The Economic Consequences Associated with Integrated Report Quality: Early Evidence from a Mandatory Setting

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Abstract

We examine whether integrated report quality (IRQ) is associated with stock liquidity, firm value, expected future cash flow, and cost of capital. Our study is motivated by the recent focus on sustainable capitalism and the global interest shown by firms, investors, and regulators in the work of the International Integrated Reporting Council (IIRC). We use data from South Africa because it is the only country where integrated reporting is mandated. We use a measure of integrated reporting quality based on proprietary data from EY who rate these reports as part of its Excellence in Integrated Reporting awards. We find that integrated reporting is positively associated with both stock liquidity (measured using bid-ask spreads) and firm value (measured using Tobin's Q). Our results are consistent whether we analyze levels or changes. When we decompose the firm value into an expected future cash flow effect and cost of capital effect, we find that the positive association between integrated reporting quality and firm value is driven mainly by the cash flow effect, consistent with investors revising their estimates of future cash flows upward as a result of a better understanding of the firm's capitals and strategy or future cash flows increasing because of improved internal decision making by managers. We provide results from a DuPont analyses which are consistent with the latter conjecture.

Keywords: Integrated reporting, corporate social responsibility, firm value, cost of capital, stock liquidity, South Africa

"Mandate integrated reporting."

– Al Gore and David Blood, "A Manifesto for Sustainable Capitalism" (2011)

1. Introduction

The International Integrated Reporting Council (IIRC) (2003, 7) defines an integrated report as 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, 2013, 7). In a 2011 *Wall Street Journal* article, former US Vice President Al Gore and David Blood identified mandating integrated reporting as one of five steps needed to support a "sustainable capitalism" where businesses focus on long-term value creation. They argue that integrated reports allow investors to make better resource-allocation decisions by providing a more comprehensive view of the firm, and they state that while "voluntary integrated reporting is gaining momentum, it must be mandated by appropriate agencies such as stock exchanges and securities regulators to ensure swift and broad adoption" (Gore & Blood, 2011). The purpose of our study is to provide early evidence on the economic consequences of the quality of mandated integrated reports, in terms of stock liquidity, firm value, expected future cash flows, and cost of equity capital, from South Africa, which is currently the only country that requires integrated reporting on a mandated basis.[1]

One motivation for our study is to better understand the implications of this new reporting framework. Integrated reporting is gaining traction at the firm, country, and international levels. For example, over 100 leading multinationals including Pepsi, HSBC, Unilever, Deutsche Bank, National Australia Bank, and Tata Steel participated in the IIRC's voluntary pilot integrated reporting program; standard-setters and professional bodies in

[1] South Africa has required integrated reporting for firms listed on the Johannesburg Stock Exchange (JSE) on an apply-or-explain basis since 2010. While this means that a firm can opt out of providing an integrate report as long as the choice is explained, KPMG (2013) finds that the 97 percent of South Africa firms provide integrated reports in 2011 and 98 percent provide them in 2013. Consequently, integrated reporting is effectively mandated in South Africa.

Australia, Brazil, India, Japan, and Singapore have expressed various levels of rhetorical support for integrated reporting; and international organizations, such as the European Commission and the Business 20 (B20) Summit, have made statements supporting integrated reporting.[2] Further, the IASB and FASB have started to engage with standard-setting bodies focusing on alternative disclosure models, including the IIRC, as part of the Corporate Reporting Dialogue.[3] However, currently, empirical evidence on the benefits associated with integrated reporting is sparse (e.g., see Huang & Watson, 2015).

Our second motivation is to extend the academic literature on the implications of new accounting frameworks. For example, there is a sizeable literature on the effects of mandatory adoption of IFRS (e.g., Daske, Hail, Leuz, & Verdi, 2008; Armstrong, Barth, Jagolinzer, & Riedl, 2010; Li, 2010). We add to this literature by examining the effects associated with the mandatory adoption of a new reporting model rather than a new set of accounting standards. That is, while IFRS affects the production of financial information, integrated reporting emphasizes non-financial information and how it is disclosed. We are unaware of another setting where a country has mandated a new reporting model.[4]

We examine the association between integrated report quality (IRQ) and a firm's stock liquidity, firm value, expected future cash flows, and cost of capital. To measure IRQ, we use proprietary data from EY who each year rate the quality of the integrated reports of the top 100 firms listed on the Johannesburg Stock Exchange (JSE). We have access to each firm's quality category, which is released publicly, as well as the underlying scores for each specific quality dimensions, which are not publicly available. According to the chair of the

[2] B20 is a group of business leaders from large companies which tries to influence governments of the G20.
[3] For example, Huguette Labelle, chair of the Dialogue, states, "The corporate reporting landscape is changing. For too long, reporting has been fragmented and disconnected from the strategic drivers of value. The Corporate Reporting Dialogue represents the coming together of organizations that have the combined power to shape the future corporate reporting landscape, creating a cohesive, meaningful and durable roadmap that builds business and investor confidence" (see http://corporatereportingdialogue.com).
[4] Several studies examine the effects of qualitative information disclosed in the management discussion and analysis (MD&A) section (e.g., Bryan, 1997; Clarkson, Kao, & Richardson, 1999) which, for example, has been mandated in the US since 1980. However, the MD&A section is only a small part of a firm's external reporting package.

EY panel that rates the reports, the ratings focus on the quality of the disclosure, e.g., whether the integrated report gives readers a sense of the issues that are fundamental to the operations of the firm.

We find IRQ is negatively associated with the bid-ask spread, our measure of stock liquidity, after controlling for corporate governance, corporate social responsibility (CSR) performance, accounting quality, firm complexity, overall disclosure quality, and other factors. To provide a stronger link between IRQ and the bid-ask spread and to reduce the likelihood of correlated omitted variables, we also run a changes model and find that firms with larger year-to-year increases in IRQ have larger decreases in their bid-ask spreads.

We also find a positive relation between IRQ and firm value measured by Tobin's Q. We focus on Tobin's Q because it measures the excess of the market value of assets over their book values and the IIRC Framework requires firms to report on capitals, such as intellectual, human, environmental, and social and relationship capital, which are only partially, or not at all, reflected in the book value of assets. Our use of Tobin's Q is also consistent with the IIRC Framework that states that the primary purpose of an integrated report is to explain to investors how an organization creates value over time. We find that IRQ is positively related to Tobin's Q whether we use levels or changes.

In our next analyses, we decompose firm value into a numerator effect (expected future cash flows) and denominator effect (discount rate) to examine the channel(s) through which integrated reporting quality increases firm value. Similar to Plumlee et al. (2015), we use analysts' estimates of future stock prices (target prices) discounted back to the current period as a proxy for expected future cash flows. Both our levels and changes models support a positive and significant association between IRQ and expected future cash flows. We use the target price method of Botosan and Plumlee (2002) to estimate cost of capital. We find evidence supporting a relation between the level of IRQ and the level of cost of capital, but

IRQ is not significant in the changes specification. Further, our results are weaker when alternative measures of cost of capital are used.

Thus, we conclude that IRQ affects firm value mainly through expected cash flows. IRQ can allow investors to better appreciate a firm's strategy and business model, leading to improved estimates of future cash flows. Further, integrated reporting may affect the thought process of management – often referred to as "integrated thinking" – leading to improved operating and investing decisions that generate higher cash flows. In our last set of analyses, we probe the integrated thinking channel further by conducting a DuPont analysis. We find that current changes in IRQ are positively associated with year-ahead changes in asset turnover, return on assets, and return on equity. We take this as preliminary evidence that integrated reporting is associated with improved decision making by managers, in particular through better utilization of assets. Overall, our study suggests high quality integrated reports can have positive economic consequences.

The remainder of the paper is organized as follows. Section 2 provides the background to integrated reporting. Section 3 discusses the related literature and develops the hypotheses. Section 4 details the research design. Section 5 presents the results and additional analyses. Section 6 concludes.

2. Background on integrated reporting

2.1. Outside South Africa

In the wake of the global financial crisis and supported by the Accounting for Sustainability (A4S) initiative led by HRH The Prince of Wales, the IIRC was established in 2010 to develop a framework for integrated reporting and to promote its use. Issued in 2013, the IIRC Framework states that the primary purpose of an integrated report is to explain to providers of financial capital how an organization creates value over time. The Framework is principles based and does not provide a standard format for integrated reports or specify

specific disclosure requirements. Instead the Framework sets out seven guiding principles and eight content elements for an integrated report. In turn, these principles and elements relate to six capitals that the organization uses to create value, which allows managers to provide a narrative that explains how the firm creates value.[5]

Integrated reporting has recently been gaining wider acceptance. Some examples at the country level since 2013 include: a report of the Expert Committee on Desirable Market Economy System commissioned by the Japanese Prime Minister recommending integrated reporting for Japanese firms (IIRC, 2014), the US Sustainability Accounting Standards Board and the IIRC reaching a memorandum of understanding to accelerate the practical implementation of integrated reporting (SASB, 2014)[6], the chief executive of the Singapore Accountancy Commission announcing plans for Singapore to "become the hub for integrated reporting in South-East Asia" (Kee, Larsen, & Seng, 2014, 22), the main Brazilian stock exchange encouraging listed firms to participate in a "report or explain" campaign on sustainability reports that includes integrated reports (BM&FBOVESPA, 2014), Australia's largest super funds embracing integrated reporting (Kitney, 2014), and the chairman of the Securities and Exchange Board of India (SEBI) announcing his intention to issue guidelines on integrated reporting for listed firms in India (Business Standard Reporters, 2014).

