EVALUATING COMBINED ASSURANCE AS A NEW CREDIBILITY ENHANCEMENT TECHNIQUE

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EVALUATING COMBINED ASSURANCE AS A NEW CREDIBILITY ENHANCEMENT TECHNIQUE

Abstract

One of the challenges associated with emerging forms of external reporting is finding efficient and effective means to enhance the credibility of these reports (IAASB 2016). This study examines a novel credibility-enhancing mechanism, combined assurance (CA), where the credibility-enhancing processes of the internal auditor, the external auditor, and the effectiveness of risk management and internal controls and processes are publicly reported by the company (audit committee). We identify the most appropriate setting currently available (Integrated Reporting in South Africa) to examine whether there are benefits associated with communicating the details of CA within companies' integrated reports. We find that communicating the details of CA is beneficial in reducing both analysts' forecast errors and dispersion, and also in reducing the bid–ask spread for companies where the information environment is weaker. The implications of these findings for regulators, standard-setters, assurance providers and users of extended external reports are discussed.

Keywords: integrated reporting; assurance; combined assurance; analyst forecasts; bid–ask spreads; information asymmetry

INTRODUCTION

The evolving nature of corporate reporting to meet the increasing information requirements of report users (KPMG 2013, 2015, 2017) is accompanied by a significant demand for mechanisms that enhance the trust and credibility of the information contained in these new forms of external reports (IAASB 2016).[1] However, as identified by the IAASB (2016), there are a number of challenges to providing traditional assurance on these reports, including the development of suitable criteria, the maturity of reporting systems in organizations, the difficulties of providing assurance on both forward-looking and non-financial information, and the availability of independent assurers with the appropriate range of subject matter expertise.

These challenges to enhancing credibility are well illustrated when considering the new extended external reporting concept of Integrated Reporting (<IR>) (IIRC 2015; IAASB 2016; KPMG 2017).[2] By integrating financial and non-financial disclosures into one report, <IR> seeks to benefit report users by providing value-relevant information to inform their decision making as well as presenting the information in an accessible, clear structure to assist the acquisition and analysis of information. However, as many content elements of <IR> are of a qualitative and forward-looking nature (e.g. strategy, business model, risks and opportunities, future outlooks), the practice of <IR> is susceptible to "green washing" (Barth, Cahan, Chen, and Venter 2017). As a result,

[1] 93 percent of the largest corporations (G250) and around 75 percent of the largest 100 companies in each of 49 countries (N100) disclose additional (predominantly non-financial) information in publicly available reports (including corporate social responsibility (CSR) reports, greenhouse gas reports, and, more recently, integrated reports) or their annual reports. Also, 67 percent of the G250 and 45 percent of the N100 obtain independent assurance on this information (KPMG 2017).

[2] <IR> aims to provide a "concise communication about how an organization's strategy, governance, performance and prospects, in the context of its external environment, lead to the creation of value over the short, medium and long term" (International Integrated Reporting Council (IIRC) 2013).

enhancing the credibility of the information content contained in new reporting models like <IR> presents an urgent yet challenging question to be answered.

In response, an innovative credibility-enhancement mechanism has emerged, namely combined assurance (CA). Often referred to as "Three lines of defense", CA aims to "optimize the assurance coverage obtained from management, internal assurance providers, and external assurance providers … ensuring that significant risks facing the company are adequately addressed" (IODSA 2009, 62).[3] Under this approach, the audit committee (or governing body) form and communicate their conclusion on the reliability of reported information, outlining their reliance on external and internal assurance, and the effectiveness of risk management and internal controls and processes. A formal statement of this type[4] from the governing body or audit committee, explaining why the committee or board believe they are in a position to accept responsibility for the information contained in the report, may be beneficial in improving the relevance and reliability of reported information, as well as being a potentially more cost-effective credibility-enhancing mechanism than independent assurance (Simnett, Zhou, and Hoang 2016).

