, suitably qualified and experienced company secretary
- evaluate the performance of the board, its committees and the individual directors every year
- agree on a governance framework between the group and its subsidiary boards

Boards and directors

The Board and directors should :

- operate ethically and with integrity, and as a responsible corporate citizen ,
- considers the interests of the community within which it operates,
- integrate governance, strategy, risk, performance and sustainability,
- comply with laws and regulations,
- identify and manages risks,
- and employ structures and processes to ensure the integrity of its IR.

Audit committees

The audit committee should:

(include: the nomination of the external auditor for appointment and to verify the independence of the auditor)

- determine the audit fee and the scope of the appointment,
- ensure that the appointment complies with the requirements of the Firms Act,
- determine the nature and extent of non-audit services,
- and pre-approve any contract for non-audit service.

The governance of risk

- Risk management should be seen as an integral part of the firm's strategic and business processes.

- The Board's responsibility for governance of risk should be set out in a risk management policy and plan.
- The Board should consider the risk policy and plan, and should monitor the whole risk management process.
- While the Board remains responsible for the risk management policy and the determination of the firm's risk appetite and risk tolerance, management is responsible for the design, implementation and effectiveness of risk management.
- The Board should receive combined assurance regarding the effectiveness of the risk management process.

**The
governance of
information
technology (IT)**

The directors should:

- ensure proper IT governance,
- the proper alignment of IT with the performance and sustainability objectives of the firm,
- and the proper management of operational IT risk, including security.

The risk committee may be assigned responsibility to oversee the management of IT risk.

The audit committee should consider IT as it relates to financial risk and reporting.

**Compliance
with laws,
rules, codes
and standards**

The Board should:

- ensure awareness of and compliance with laws, rules, codes and standards throughout the business.
- Be responsible for the implementation of an effective compliance framework and processes, and for the effective management of the firm's compliance risk.
- mandate management to establish a compliance function to implement measures and procedures to ensure that the Board's policy on compliance is implemented.

Internal audit

The internal audit function should:

- be positioned at a level within the firm to understand the strategic direction and goals of the firm.

- develop a program to test the internal controls vis-a-vis specific risks.
- provide assurance with reference to the adequacy of controls to identify risks that may impair the realisation of specific goals as well as opportunities that will promote the achievement of the firm's strategic goals.
- form an integral part of the combined assurance model.
- provide a written assessment of internal controls and risk management to the Board, and specifically on internal financial controls to the audit committee.

Governing stakeholder relationships

The board should:

- appreciate that stakeholders' perceptions affect a company's reputation
- delegate to management to proactively deal with stakeholder relationships
- strive to achieve the appropriate balance between its various stakeholder groupings, in the best interests of the company
- ensure equitable treatment of shareholders
- ensure transparent and effective communication with stakeholders
- ensure that disputes are resolved effectively, efficiently and expeditiously.

Integrated reporting and disclosure

The Board should:

- ensure that the positive and negative impacts of the firm's operations, as well as plans to improve the positives and eradicate the negatives, are conveyed in the integrated report.
- delegate oversight of the integrated report to an appropriate committee (either the audit committee or a sustainability committee).

The audit committee should:

- oversee the provision of independent assurance over sustainability issues,
 - and assist the Board by reviewing the integrated reporting and disclosure to ensure that it does not contradict financial reporting.
-

The emerging governance trends that mentioned in King III report are linked to the alternative dispute resolution, risk-based internal audit, shareholder approval of non-executive directors' remuneration and the evaluation of board and directors' performance. Moreover, it contains a number of new principles to address data and information not previously included in the King reports such as IT governance, business rescue and fundamental and affected transactions in terms of director's responsibilities during mergers, acquisitions ([Iod, 2009](#)).

A.1.4. King IV report

King IV was issued on 1 November 2016. It was applied as a draft for a 2-year period and another year grace period to conform organizations and firms to the King IV report. King IV report strengthens the idea that effective corporate governance techniques are holistic and interrelated set of arrangements to be understood and applied in an integrated manner. It contains a set of voluntary principles and leading practices. King IV is based on outcomes. The principles and practices of the King IV report are related to desired outcomes, therefore articulating the advantages of good corporate governance. The basic difference is that King IV report based on “apply and explain” regime in contrast with the King III report based on “apply or explain” regime.

The most important characteristics of King IV report related to the delegation to management, the delegation to committees, the corporate governance services to the governing body, the audit committee disclosures, the risk governance, the combined assurance model, Social and ethics committees, performance evaluations, and technology and information ([PWC, 2016](#); [Iod, 2016](#)).