At the international level, in releasing a directive on environmental, governance, and social (ESG) information in April 2014, the European Commission (EC) acknowledged that integrated reporting is "a step ahead" of its own ESG disclosure requirements and that it is "monitoring with great interest the evolution of the integrated reporting concept, and, in particular, the work of the IIRC" (EC, 2014, 3). In June 2014, the B20 Summit released a

[5] The seven guiding principles are: strategic focus and future orientation, connectivity of information, stakeholder relationships, materiality, conciseness, reliability and completeness, and consistency and comparability (IIRC, 2013). The eight content elements are: organizational overview and external environment, governance, business model, risks and opportunities, strategy and resource allocation, performance, outlook, and basis of preparation (IIRC, 2013). The six capitals are: financial, manufacturing, human, intellectual, social and relationship, and natural capital (IIRC, 2013).
[6] The SASB is an organization that establishes and maintains industry-specific standards for use in disclosing material sustainability issues in annual filings to the Securities and Exchange Commission.

report on “unlocking investment in infrastructure” in which one of its key recommendations to the G20 finance ministers is that corporate reporting should provide investors with a “longer-term and broader perspective on shareholder value creation”, specifically referring to integrated reporting as an example (B20, 2014, 2).[7] Finally, the IIRC specifically refers to the period 2014-2017 as the “breakthrough phase” as it aims to achieve “a meaningful shift toward early adoption” of integrated reporting by reporting entities around the world (IIRC, 2014, 3).

Several surveys have been conducted to ascertain preparer’s and user’s views of integrated reporting. For example, Black Sun (2014), a consulting firm, obtained survey responses from 66 organizations that took part in the IIRC’s pilot program mentioned above. 92 percent of respondents agreed that integrated reports give users a clearer view of how their organization creates values, 79 percent agreed that integrated reporting gives investors greater confidence in the long-term viability of the organization’s business models, and 65 percent agreed that integrated reporting improved the organization’s own internal decision making (Black Sun, 2014). Moreover, Black Sun found that organizations have more positive responses once they have prepared at least one integrated report. However, as participation in the pilot program was voluntary, these responses may be biased upward.

Consistent with this possibility, a 2014 survey of 200 CFOs in Ireland and the UK by the Association of Chartered Certified Accountants (ACCA) reflects more cautious views about integrated reporting. In contrast to the Black Sun survey, almost 50 percent are waiting to see how integrated reporting develops before deciding whether to prepare an integrated report, and 10 percent have no intention to prepare an integrated report unless it is required (ACCA, 2014). These responses illustrate the different attitudes of voluntary adopters from non-voluntary adopters, and suggests the ‘benefits’ of integrated reporting for the general

[7] B20 is a group of business leaders from large companies which tries to influence governments of the G20.

population of firms may not be as substantial as suggested by pilot program participants and other integrated reporting advocates.

2.2. South Africa

Integrated reporting in South Africa pre-dates the establishment of the IIRC and release of the framework. To address concerns about ineffective management in the post-apartheid era, in 1993, the South African Institute of Directors commissioned the King Committee with the mandate to promote the highest standards of corporate governance in South Africa (West, 2006). Hence, South Africa's history of apartheid has been influential in shaping social and environmental governance (De Villiers, Rinaldi, & Unerman, 2015). The first King Report (King I), largely based on the UK Cadbury Report, was issued during 1994. A second report (King II) was released in 2002. With changes to South African companies law, the King Committee issued a third report (King III) in 2009.

A key recommendation of King III is that firms are required to prepare an integrated report to present the firm's performance in terms of both its finance and sustainability. The board of directors is charged with the responsibility to ensure the integrity of the integrated report. The move towards integrated reporting was fueled by the belief of the Committee that conventional financial reporting was no longer meeting the needs of firms' stakeholders. For example, Mervyn King, the chairman of the King Committee and the IIRC, states (King, 2013, 5):

> At the beginning of the 21st century it was appreciated that some 80% of the value of companies was not represented by additives in a balance sheet according to International Financial Reporting Standards. To understand value, therefore, there had to be a shift in thinking from a focus in value being seen in the context of future cash flows. Value embraces the impact of the financial aspects on the non-financial aspects and vice versa and how a board has applied its collective mind to the material sustainability issues of a company in its long-term strategy.

Since the King Code is a JSE listing requirement, the release of King III meant that listed firms were required to issue an integrated report for periods on or after March 1, 2010, or explain why they do not wish to apply this principle of King. During May 2010, the Integrated Reporting Committee of South Africa (IRC) was established to develop guidelines on good integrated reporting practices. The IRC's discussion paper on a framework for an integrated report, released on January 25, 2011, was the first national initiative on integrated reporting. During March 2014, the IRC endorsed the Framework of the IIRC for South African firms and ceased its own guidance.

3. Hypothesis development

3.1. Research on integrated reports

As Huang and Watson (2015) note in their literature review of research on corporate social responsibility, the research on integrated reporting is sparse. However, there are a few recent studies that explore the implications of integrated reporting in various contexts.

For example, using a self-constructed measure of the level of alignment between the firm's integrated report and the 2012 draft IIRC Framework to measure IRQ, Zhou, Simnett, and Green (2015) find a negative association between changes in the level of alignment and subsequent changes in analyst forecast error and analyst forecast dispersion for a sample of South African firms over their sample period from 2009 to 2012. They also find a negative association between changes in the level of alignment with the 2012 draft IIRC Framework and subsequent changes in cost of equity capital, but only for firms with low analyst following. Bernardi and Stark (2015) find a significantly negative association between Bloomberg ESG scores and analyst forecast accuracy for 40 South African firms in the post-integrated reporting period, but not in the pre-period. Their evidence is consistent with integrated reporting making ESG disclosures useful for analysts, although they find their results are driven by environment-related disclosures, leading them to suggest that integrated

reporting may thus be less useful for some industries such as financial services. In contrast to Zhou et al. (2015) and Bernardi and Stark (2015) who focus on financial analysts, we focus on the effects of IRQ on investors in general as we are interested in the market-wide implications of mandating integrating reporting.

Arguelles, Balatbat, and Green (2015) examine the benefits of integrated reporting for early adopters using an international sample. They find that there is a stronger association between the degree of adherence to integrated reporting principles (constructed from Thomson Reuters' Asset 4 data) and market value of equity for early adopters of integrated reporting relative to non-adopters. However, this result is not surprising as the majority of the early adopters of integrated reporting in Arguelles et al.'s (2015) sample are voluntary adopters. By contrast, our study focuses on the capital market benefits for mandatory adopters.

Finally, Serafeim (2015) finds that US firms that practice integrated reporting have a longer-term oriented investor base with more dedicated and fewer transient investors than firms that are weaker at integrated reporting. Thus, Serafeim's (2015) focus is also on voluntary adopters. In addition, like Bernardi and Stark (2015) and Arguelles et al. (2015) who measure integrated reporting using publicly available data from databases, Serafeim's (2015) proxy for integrated reporting is based on Asset 4 data. Asset 4 (as well as Bloomberg's ESG data) report ESG values for all firms, regardless of whether they actually publish an integrated report. By contrast, our proxy of integrated reporting quality is based on an independent, external review of actual integrated reports.

3.2. Hypotheses

We commence by examining whether integrated reporting has an impact on the firm's information environment and, therefore, affects its stock liquidity. The agency problem posits that information asymmetry exists between managers with superior information and

information disadvantaged outsiders, such as investors. This could lead to adverse selection which increases the price of shares, reduces liquidity and increases the cost of capital as investors demand a premium to compensate for risk (e.g., Francis, Nanda, & Olsson, 2008; Gietzmann & Ireland, 2005). Disclosure is a mechanism which managers could use to reduce information asymmetry thereby decreasing investors' out-of-pocket monitoring cost.

Integrated reporting has the potential to reduce information asymmetry about the capitals which affect value. In addition to financial capital, the IIRC Framework requires that managers of firms think about and report on material aspects relating to manufactured, intellectual, human, social and relationship, and natural capital. Traditional financial reporting focuses largely on the monetary values and returns of manufactured and financial capital, while it provides incomplete reporting on intellectual capital (e.g., intangibles) and human capital (e.g., employee benefits). Although some of the integrated reporting capitals may be addressed by voluntary CSR reports, a criticism of these reports is that they are disconnected from the firm's strategy, business model, and financial performance (Serafeim, 2015). As such, providers of financial capital obtain an incomplete and disjointed picture of the firm's ability to create value (in its broader sense) over the short, medium, and long term.