While the claimed benefits of enhancing user confidence and cost-effectiveness are intuitively appealing, whether such an innovative practice is considered by the users of integrated reports and has an impact on their decision making is an empirical question, the answer to which serves as timely and valuable evidence to report preparers, users, and regulators. So far, little is known about whether the implementation and

[3] The King IV Report (IODSA 2016) continues to develop the concept of combined assurance and recognizes the following assurance providers: line functions that own and manage risk and opportunity; specialist functions that facilitate and oversee risk and opportunity; internal assurance providers; external assurance providers; and the governing body, audit, and regulatory inspectors.
[4] Refer to Appendix 1 for an example of a combined assurance report.

communication quality[5] of CA has any impact on the decision-making process of report users.

This study utilizes the best available current setting and provides empirical evidence as to whether the implementation and communication quality of CA is beneficial to the information environment by helping to reduce information asymmetry. We adopt commonly used proxies from previous literature to measure information asymmetry, namely analysts' forecast errors, analysts' forecast dispersion, and bid–ask spread. We do this while controlling for the disclosure quality of the integrated report, and the issuance of corporate social responsibility (CSR) reports. Therefore, the study also extends the growing literature on the capital market response to <IR> (Serafeim 2015; Barth et al. 2017; Zhou, Simnett, and Green 2017), by directly examining mechanisms aimed at enhancing the credibility of integrated reports.

We reviewed the possible research settings around the world, and while CA is gaining traction (IIA 2013; EY 2013; Deloitte 2014; PwC 2016; KPMG 2016), we find South Africa to be the most appropriate context in which to examine our research questions for three main reasons: (1) the extensive disclosure of <IR> by South African companies listed on the Johannasberg Stock Exchange (JSE) over a number of years, with available analysis of the quality of the information content of these <IR>; (2) the concept of CA being encouraged and gaining traction there since 2009, alongside the introduction of <IR>; and (3) similar to the practice of <IR>, there being significant variations in the incidence and observed communication quality of CA. Hence, South Africa provides the most appropriate setting where researchers can observe both time-series and cross-

[5] Although King III recommends the implementation of CA, there is no guidance provided as to how best to communicate the practice to report users. As a result, there is substantial variation in the length and depth of the communication on CA, ranging from a one sentence mention of its existence, to a report outlining the aims, model specification, and relevant conclusions based on CA.

sectional variations in the implementation and communication quality of this voluntary novel cost-efficient credibility-enhancing mechanism.[6]

Using the top 100 companies[7] by market capitalization listed on the Johannesburg Stock Exchange (JSE) between 2009 and 2015, we identify an increasing adoption of CA during our sample period. Our analyses show that both the implementation and the communication quality of CA significantly reduce analysts' forecast errors and dispersion, suggesting that this new cost-efficient credibility-enhancing mechanism is useful to analysts in their earnings forecasting tasks in that they make more accurate forecasts as well as having fewer disagreements.[8] Further, we observe that the communication of CA reduces the bid–ask spread for companies for which the information environment is weaker, proxied by the number of analysts' following. Our results are obtained after controlling for the disclosure quality of the integrated report, and the issuance of CSR reports. This provides evidence that CA adds additional value to the <IR> disclosures for capital market participants and helps to further reduce information asymmetry for reporting companies. The study directly responds to current calls for more research on credibility enhancement techniques for emerging forms of external reporting (Cohen and Simnett 2015; IAASB 2016).

The results are of interest to various parties, including companies seeking to implement ways to enhance the credibility of their integrated reports, assurance practitioners

[6] In August 2013 the UK government published new regulations for the strategic report, with the principles very close to <IR> (FRC 2014). This new report sits within the annual report, and is also accompanied by a report to shareholders from the audit committee (FRC 2017). However, as we currently do not have sufficient experience with strategic reporting in the UK, and the audit committee report may not necessarily include the three lines of defence, South Africa was a more appropriate research setting.