By contrast, the IIRC Framework's guiding principle of the connectivity of information requires managers to report a holistic picture of the "combination, interrelatedness and dependencies between the factors that affect the organization's ability to create value over time" (IIRC, 2013, 5). Hence, integrated reports have the potential to provide information incremental to the existing corporate reports such as annual and CSR reports which users of the integrated reports may find useful in their capital allocation decisions. To the extent that integrated reports provide a more comprehensive set of information about a firm, we expect a larger decrease in information asymmetry and, specifically, a larger increase in liquidity for firms with higher quality integrated reports:

H1 *There is a negative association between integrated report quality and a firm's stock liquidity.*

The IIRC Framework states that integrated reporting aims to: (1) improve the quality of information available to the providers of financial capital to improve the efficient and productive allocation of capital, (2) promote a cohesive and efficient approach to corporate reporting and communicate the full range of factors that materially affect the ability of a firm to create value, (3) enhance accountability and stewardship for the six capitals and promote understanding of their interdependencies, and (4) support integrated thinking, decision-making and actions that focus on the creation of value over the short, medium and long term (IIRC, 2013). Given the focus of integrated reporting on value creation, we next consider whether better integrated reporting quality is associated with higher firm value.

In simple terms, firm value is affected by a firm's expected future cash flows and the riskiness associated with those cash flows (i.e., cost of capital). Future cash flows can be directly affected by integrated reporting by out-of-pocket implementation costs associated with preparing integrated reports, which can be substantial for small firms (ACCA, 2014) and by real decisions made by the firm to the extent that such decisions are different from the decisions that would be made in the absence of integrated reporting. Indeed, one of the benefits of integrated reporting touted by the IIRC is that its use can lead to "integrated thinking" and integrated decision-making – e.g., by breaking down silos and focusing on long-term, instead of short-term, strategy – resulting in better real decisions and enhanced firm value. Similarly, Eccles and Serafeim (2015) argue that while traditional financial reports serve mainly an information function, integrated reports extends to a transformation function affecting internal decision making. For example, 78 percent of the respondents in the Black Sun (2014) survey agree that their firms have benefited from increased collaborative thinking

At the same time, proponents of integrated reporting argue that these reports can improve investors' ability to estimate future cash flows by improving the quality, range, and connectivity of data being produced (e.g., Black Sun, 2014). Company reports are also used by shareholders to monitor managers (Lambert, 2001). As such, higher quality reports should improve shareholders' monitoring ability and reduce the amount of firm cash flow that managers appropriate for themselves. Thus, integrated reports can provide a more holistic understanding of firm value, but can also improve monitoring of managers' decisions. In addition, disclosure about the six capitals is informative to stakeholders such as customers and employees who choose to associate with firms signaling their social legitimacy. This could result in increased sales and financial performance (Plumlee et al., 2015).

Regarding cost of capital, the IIRC (2013) contends that integrated reporting can help investors understand the risks that the firm is exposed to and how its strategy and business model respond to those risks. Michael Bray (2011, 7) of KPMG Australia argues that early adopters of integrated reporting "note positive comments from their investors and they expect their cost of capital will more closely mirror their strategy".

A firm's cost of capital is the sum of the risk-free return and the risk premium. A well-established literature suggests an association between disclosure and the cost of equity capital. In order to link disclosure with cost of equity effects, it is necessary to show how disclosure affects a firm's non-diversifiable risk. Lambert et al. (2007) argue that accounting information influences cost of capital directly through the market's assessment of the riskiness of future cash flows.

Direct effects include at least three channels through which disclosure could affect a firm's cost of equity capital. First, disclosure is a mechanism managers could use to reduce information asymmetry. As we have argued under H1, integrated reporting improves and

expands the information available to capital market participants. This could reduce firm-level information asymmetry.

Second, disclosure could improve investors' awareness of non-financial aspects of the firm, resulting in a larger investor base with increased risk sharing amongst investors (Merton, 1987). Merton's (1987) capital market equilibrium model allows for incomplete information. In this setting, investors only purchase stock that they know about because gathering and processing information about a firm is costly. By providing an inexpensive, but complete, overview of a firm's activities, integrated reports may help the firm expand its investor base, leading to a lower cost of capital.

Third, investors do not know the true value of the expected return of a firm. Disclosure reduces parameter uncertainty and estimation risk, parts of which are non-diversifiable (Hail & Leuz, 2006). Integrated reporting has the potential to reduce parameter uncertainty and estimation risk, because it intends to explain to providers of financial capital how a firm creates value over time in a concise manner by creating a holistic picture of the interrelatedness of the six capitals a firm depends on. The "strategic focus and future orientation" guiding principle of integrated reporting and the content elements relating to the "business model", "risks and opportunities", "strategy and resource allocation" and "outlook" could be useful to investors in reducing parameter uncertainty and estimation risk.

Thus, the preceding discussion and an extensive literature on firm value (e.g., Morck, Shleifer, & Vishny, 1988; Yermack, 1996; Bebchuk, Cremers, & Peyer, 2011; Li, Minnis, Nagar, & Rajan, 2014) lead to the following three hypothesis:

H2 *There is a positive association between integrated report quality and firm value.*

H3 *There is a positive association between integrated report quality and expected future cash flows.*

H4 There is a negative association between integrated report quality and cost of capital.

4. Research design

4.1. Data and sample

Integrated reporting became effective for firms listed on the JSE for annual periods beginning on or after 1 March 2010. Our sample includes the top 100 firms on the JSE based on market capitalization on 31 December 2011, 2012 and 2013 respectively. We start in 2011, because this is the first year in which the EY's Excellence in Integrated Reporting Awards, which we use to construct our integrated report quality proxy, were made. The top 100 firms represent approximately 90 percent of the market capitalization of the JSE.

Table 1 contains the detail of our sample. The sample for the bid-ask and Tobin's Q models consist of 224 firm-year observations representing 92 firms. The 'Financial' (26.34 percent) and 'Materials' (24.55 percent) sectors have the largest number of observations in the sample. Due to additional data constraints of analyst forecasts, the sample for the cost of capital and expected future cash flows tests consists of 163 firm-year observations representing 67 firms. The industry composition in this sample is similar in distribution to the bid-ask and Tobin's Q sample.

4.2. Dependent variables

Our hypotheses require proxies for four constructs: stock liquidity, firm value, expected future cash flows, and cost of capital. We discuss our proxies for each of these constructs in this section.

Leuz and Verrecchia (2000, 99) note that "the bid-ask spread is commonly thought to measure information asymmetry explicitly". This is because investors are less concerned about adverse selection when information asymmetry is small and, as a result, become more willing to trade, resulting in lower bid-ask spreads (e.g., Cheng, Dhaliwal, & Neamtiu, 2011; Leuz & Verrecchia, 2000; Muller, Riedl, & Sellhorn, 2011; Welker, 1995). Similar to

Bushee, Core, Guay, and Hamm (2010), we use the bid-ask spread as a proxy for information asymmetry generally and stock liquidity specifically. We calculate the bid-ask spread as the natural logarithm of the median of the daily difference between the bid and the ask prices divided by the midpoint from month -9 to +3 relative to the end of the financial period (Daske et al., 2008; Lang, Lins, & Maffett, 2012).

We follow an extensive literature that uses Tobin's Q as a proxy for firm value.[8] Tobin's Q is designed to reflect the valuation placed on a firm's assets by the market relative to their book value (e.g., Lang & Maffett, 2011). This attribute makes Tobin's Q a suitable proxy for our setting, because many of the capitals of integrated reporting, such as intellectual, human, environmental and social and relationship capital, are only partially, or not at all, reflected in the book value of assets. Hence, we investigate whether integrated report quality is associated with firm value beyond what is already contained in the financial statements. We calculate Tobin's Q as total assets minus book value of equity plus market value of equity scaled by total assets (Daske et al., 2008; Lang, Lins, & Maffett, 2012). To ensure that the information incorporated in the integrated reports are reflected in firm value, we calculate the market value of equity three months after the end of the financial period. Tobin's Q inherently incorporates the cost of capital through the discounting of future cash flows. Because Tobin's Q captures both expected discount rates and expected future cash flows, Daske et al. (2008) argue that Tobin's Q is a more comprehensive measure of firm value than cost of capital.

We use the next two dependent variables to separate firm value into the cash flow component (i.e., the numerator effect) and the cost of capital component (i.e., the denominator effect). Following Botosan and Plumlee (2002) and Plumlee et al. (2015), we rely on one year-ahead target prices forecasted by financial analysts to construct proxies for

[8] See for example, Adams and Santos (2006), Chen and Li (2013), Daske et al. (2008), Lang, Lins, and Maffett (2012), Lang, Lins, and Miller (2003), Lang and Maffett (2011), and Masulis, Wang, and Xie (2012). Lang, Lins, and Miller (2003) discuss the use of Tobin's Q as a proxy of firm value in the academic literature in footnote 11 of their paper.

expected future cash flow (*EFCF*) and cost of capital (*COC*).[9] IBES provides the target price forecasts with a high and low value.

We employ the mean target price as the terminal value in combination with forecasts of dividend pay-outs and current stock price to derive an implied cost of equity capital, which is our cost of capital proxy. While there is no agreement in the literature about the appropriate proxy for cost of capital (e.g., Dhaliwal, Li, Tsang, & Yang, 2014), Botosan, Plumlee, and Wen (2011) evaluate the construct validity of cost of capital proxies based on their association with realized returns and five known risk factors, and find that *COC* rates highly in terms of construct validity based on these criteria. We discount the mean target price back to the current period using the implied cost of equity capital (*COC)* to derive our measure *EFCF*. [10] Consistent with the way we compute *TobinQ* and *Bid_Ask*, stock prices and analyst forecasts are measured three months after the end of the financial period in the calculation of *COC*.

4.3. Measure of integrated report quality

Our proxy for integrated report quality (*IRQ*) is constructed from the EY Excellence in Integrated Reporting Awards. Since the 2011 fiscal year, EY evaluates the integrated reports of the top 100 firms on the JSE against a list of criteria based on the IIRC Framework (or a draft thereof prior to it being issued). We evaluated the score sheets used by the adjudicators for consistency with the IIRC Framework and we believe that it is an appropriate measure for integrated report quality.[11] Graham (2014, 16), the chair of the adjudication panel, states that the "marking process is not simply about 'ticking the box'. More emphasis is placed on the quality of information presented – the relevance, understandability,

[9] IBES only provides six-month ahead or 12-month ahead target prices, which restricts us from having more than one year on the forecast horizon before the terminal period.

[10] To avoid measurement error in our cost of capital proxy affecting *EFCF*, we also estimate our models using the undiscounted target price to measure *EFCF*, and the results remain qualitatively unchanged.

[11] EY only publishes the considerations taken into account in scoring the reports at a high level (e.g., see page 26 of EY (2014)). EY does not want to make their detailed score sheet publicly available as they believe that this would encourage a "tick-the-box" mentality amongst firms without them engaging in the spirit of integrated reporting. As a result, we also do not include the detailed score sheets in our study.

accessibility and connectedness of that information, whether users of the integrated reports would have a reasonable sense of the issues that are core to the operations of each of the companies, and whether companies have dealt with the issues that users would have expected."

The integrated reports are evaluated by three adjudicators who have extensive experience in reading and evaluating firms' corporate reports. Two of the adjudicators have been involved in the EY Excellence in Integrated Reporting Awards and the preceding EY Excellence in Corporate Reporting Awards since its inception in 1997, while the other adjudicator has been involved since 2005 (EY, 2014). Hence, the three adjudicators were the same for all three years in our sample.[12]

EY do not announce the final scores of firms, but categorizes firms into five buckets.[13] We have proprietary access to the underlying scores of the three adjudicators supporting these publicly announced buckets. Because the scores are subjective measures of qualitative information, we calculate a firm's score as the mean of the three adjudicators' scores and annually rank these scores into deciles to mitigate concerns about measurement error.[14]

4.4. Models

To examine the economic consequences of IRQ, our empirical strategy is to conduct cross-sectional tests since there is wide variation in IRQ across firms. We do not utilize a difference-in-differences design because the introduction of integrated reporting in South

[12] We interviewed Graham on 21 August 2014 about the process the adjudicators follow in scoring the integrated reports. He confirmed that it takes between 30 minutes and four hours to evaluate a single report, depending on the extent to which a firm has implemented integrated reporting principles. He described that discrepancies between the scores of adjudicators are identified at a meeting between the adjudicators. Where the adjudicators are not able to resolve these discrepancies at the initial meeting, the reports of these firms are reevaluated by the adjudicators and discussed at a follow-up meeting. He also indicated that the adjudicators take care to distinguish between credible information and puffery. As Graham described during the interview: "For some firms, it is merely a public relations exercise through pictures, but we would never rate those well. It is hard for a firm to be excellent without clear key performance indicators. If a firm has a lot of green washing and narratives are too long, it is not going to be excellent."

[13] The buckets are "top 10", "excellent", "good", "average", and "progress to be made".

[14] Due to the developments within integrated reporting over the sample period, EY did not use exactly the same score sheet for the three periods in our sample. As a result, the raw scores are not directly comparable over time. To address this issue we do not include the raw scores in the regression, but the annual decile ranks instead.

Africa was a process rather than a point-in-time change. As a result, some firms prepared integrated reports before they were mandated, but it is difficult to identify these firms, and even if we could, we would not have an EY IRQ score for them. Consequently, to test the hypotheses, we estimate the following model (firm-subscripts omitted):

$$Econ_{it} = \beta_0 + \beta_1 IRQ_{it} + \beta_2 Gov_{it} + \beta_3 CSRPerf_{it} + \beta_4 LowAQ_{it} + \beta_5 Complex_{it} + \beta_6 MFDisc_{it} + \sum \beta_j Controls_{it} + \varepsilon \quad (1)$$

where *Econ* is the economic consequences we test being either the bid-ask spread (*Bid_Ask*), Tobin's Q (*TobinQ*), expected future cash flow (*EFCF*), or the implied cost of equity capital (*COC*). Because *Bid_Ask* is increasing with illiquidity, if higher quality integrated reports are associated with increased liquidity, we expect the coefficient of β_1 to be negative and significant in the bid-ask regression. If higher quality integrated reports are associated with firm value and expected future cash flow, we expect the coefficient of β_1 to be positive and significant in the *TobinQ* and *EFCF* regressions. If higher quality integrated reports is associated with lower cost of equity capital, we expect the coefficient of β_1 to be negative and significant in the cost of capital regression.

Based on the prior literature, we include control variables in our models as other factors may be correlated with *IRQ* or could be associated with the economic consequences we test (Hail & Leuz, 2006; Dhaliwal, Li, Tsang, & Yang, 2011; Dhaliwal, Radhakrishnan, Tsang, & Yang, 2012; Dhaliwal et al., 2014).

We control for corporate governance (*Gov*), because Chen, Chen, and Wei (2009) find that corporate governance is negatively associated with cost of capital (which influences firm value through the denominator effect). *Gov* is the average of the board function, board structure, compensation policy, and shareholder rights scores from Asset 4.[15]

[15] Asset 4 is a division of Thomson Reuters which collects environmental, social and corporate governance data for over 6,000 firms globally. The over 750 individual data items are grouped into 18 categories within four pillars. The four pillars are economic, environmental, social and corporate governance performance.

Dhaliwal et al. (2011) and El Ghoul, Guedhami, Kwok, and Mishra (2011) show the importance of controlling for the effect of CSR performance in tests of the association between CSR disclosure and cost of equity capital. Similarly, Cho, Lee and Pfeiffer (2013) find that CSR performance is negatively associated with the bid-ask spread. We include the average of the environmental and social scores from Asset 4 to control for CSR performance (*CSRPerf*) in our models.

We control for accounting quality because Francis et al. (2008) show that earnings quality is negatively associated with cost of capital (which also affects firm value through a denominator effect), while Lang et al. (2012) show that liquidity is higher for firms with less incidence of earnings management. Ideally, we would like to include discretionary accruals as a proxy for accounting quality in our models. Due to data requirements for property, plant and equipment and inventory, discretionary accrual models are not suited to financial firms, which constitute 26 percent of our sample. To overcome this problem, we follow Bowen, Rajgopal and Venkatachalam (2008) by including the frequency of small positive earnings surprises in our model. *LowAQ* represents the annual decile rank of the frequency of small earnings surprises over the previous five years.

We control for firm complexity (*Complex*), because complex firms may find it harder to implement the concepts of integrated reporting. For example, the extent to which firms comply with the IIRC Framework's guiding principles of conciseness and connectivity of information may not be comparable across firms with multiple subsidiaries or divisions and firms with a simple structure and operations. To control for this effect, our proxy for complexity is the average annual decile rank of earnings volatility, stock return volatility and the number of subsidiaries a firm has (De Franco, Hope, Vyas, & Zhou, 2015).

MFDisc measures the frequency and precision of management forecasts in the current and preceding two years as a proxy for firms' overall disclosure quality (Baginski & Rakow,

2012; Plumlee et al., 2015). We obtain management forecasts from the Capital IQ Key Developments database.[16] *MFDisc* is the product of the "supplier", "frequency", and "precision" items from that database. "Supplier" equals one if a firm issued at least one management forecast during the current or preceding two financial periods, and zero otherwise. "Frequency" is the number of management forecasts issued by a firm during the current and preceding two financial periods. "Precision" is the average of the precision of management forecasts issued by a firm during the current and preceding two financial periods. Forecast precision equals "one" for general impression forecasts, "two" for minimum and maximum forecasts, "three" for range forecasts, and "four" for point forecasts.

We control for additional factors in our models (*Controls*). Variable definitions are contained in the Appendix. The bid-ask model includes the incidence of losses and the book-to-market ratio as control variables (Lang et al., 2012). We control for asset growth, the incidence of dividends, leverage, and profitability in the Tobin's Q model (Daske et al., 2008; Lang et al., 2012; Lang et al., 2003). The expected future cash flow model includes control variables for revenue growth and accruals (Doyle, Lundholm, & Soliman, 2003; Barth,Cram, & Nelson, 2009). The cost of capital model includes control variables for beta, analyst forecast dispersion, analyst forecast bias, and leverage (Dhaliwal et al., 2014). All of the models include size as an additional control variable. The models include year and industry fixed effects. Standard errors are clustered by firm and by year based on bootstrapping of 10,000 iterations.[17]

[16] The Capital IQ Key Developments database covers 164 key developments. The following key developments contain management forecasts: "corporate guidance – lowered" (nr. 26), "corporate guidance – raised" (nr. 27) and "corporate guidance – new/confirmed" (nr. 29). We do not limit the forecasts to earnings only, because other forecasts such as production and capital expenditure are important disclosures for mining firms which is a large part of our sample. For the 2011, 2012 and 2013 years all the firms included in our sample are covered by Capital IQ Key Developments.

[17] Gow, Ormazabal, and Taylor (2010) warn against using asymptotic methods, such as OLS with normal two-way clustered standard errors, in small sample settings. We implement their advice of using bootstrapping methods with two-way clustering of standard errors given the small number of clusters in our time dimension.