[7] We are restricted to the Top 100, as we use the rankings from EY as one of our measures to control for the quality of integrated reports, and EY only ranks the Top 100 companies (EY 2016). These top 100 companies, however, account for approximately 95 percent of the total market capitalization of the JSE at 31 December 2015.

[8] However, we do note that the result on analysts' forecast accuracy needs to be interpreted with caution as it appears to be sensitive to certain conditions as detailed in our sensitivity analyses.

aiming to provide higher assurance quality and more effective assurance communication, and regulators and standard-setters requiring evidence of cost-effective credibility-enhancing mechanisms for this extended range of reported information.

The rest of this paper is organized as follows. The next section discusses the background to CA and provides a literature review, followed by the development of the hypotheses. We then present the research methodology and results. The final section summarizes and concludes the study.

LITERATURE REVIEW AND BACKGROUND TO COMBINED ASSURANCE

This section firstly reviews the relevant literature on the relationship between information quality, auditing/assurance, and information asymmetry. It then discusses the current research undertaken on <IR> and the emergence and development of CA.

Information Quality, Auditing/Assurance, and Information Asymmetry

Increased quality of public disclosures decreases information asymmetry by reducing informed investors' incentives to look for and trade on private information, and by reducing uninformed investors' likelihood of price protecting and exiting the market (Verrecchia 2001; Brown and Hillegeist 2007; Leuz and Wysocki 2016). A negative association between <IR> quality and information asymmetry is often found in archival studies (Healy, Hutton, and Palepu 1999; Leuz and Verrecchia 2000; Heflin, Shaw, and Wild 2005; Brown and Hillegeist 2007; Barth et al. 2017).

As corporate reports, including those containing non-financial information such as integrated reports, are prepared by the company's management and prone to agency problems, information asymmetry between report users and management can cause users to question the quality and credibility of reported information (Adams 2004; O'Dwyer and Owen 2007; Adams and Larrinaga-González 2007; Cohen and Simnett

2015). This skepticism may prevent report users, including investors and analysts, from fully incorporating the information into their decision making.

In accordance with the information hypothesis (Wallace 1980), independent audit or assurance can improve the credibility of such corporate reports and reduce information asymmetry for capital market participants. The credibility-enhancing framework presented by Mercer (2004) also identifies both internal and external assurance among the mechanisms that can improve the perceived reliability of underlying disclosures, especially when management has incentives to misreport. It is well established that audit quality is a determinant and component of reporting quality (DeFond and Zhang 2014; Gaynor, Kelton, Mercer, and Yohn 2016) and is valued by capital market participants (Mansi, Maxwell, and Miller 2004; Khurana and Raman 2004; Chen, Chen, Lobo, and Wang 2011).

CSR assurance is a new assurance service (O'Dwyer, Owen, and Unerman 2011), which has been proposed in the literature as a possible solution to the credibility gap in CSR reports (Manetti and Becatti 2009). Counter arguments, however, assert that CSR assurance can undermine credibility because it is seen as symbolic or decoupled from organizational processes (Perego and Kolk 2012). Archival evidence finds that CSR assurance has a negative association with cost of capital and analyst forecast errors (Dhaliwal, Li, Tsang, and Yang 2011; Casey and Grenier 2015), suggesting that analysts and other capital market participants value and react to the credibility-enhancing effect of independent assurance. Experimental evidence also finds that analysts perceive CSR information as more reliable when it is independently assured (Coram, Monroe, and Woodliff 2009; Pflugrath, Roebuck, and Simnett 2011). However, having independent assurance on CSR information by itself may not be

sufficient to elicit an impact on analysts' decision making, as the effect of CSR assurance on analysts' judgments is context specific (for example, industry of reporter and location of analysts, as identified by Pflugrath et al. 2011). Furthermore, the decision to obtain assurance is also context and firm-specific, as Ballou, Casey, Grenier, and Heitger (2012) suggest that while CSR assurance can foster strategic integration, not all firms obtain it.