To provide a stronger link between *IRQ* and the dependent variables and to reduce the likelihood of correlated omitted variables, we also run the models in their change form by taking the first differences of all variables.[18]

5. Results

5.1. Descriptive statistics

Table 2 provides descriptive statistics for the sample. Panel A contains the distribution of the raw EY scores for each year included in our sample, and shows that our sample is similar to the full sample of firms rated by EY in terms of central tendency, variability, and extreme values. Panel B contains descriptive statistics for the variables used in the analysis. The mean (median) natural logarithm of the bid-ask spread is -5.97 (-6.00), while the mean (median) Tobin's Q is 1.81 (1.42), and the mean (median) expected future cash flow in its natural logarithm form is 4.23 (4.24). The mean (median) of the *COC* is 0.17 (0.14), which is higher than the cost of capital in more developed countries such as the US and UK, and is comparable with the estimate for South African firms of 0.16 reported in Hail and Leuz (2006). The *Gov* and *CSRPerf* variables are expressed as a percentage. The mean (median) governance percentage is 54.19 (55.25), while the mean (median) CSR performance is 66.49 (75.25). Of the total sample, 80 percent declared or paid dividends, while 8 percent had losses.

Table 3 sets out the correlations for the independent variables included in the bid-ask and Tobin's Q regressions (our largest sample). *IRQ* is positively correlated with *Gov*, *CSRPerf*, *Complex*, *MFDisc*, and *Size*. Larger firms are better governed and have better CSR performance than smaller firms, as evidenced by the Pearson correlations of 0.28 and 0.46,

[18] In the changes models we account for changes in *Loss* and *Div* through indicator variables. For *Loss* we create three indicator variables: (1) firms that moved from a loss to a profit, (2) firms that remained in a loss position, and (3) firms that moved from a profit to a loss. Hence, firms that remained profitable are captured in the intercept. For *Div* we create three indicator variables: (1) firms that remained non-dividend paying, (2) firms that paid a dividend in the prior period but not in the current period, and (3) firms that did not pay a dividend in the prior period but paid in the current period. Hence, firms that remained dividend paying are captured in the intercept.

respectively. Table 4 shows the year-to-year movement between *IRQ* deciles for our changes models. There is considerable change in the *IRQ* decile rankings for firms during our sample period. Specifically, for the Tobin's Q and bid-ask regressions, there is at least a one decile change in *IRQ* for 69 percent of the observations. Further, 34.9 percent of the sample experienced at least a two decile shift in *IRQ*, indicating that the (relative) quality of a firm's integrated report can increase or decrease substantially from year to year. A similar pattern exists for the expected future cash flows and cost of capital samples (not tabulated). This analysis helps alleviate concerns that our *IRQ* measure is sticky over time.

5.2. Main results

We first evaluate whether integrated report quality is associated with a firm's information environment. Table 5 contains the results of the bid-ask regression in its levels and changes form. In the levels regression, consistent with H1, the coefficient of *IRQ* is negative and significant (coefficient = -0.028, *t*-stat. = -2.170), i.e., firms with better integrated reporting quality have a smaller bid-ask spread and higher liquidity. In economic terms, the results of the levels regression suggest that an interquartile shift in *IRQ* is associated with a 2.29 percent reduction in the bid-ask spread.[19] Of the control variables, *Size* and *CSRPerf* are negatively and significantly associated with the bid-ask spread, while *Complex* has a positive and significant coefficient. Thus, large firms and firms with superior CSR performance have smaller bid-ask spreads, while more complex firms have larger spreads. The levels regression has an adjusted R^2 of 68.4 percent.

We find similar results for the changes regression. *ΔIRQ* has a significant and negative coefficient (coefficient = -0.023, *t*-statistic = -3.249). Among the control variables, *ΔBTM* and *ΔLowAQ* have positive and significant coefficients, indicating that increases in the book-to-market ratio and worsening accounting quality are associated with increases in the

[19] The economic significance for the bid-ask spread is calculated as follows: From Table 2, panel B, *Bid_Ask* has a median value of -6.00 and the interquartile shift in *IRQ* is 5.00 (7.00 – 2.00). The coefficient of *IRQ* in the bid-ask levels regression in Table 5 is -0.028. Hence, the economic significance is calculated as (-0.028 x 5.00)) / -6.00.

bid-ask spread and decreasing liquidity. On the other hand, firms that increase the frequency and/or precision of their management forecasts see decreases in the bid-ask spread as *ΔMFDisc* has a negative and significant coefficient. The changes model has an adjusted R^2 of 18 percent, which is not surprising as changes are generally harder to explain than levels. Overall, the results in Table 5 suggest that integrated report quality is positively associated with firms' liquidity, as evidenced by lower bid-ask spreads.

Table 6 contains the results of the levels and changes regressions where firm value (*TobinQ*) is the dependent variable. In the levels regression, the coefficient for our variable of interest, *IRQ*, is positive and significant (coefficient = 0.036, *t*-statistic = 2.256). This is consistent with H2. In other words, integrated report quality is positively associated with firm value incremental to governance, CSR performance, accounting quality, overall disclosure quality, and the other control variables in our model. In terms of economic significance, results of the levels regression suggest that an interquartile shift in *IRQ* is associated with a 12.6 percent increase in Tobin's Q.[20] The control variable, *IB*, also has a positive and significant coefficient, which suggests that profitable firms have higher firm values than less profitable firms. *Div* has a negative and significant coefficient, and the overall model explains 70.2 percent of the variation in Tobin's Q. The changes specification also provides support for H2. The relation between *ΔIRQ* and *ΔTobinQ* is positive and significant (coefficient = 0.011, *t*-statistic = 2.316).[21]

To better understand how integrated reporting quality relates to firm value, we decompose firm value into its cash flow (numerator) and discount rate (denominator)

[20] The economic significance for Tobin's Q is calculated as follows: From Table 2 Panel B, *TobinQ* has a median value of 1.42, while the interquartile shift in *IRQ* is 5.00 (7.00 – 2.00). The coefficient of *IRQ* in the Tobin's Q levels regression in Table 6 is 0.036. Hence, the economic significance is calculated as (0.036 x 5.00) / 1.42.

[21] As an additional test to our Tobin's Q results, we employ a modified Ohlson (1995) valuation model in levels (price) and changes (returns) (see Barth and Clinch, 2009). The levels-model regress share price three months after the end of the financial period on *IRQ*, book value of equity per share, income before extra-ordinary items per share, and other control variables. The returns model regress the percentage change in the Datastream Total Return Index for the period -9 to +3 relative to the financial year-end on *ΔIRQ*, earnings before extraordinary items (IB) scaled by lagged market value of equity, the change in earnings before extraordinary items scaled by lagged market value of equity, and other control variables. While the coefficient of *IRQ* is insignificant in the levels model, the coefficient of *ΔIRQ* (not tabulated) is positive and statistically significant in the returns model (coefficient = 0.0195; *t*-statistic = 2.304).

components. Table 7 presents the results of the analysis of the relation between integrated reporting quality and expected future cash flows. In the levels regression, consistent with H2, the association between *IRQ* and expected future cash flows is positive and marginally significant (coefficient = 0.047, *t*-statistic = 1.583).[22] Further, the economic effect is non-trivial as an interquartile shift in *IRQ* is associated with a 5.5 percent increase in expected future cash flows.[23] Consistent with the levels regression, there is a positive and significant relation between *ΔIRQ* and *ΔEFCF* (coefficient = 0.004, *t*-statistic = 2.868). Thus, the results in Table 7 suggest that better integrated reporting can affect firm value through the numerator or cash flow effect, which supports H3.

Table 8 provides the results of the levels and changes regressions examining the relation between integrated reporting quality and cost of capital. In the levels regression, we find that *IRQ* has a negative and significant coefficient in the levels test (coefficient = -0.013, *t*-statistic = -1.672). Further, the coefficient for *ΔIRQ* in the changes test is not statistically significant (coefficient = -0.003, *t*-statistic = -0.171).

Given the inconsistent cost of capital evidence across the levels and changes models, we use alternative cost of capital proxies based on Claus and Thomas (2001), Gebhardt, Lee, and Swaminathan (2001), Easton (2004), Ohlson and Jeuttner-Nauroth (2005), Hail and Leuz (2006), and Mohanram and Gode (2013). For levels tests (not tabulated), we only find a significant coefficient when the Easton's (2004) PEG measure is used (coefficient = -0.004, *t*-statistic = -1.647). For changes tests (not tabulated), we only find significant results based on the Claus and Thomas' (2001) and Ohlson and Jeuttner-Nauroth's (2005) measures (coefficient = -0.0008 and -0.0036, *t*-statistic = -2.3751 and -2.737, respectively). As none of

[22] As an alternative, we replace discounted target price as the dependent variable with one-year ahead ex-post net cash flows from operating activities (Datastream item: WC04860) deflated by total assets (Datastream item: WC02999). We find statistically stronger results – *IRQ* is positively associated with one-year ahead ex-post operating cash flows (coefficient = 0.007, *t*-statistic = 1.831).

[23] The economic significance for *EFCF* is calculated as follows: From Table 2 Panel B, *EFCF* has a median value of 4.24, while the interquartile shift in *IRQ* is 5.00 (7.00 – 2.00). The coefficient of *IRQ* in the *EFCF* levels regression in Table 7 is 0.047. Hence, the economic significance is calculated as (0.047 x 5.00) / 4.24.

these measures produce consistently significant results for both levels and changes, at best, our results provide only weak support for the cost of capital channel. This suggests that integrated reporting mainly increases firm value by increasing future cash flows, a view that is consistent with integrated reporting providing managers with better information to facilitate improved decision making.

Overall, we find that there are positive economic consequences associated with integrated report quality. We find that integrated report quality is positively associated with stock liquidity, consistent with integrated reporting improving a firm's information environment. Our evidence also suggests that integrated report quality is positively related to firm value, and that this relation is driven by the effect of integrated reporting quality on expected future cash flows and less by its effect on cost of capital.

5.3. Additional analyses

The evidence suggests that integrated reporting quality affects firm value through future cash flows, which is consistent with integrated reporting improving internal decision making by managers, a view that is supported by anecdotal and survey evidence (Black Sun, 2014; SAICA, 2015). In this section, we explore the specific channel(s) through which integrated reporting improves cash flows.

Because managers' decisions are not directly observable, following Patatoukas (2012), we rely on a DuPont analysis and investigate the intertemporal association between changes in integrated report quality and future changes in firm performance.[24] Standard DuPont analysis decomposes return on equity (*ROE*) into three multiplicative ratios, i.e.:

$$ROE = PM \times ATO \times LEV \quad (2)$$

where *ATO* is the asset turnover ratio, *PM* is the profit margin, and *LEV* is financial leverage (e.g., Soliman, 2008). In Eq. (2), the product of *PM* and *ATO* is the return on assets (*ROA*).

[24] Patatoukas (2012) investigates the intertemporal association between changes in customer-base concentration and subsequent changes in supplier firm performance.

The Appendix provides detailed definitions of these variables. We examine whether *ΔIRQ* is a leading indicator of one-year-ahead changes in asset turnover, profit margin, and accounting rates of return. Thus, consistent with Soliman (2008) and Patatoukas (2012), we estimate the following model:

$$\Delta Perf_{it+1} = \beta_0 + \beta_1 IRQ_t + \beta_2 PM_t + \beta_3 ATO_t + \beta_4 \Delta PM_t + \beta_5 \Delta ATO_t + \beta_6 AT\_Gr_t + \varepsilon \quad (3)$$

where $\Delta Perf_{t+1}$ (performance) is the one-year-ahead changes in either *ATO*, *PM*, *ROA*, or *ROE*. We control for contemporaneous levels and changes in profit margins and asset turnover as well as asset growth, because these have predictive power for future changes in firm performance (e.g., Fairfield & Yohn, 2001; Soliman, 2008).

Because the DuPont analysis is not meaningful for financial firms, we exclude firms with a GICS sector code of 40 from our analysis (Soliman, 2008; Patatoukas, 2012). This reduces our sample to 98 observations. To mitigate the small sample size issue, we employ the bootstrapping method using 10,000 iterations as in previous analyses.

Table 9 contains the results of our analysis of intertemporal changes. Consistent with the notion that integrated reporting assists in improved internal decision making by managers, changes in *IRQ* positively predicts one-year ahead changes in *ROE* (coefficient = 0.008, *t*-statistic = 3.775) and *ROA* (coefficient = 0.003, *t*-statistic = 2.597). When we decompose, *ROA* into *ATO* and *PM*, we find a positive and statistically significant association between the current change in integrated report quality and the year-ahead change in asset turnover (coefficient = 0.008, *t*-statistic = 2.617). Since *ATO* measures a firms' efficiency in utilizing their assets to generate revenue and is frequently considered as a measure of asset utilization by managers, our evidence suggests that improvements in integrated report quality are followed by efficiency gains in the form of enhanced asset utilization.

In contrast, we do not find a significant association between changes in *IRQ* and the year-ahead changes in profit margin. However, this is not surprising as Soliman (2008)

contends that competitive forces affect asset turnover and profit margin differently. Because high profit margins attract new entrants or imitation by rivals, any effect of integrated report on the profit margin is likely to be transitory. On the other hand, Soliman (2008) argues it is more difficult to imitate a firm's efficiency in using its assets as doing so often requires overhauls to operations, such as factories, and these overhauls can be costly.

Thus, our DuPont analysis suggests that integrated reporting can affect future cash flows through efficiency gains in asset utilization.

6. Conclusion

Integrated reporting is a new reporting framework that extends beyond traditional corporate reporting by focusing long-term value creation in terms of financial, manufacturing, human, intellectual, social and relationship, and natural capital. It has its own supporting body, the IIRC, and the IIRC has designated 2014-2017 as the "breakthrough phase" as it aims to achieve wider acceptance for integrated reporting. However, despite the anecdotal support integrated reporting has received at the firm, national, and international levels, empirical evidence on the economic consequences of integrated reporting is scarce.

In this study, we examine whether integrated report quality is associated with stock liquidity and firm value and its components, namely expected future cash flows and cost of capital. We conduct our analyses using South African data because South Africa currently is the only country that mandates integrated reporting. Specifically, integrated reporting has been mandatory (on an apply-or-explain basis) for firms listed on the JSE since March 2010.

We find a positive association between integrated reporting quality and both stock liquidity and firm value. Further, we decompose firm value into two components – expected future cash flows (numerator effect) and cost of capital (denominator effect). We find that integrated report quality is positively associated with expected future cash flows, while the evidence on the association between integrated reporting quality and the cost of capital is

weak and inconsistent at best. Thus, on balance, our evidence suggests that integrated reporting affects firm value mainly by increasing expected future cash flows, consistent with investors revising their estimates of future cash flows upward because they have a better understanding of the firm's capitals and business strategy or with integrated reporting leading to better decisions being made by managers as a result of "integrated thinking". We probe the latter possibility using a DuPont analysis. Consistent with improved internal decision making, we find that find that changes in IRQ are positively associated with one year-ahead changes in asset turnover, return on assets, and return on equity.

As all studies have limitations, a few caveats are in order. One limitations of our study is the small sample size which arises because we rely on the EY IRQ ratings which are only available for the 100 largest South African firms each period. While some researchers examining integrated reporting use data from Thomson Reuters' Asset 4 or Bloomberg's ESG file, this comes at the expense of using an indirect and relatively crude proxy for integrated report quality. Instead, we use proprietary data from EY that reflect the assessment of three external independent reviewers who rate each integrated report on multiple dimensions. However, despite the small sample size, we find strong and consistent results in our liquidity, firm value, and expected future cash flow tests using both level and change specifications.

Another concern is that our findings are based on a single country and may not be generalizable to other jurisdictions. While this criticism can be directed at any within-country study, we note that South Africa has a common law tradition, strong outside investor rights, and high accounting quality. For example, Leuz, Nanda, and Wysocki (2003) find that out of 31 countries, South Africa has the fifth most transparent earnings (i.e., least earnings management), following the US, Australia, Ireland, and Canada. More recently, South Africa was ranked first in terms of strength of auditing and reporting standards, second in terms of

protection of minority shareholders' interests, and third in terms of the efficacy of corporate boards out of 144 countries in the 2014-2015 World Economic Forum Global Competitiveness Report (WEF, 2015).

Our findings should be of interest to firms, investors, regulators, and the IIRC as it suggests that the integrated reporting model is associated with positive economic benefits, even when it is mandated. Our results suggest that these benefits arise not only from a more holistic and comprehensive presentation of information but, perhaps more importantly, from changes in the decision-making processes within firms.

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Appendix

Variable definitions

Variable	Definition (data from Compustat and Datastream unless stated otherwise)
Dependent variables	
Bid_Ask	Bid-ask spread which is calculated as the natural logarithm of the median value of daily (*Ask* – *Bid*) / ((*Ask* + *Bid*) / 2) measured over the period spanning month -9 to month +3 relative to a firm's fiscal year-end. *Ask* and *Bid* are the daily closing ask and bid prices, respectively, obtained from the McGregor BFA database.
TobinQ	Market-to-book ratio of total assets calculated as total assets minus total common equity plus common shares outstanding at year-end multiplied with share price three months after the end of the financial period, divided by total assets.
EFCF	Expected future cash flow which is the terminal value (target price) from IBES discounted using *COC* (defined below).
COC	Cost of equity capital measured as the average internal rate of return (*R*) based on the approach by Botosan and Plumlee (2002). $P_t = (1 + R)^{-1}(E_t[D_{t+1}]) + (1 + R)^{-1}(E_t[P_{t+1}])$ where P_t is the stock price, *R* is the implied cost of equity capital, $E_t[\,]$ denotes market expectation based on the information available in year t, D_{t+1} is the dividends in year t+1, P_{t+1} is the target price at the end of t+1. Stock prices and analyst forecasts are measured as of month +3 after the fiscal year-end, consistent with the calculations for compute *TobinQ* and *Bid_Ask*.
Variable of interest	
IRQ	Integrated report quality measured as the annual decile rank of the EY Excellence in Integrated Reporting awards scores.
Control variables in all models	
Gov	Corporate governance score calculated as the average of board function (*CGBF*), board structure (*CGBS*), compensation policy (*CGCP*) and shareholder right (*CGSR*) scores from Asset 4.
CSRPerf	Corporate social responsibility performance score calculated as the average of the environmental (*ENVSCORE*) and the social performance score (*SOCSCORE*) from the Asset 4 database.
LowAQ	Low accounting quality measured by the annual decile rank of the fraction of the frequency of small earnings surprises from years *t*-5 to *t*-1. A small earnings surprise is where the difference between net income in year *t* and year *t*-1, scaled by total assets at the end of year *t-2*, is between 0 and 0.025.
Complex	Firm complexity measured as the average decile rank of *earnings volatility*, *number of subsidiaries* and *return volatility*. *Earnings volatility* is measured as the natural logarithm of the standard deviation of income before extraordinary items per share from years *t*-5 to *t*-1. *Number of subsidiaries* of a firm is from the McGregor BFA database. *Return volatility* is measured as the standard deviation of daily stock returns over *t*-1.
MFDisc	Overall disclosure quality measured by management forecast disclosure, computed as the product of *Supplier*, *Frequency* and *Precision*. Management forecast data is from the Capital IQ Key Developments database. *Supplier* equals 1 if a firm issued at least one management forecast during the current

	and preceding two financial periods, and 0 otherwise. *Frequency* is number of management forecasts issued by a firm during the current and preceding two financial periods. *Precision* is the average precision of management forecasts issued by a firm during the current and preceding two financial periods. Forecast precision equals 1 for general impression forecasts, 2 for minimum and maximum forecasts, 3 for range forecasts and 4 for point forecasts.
Size	Size measured as the natural logarithm of market capitalization at the beginning of the year.
Other control variables (bid-ask model)	
Loss	Loss indicator variable which is coded 1 if income before extraordinary items is negative and 0 otherwise.
BTM	Book-to-market ratio of equity calculated as the book value of common shareholders' interest in the firm, divided by the number of common shares outstanding multiplied by the share price at the end of the year.
Other control variables (Tobin's Q model)	
AT_Gr	Asset growth measured as the one-year change in total assets scaled by lagged total assets.
Div	Indicator variable coded 1 if the firm declared or paid a dividend in the current year and 0 otherwise.
IB	Income before extraordinary items scaled by total assets.
Lev	Leverage calculated as the ratio of total debt to the sum of total debt and the book value of common shareholders' interest in the firm.
Other control variables (EFCF model)	
Accr	Accruals calculated as the difference between net income before extra-ordinary items and preference dividends and net cash flow from operating activities, scaled by total assets.
RevGr	Revenue growth measured as the one-year change in revenues, scaled by lagged revenue growth.
Other control variables (cost of capital model)	
Beta	Obtained from a firm-specific CAPM regression over the past year. *Beta* is winsorized between 0 and 4.
Disp	Natural logarithm of the standard deviation of the EPS forecast for period *t* divided by the consensus EPS forecast for period *t*.
FcBias	The one-year-ahead analyst earnings forecast error (consensus minus actual EPS) divided by the absolute value of actual EPS.
Lev	As defined above.
DuPont variables	
ATO	Asset turnover measured as the ratio of revenue to beginning of period book value of assets.
PM	Profit margin measured as the ratio of income before extraordinary items to revenue.
ROA	Return on assets calculated as the ratio of income before extraordinary items to lagged assets.
ROE	Return on equity measured as the ratio of income before extraordinary items to lagged book value of common equity.
AT_Gr	As defined above.

Table 1
Sample.

Panel A: Sample selection		
	Firms	Firm-years
EY observations (3 years x 100 firms per year)	112	300
No Compustat coverage	(3)	(10)
Missing ASSET4 data items	(8)	(44)
Other missing data items	(9)	(22)
Sample: Tobin's Q and Bid-Ask	92	224
No IBES coverage for target price forecasts	(25)	(61)
Sample: Cost of capital and Expected future cash flows	67	163

Panel B: Industry composition		
GICS sector	Firm-years	%
Energy	7	3.13
Materials	55	24.55
Industrials	25	11.16
Consumer (discretionary)	27	12.05
Consumer (staples)	34	15.18
Health care	8	3.57
Financials	59	26.34
Information technology	3	1.34
Telecommunication services	6	2.68
Final sample: Tobin's Q and Bid-Ask	224	100.00

Table 2
Descriptive statistics.

Panel A: Distribution of raw EY scores

	Mean %	Median %	Std. dev. %	Min. %	Max. %
2011					
EY sample (n = 100)	58.33	59.90	16.77	24.85	90.30
Our sample (n = 65)	61.03	61.01	16.38	25.25	90.30
2012					
EY sample (n = 100)	49.79	51.41	15.58	15.00	78.55
Our sample (n = 83)	50.49	52.61	14.87	15.00	78.55
2013					
EY sample (n = 100)	49.49	48.76	16.51	16.14	75.92
Our sample (n = 76)	48.80	47.58	16.20	17.52	75.92

Panel B: Distribution of regression variables

	Mean	P25	Median	P75	Std. dev.
Bid_Ask	-5.97	-6.29	-6.00	-5.64	0.53
TobinQ	1.81	1.11	1.42	2.15	1.09
EFCF	4.23	3.54	4.24	4.95	1.08
COC	0.17	0.07	0.14	0.24	0.16
IRQ	4.50	2.00	5.00	7.00	2.85
Gov	54.19	43.91	55.25	65.32	15.75
CSRPerf	66.49	53.86	75.25	84.30	24.79
LowAQ	4.53	2.00	5.00	7.00	2.82
Complex	4.50	3.00	4.67	6.00	1.86
MFDisc	9.43	1.00	5.00	12.00	13.10
Accr	-0.02	-0.06	-0.02	0.15	0.09
AT_Gr	0.15	0.06	0.13	0.21	0.17
BTM	0.58	0.30	0.52	0.82	0.38
Div	0.80	1.00	1.00	1.00	0.40
IB	0.07	0.03	0.06	0.11	0.08
Lev	0.29	0.13	0.25	0.40	0.21
Loss	0.08	0.00	0.00	0.40	0.28
Rev_Gr	0.16	0.03	0.12	0.22	0.29
Size	10.27	9.30	10.03	10.92	1.24

The table sets out descriptive statistics for all the variables used in the regression analysis for the sample period from 2011 to 2013. The sample includes 224 firm-year observations for 92 firms, except for the *COC* sample (the *EFCF* sample) which includes 163 (164) firm-year observations for 67 (67) firms. All of the variables are defined in the Appendix.

Table 3
Correlations.

	IRQ	*Gov*	*CSRPerf*	*LowAQ*	*Complex*	*MFDisc*	*AT_Gr*	*Div*	*IB*	*Lev*	*BTM*	*Loss*	*Size*
IRQ		0.45***	0.56***	0.01	0.33***	0.31***	-0.20***	0.02	-0.02	0.07	-0.05	0.10	0.33***
Gov	0.42***		0.39***	-0.07	0.30***	0.44***	-0.28***	0.00	-0.11	0.01	0.04	0.17***	0.28***
CSRPerf	0.54***	0.34***		0.09	0.53***	0.17***	-0.27***	0.07	-0.15**	0.13**	-0.03	0.16**	0.46***
LowAQ	0.01	-0.08	0.08		-0.26***	-0.21***	0.07	-0.21***	-0.12*	0.29***	-0.25***	-0.11*	0.01
Complex	0.33***	0.31***	0.52***	-0.27***		0.40***	-0.21***	-0.01	-0.08	-0.11*	0.17***	0.23***	0.49***
MFDisc	0.34***	0.44***	0.29***	-0.24***	0.49***		-0.27***	-0.04	-0.20***	-0.08	0.25**	0.30***	0.23***
AT_Gr	-0.14**	-0.31***	-0.23***	0.05	-0.18***	-0.18***		0.10	0.12*	0.11	-0.19***	-0.33***	-0.19***
Div	0.02	0.01	0.00	-0.22***	0.00	-0.02	0.17***		0.28***	-0.04	-0.18***	-0.09	0.04
IB	-0.12*	-0.13**	-0.17***	-0.08	-0.14**	-0.18***	0.22***	0.38***		-0.35***	-0.50***	-0.49***	0.09
Lev	0.05	-0.05	0.16***	0.27***	-0.01	-0.12*	0.12*	0.01	-0.31***		-0.02	0.13**	0.03
BTM	-0.03	0.02	-0.03	-0.22***	0.18***	0.15**	-0.19***	-0.23***	-0.52***	0.04		0.30***	-0.13**
Loss	0.10	0.18***	0.14**	-0.09	0.25***	0.22***	-0.35***	-0.09	-0.48***	0.12*	0.20***		0.05
Size	0.35***	0.26***	0.51***	0.02	0.49***	0.26***	-0.14**	0.02	0.04	0.02	-0.12*	0.06	

The table sets out Pearson (Spearman) correlations above (below) the diagonal for the variables used in the regression analysis for the sample period from 2011 to 2013. *, ** and *** denote significance at a 10%, 5% and 1% level respectively based on a two-tailed test. The sample includes 224 firm-year observations for 92 firms. All of the variables are defined in the Appendix.

Table 4
Changes in integrated reporting quality deciles.

	TobinQ and *Bid_Ask* sample	
Decile changes	Firm-years	%
Five deciles down	1	0.76
Four deciles down	3	2.27
Three deciles down	6	4.55
Two deciles down	7	5.30
One decile down	27	20.45
Unchanged	41	31.06
One decile up	18	13.64
Two deciles up	14	10.61
Three deciles up	11	8.33
Four deciles up	2	1.52
Five deciles up	1	0.76
Six deciles up	1	0.76
	132	100.00

This table shows the movement in our independent variable of interest, integrated report quality (*IRQ*), for the changes regressions.

Table 5
Regression of liquidity on integrated reporting quality: levels and changes.

		Bid_Ask		*ΔBid_Ask*
Variables	Predicted sign	Coefficient (*t*-stat.)	Variables	Coefficient (*t*-stat.)
IRQ	−	-0.028**	*ΔIRQ*	-0.023***
		(-2.170)		(-3.249)
BTM		0.022	*ΔBTM*	0.299***
		(0.274)		(3.422)
Size		-0.320***	*ΔSize*	-0.214
		(-9.358)		(-0.965)
Gov		0.003	*ΔGov*	0.001
		(1.563)		(0.380)
CSRPerf		-0.003**	*ΔCSRPerf*	0.001
		(-2.068)		(0.054)
LowAQ		-0.009	*ΔLowAQ*	0.018**
		(-1.250)		(2.023)
Complex		0.028**	*ΔComplex*	0.055
		(1.994)		(1.292)
MFDisc		-0.003	*ΔMFDisc*	-0.004*
		(-1.375)		(-1.696)
Loss		0.022	*Loss* indicator variables	Yes
		(0.271)		
Industry fixed effects		Yes	Industry fixed effects	Yes
Year fixed effects		Yes	Year fixed effects	Yes
Adjusted R^2		0.684	Adjusted R^2	0.180
N		224	*N*	132

The levels (changes) sample includes 224 (132) firm-year observations for 92 (79) firms. See the Appendix for variable definitions. All variables, excluding indicator variables, *IRQ, LowAQ, Complex* and *MFDisc*, are winsorized at the 1 and 99 percentiles. Standard errors are clustered by firm and by year based on bootstrapping methods using 10,000 iterations. *, ** and *** denote significance at a 10%, 5% and 1% level respectively based on a two-tailed test, except for *IRQ* which is based on a one-tailed test.

Table 6
Regression of Tobin's Q on integrated reporting quality: levels and changes.

		TobinQ		*ΔTobinQ*
Variables	Predicted sign	Coefficient (*t*-stat.)	Variables	Coefficient (*t*-stat.)
IRQ	+	0.036**	*ΔIRQ*	0.011**
		(2.256)		(2.316)
AT_GR		-0.097	*ΔAT_GR*	0.001
		(-0.721)		(0.013)
IB		8.999***	*ΔIB*	0.775
		(9.147)		(1.103)
Lev		0.121	*ΔLev*	0.278
		(0.521)		(0.829)
Size		-0.004	*ΔSize*	-0.192*
		(-0.071)		(-1.774)
Gov		0.005	*ΔGov*	0.001
		(1.497)		(0.468)
CSRPerf		-0.001	*ΔCSRPerf*	0.001
		(-0.225)		(0.155)
LowAQ		-0.013	*ΔLowAQ*	0.006
		(-0.690)		(0.292)
Complex		-0.053	*ΔComplex*	-0.026
		(-1.240)		(-0.542)
MFDisc		-0.004	*ΔMFDisc*	-0.003
		(-1.515)		(-0.994)
Div		-0.241**	*Div* indicator variables	Yes
		(-2.451)		
Industry fixed effects		Yes	Industry fixed effects	Yes
Year fixed effects		Yes	Year fixed effects	Yes
Adjusted R^2		0.702	Adjusted R^2	0.028
N		224	*N*	132

The levels (changes) sample includes 224 (132) firm-year observations for 92 (79) firms. See the Appendix for variable definitions. All variables, excluding indicator variables, *IRQ, LowAQ, Complex* and *MFDisc*, are winsorized at the 1 and 99 percentiles. Standard errors are clustered by firm and by year based on bootstrapping methods using 10,000 iterations. *, ** and *** denote significance at a 10%, 5% and 1% level respectively based on a two-tailed test, except for *IRQ* which is based on a one-tailed test.

Table 7
Regression of expected future cash flows on integrated reporting quality: levels and changes.

		EFCF		*ΔEFCF*
Variables	Predicted sign	Coefficient (*t*-stat.)	Variables	Coefficient (*t*-stat.)
IRQ	+	0.047*	*ΔIRQ*	0.004***
		(1.583)		(2.868)
Rev_Gr		0.307	*ΔRev_Gr*	0.012
		(1.421)		(0.332)
Accr		0.405	*ΔAccr*	0.151
		(0.533)		(1.498)
Size		0.416***	*ΔSize*	0.152*
		(4.536)		(1.712)
Gov		-0.008	*ΔGov*	-0.000
		(-0.943)		(-0.027)
CSRPerf		-0.009*	*ΔCSRPerf*	0.000
		(-1.922)		(0.233)
LowAQ		0.039	*ΔLowAQ*	0.003
		(0.992)		(0.836)
Complex		0.278***	*ΔComplex*	0.012***
		(3.469)		(3.836)
MFDisc		-0.005	*ΔMFDisc*	-0.003
		(-0.452)		(-1.123)
Industry fixed effects		Yes	Industry fixed effects	Yes
Year fixed effects		Yes	Year fixed effects	Yes
Adjusted R^2		0.538	Adjusted R^2	0.274
N		163	*N*	95

The levels (changes) sample includes 163 (95) firm-year observations for 67 (59) firms. See the Appendix for variable definitions. All variables, excluding indicator variables, *IRQ, LowAQ, Complex* and *MFDisc*, are winsorized at the 1 and 99 percentiles. Standard errors are clustered by firm and by year based on bootstrapping methods using 10,000 iterations. *, ** and *** denote significance at a 10%, 5% and 1% level respectively based on a two-tailed test, except for *IRQ* which is based on a one-tailed test.

Table 8
Regression of cost of capital on integrated reporting quality: levels and changes.

		COC		*ΔCOC*
Variables	Predicted sign	Coefficient (*t*-stat.)	Variables	Coefficient (*t*-stat.)
IRQ	−	-0.013**	*ΔIRQ*	-0.003
		(-1.672)		(-0.171)
Beta		0.036	*ΔBeta*	0.038
		(0.934)		(0.381)
Disp		0.000	*ΔDisp*	-0.034
		(0.078)		(-1.174)
FcBias		0.005	*ΔFcBias*	0.002
		(0.177)		(0.098)
Lev		0.152	*ΔLev*	1.018
		(1.620)		(1.615)
Size		-0.041*	*ΔSize*	-0.023
		(-1.906)		(-0.174)
Gov		-0.000	*ΔGov*	0.008
		(-0.010)		(1.063)
CSRPerf		0.001	*ΔCSRPerf*	-0.001
		(1.203)		(-0.304)
LowAQ		0.007	*ΔLowAQ*	0.036
		(1.386)		(0.827)
Complex		0.033	*ΔComplex*	-0.014
		(1.639)		(-0.708)
MFDisc		0.002*	*ΔMFDisc*	0.001
		(1.692)		(0.206)
Industry fixed effects		Yes	Industry fixed effects	Yes
Year fixed effects		Yes	Year fixed effects	Yes
Adjusted R^2		0.337	Adjusted R^2	0.029
N		163	*N*	95

The levels (changes) sample includes 163 (95) firm-year observations for 67 (59) firms. See the appendix for variable definitions. All variables, excluding indicator variables, *IRQ*, *LowAQ*, *Complex* and *MFDisc*, are winsorized at the 1 and 99 percentiles. Standard errors are clustered by firm and by year based on bootstrapping methods using 10 000 iterations. *, ** and *** denote significance at a 10%, 5% and 1% level respectively based on a two-tailed test, except for *IRQ* which is based on a one-tailed test.

Table 9
DuPont analysis of intertemporal changes.

	ΔATO_{t+1}	ΔPM_{t+1}	ΔROA_{t+1}	ΔROE_{t+1}
ΔIRQ_t	0.008***	0.000	0.003***	0.008***
	(2.617)	(0.171)	(2.597)	(3.775)
PM_t	-0.076	-0.199***	-0.182***	-0.328***
	(-0.252)	(-2.964)	(3.620)	(-2.780)
ATO_t	-0.030**	0.001	-0.004	-0.016*
	(-2.080)	(0.135)	(-1.240)	(-1.870)
ΔPM_t	0.326	-0.814***	-0.222***	-0.471***
	(0.787)	(-11.046)	(-4.620)	(-5.211)
ΔATO_t	-0.004	0.062	0.023	0.072
	(-0.043)	(1.052)	(0.993)	(1.207)
AT_GR_t	-0.718***	0.096	-0.009	-0.051
	(-7.932)	(1.010)	(-0.335)	(-0.897)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.234	0.352	0.336	0.257
N	98	98	98	98

The sample includes 98 firm-year observations for 58 non-financial firms. See the Appendix for variable definitions. All variables, excluding indicator variables and ΔIRQ are winsorized at the 2.5 and 97.5 percentiles. Standard errors are clustered by firm and by year based on bootstrapping methods using 10 000 iterations. *, ** and *** denote significance at a 10%, 5% and 1% level respectively based on a two-tailed test, except for ΔIRQ which is based on a one-tailed test.