<IR> and Associated Credibility-enhancing Mechanisms

By integrating financial and non-financial information, <IR> seeks to provide value-relevant information in a decluttered and well-connected manner to assist report users in information acquisition, analysis, and decision making. There is empirical evidence that <IR> leads to reduced information asymmetry when assessing companies' future performance. Barth et al. (2017) find that <IR> disclosure quality is positively associated with liquidity, expected and realized future cash flows, and higher investment efficiency, supporting the dual purpose of improved external information and better internal decisions. Zhou et al. (2017) focus on the external information benefit of <IR> and provide evidence that integrated reports provide more value-relevant information to the capital market, and therefore <IR> disclosure quality is negatively associated with analysts' forecast errors and cost of capital. These findings suggest that <IR> can benefit the information environment and reduce information asymmetry among investors.

However, <IR> will not achieve its purposes unless it is, and is perceived to be, credible. Credibility-enhancing mechanisms improve users' confidence in making informed decisions based on the information contained in the integrated report. In fact, the credibility issue of <IR> has been emphasized by the IIRC. Although the <IR>

framework (2013) does not include a requirement for independent assurance, the IIRC acknowledges in the framework that the credibility of integrated reports should be enhanced by mechanisms such as external assurance, robust internal control and reporting systems, stakeholder engagement, internal audit, and responsibility statements by the governing body (IIRC 2014; Simnett et al. 2016).

When reporting and governance processes relating to all the resources and relationships significant to the value-creation activities of a company (including both financial and non-financial information) are integrated into one report in accordance with <IR> principles, it may be cost prohibitive to obtain traditional independent external assurance on each of the different subject matters contained in integrated annual reports.[9] Whilst it may be possible to obtain separate assurance on specific components of an integrated report (for example, the CSR report is commonly assured), assuring integrated reports by just combining the financial audit and non-financial assurance is not sufficient, given the integrated nature of the reports (Simnett et al. 2016). Further, separate assurance on subsets of the entire set of resources and relationships could create difficulties in optimizing assurance efficiency and effectiveness, and there are opportunities to coordinate all credibility-enhancing mechanisms to achieve more effective and efficient assurance coverage (IIRC 2015; IAASB 2016).

The concept of CA as a novel credibility-enhancing mechanism of <IR> aims to address these challenges by coordinating the activities of various parties that contribute to enhancing the credibility of <IR>, including management and internal and external auditors, in order to avoid silos, deliver an appropriate assurance coverage, and address significant risks to the business. The concept of CA is gaining traction from both

[9] There is also the practical difficulty of finding an assurance provider with the required expertise to provide assurance over all the capitals (resources) covered in integrated reports, and their connectivity.

internal and external auditors, with the Institute of Internal Auditors (IIA 2013; Huibers 2015), and each of the Big Four firms (EY 2013, Deloitte 2014, PwC 2016, and KPMG 2016) communicating the benefits of implementing CA for more effective and efficient assurance and risk management. However, to the best of our knowledge, there has been no published empirical research on the effect of such credibility-enhancing mechanisms. Our study fills the void by providing the first empirical evidence on the effect of this novel credibility-enhancing technique of <IR>.

HYPOTHESIS DEVELOPMENT

CA and Analysts' Forecast Accuracy

Analyst forecasts provide important input for the capital market. Analysts' forecasting ability is influenced by a number of factors, including the quality (relevance and reliability) of the information disclosed by companies. Evidence suggests that the disclosure of high quality value-relevant information assists analysts in predicting earnings in a more informed manner, which in turn improves accuracy and reduces the dispersion of their forecast (Lang and Lundholm 1996; Williams 1996; Hope 2003; Kothari, Li, and Short 2009; Lehavy, Li, and Merkley 2011; Barth et al. 2017)[10].

By focusing on the value-creation process of companies and encompassing financial and non-financial information, <IR> has the potential to provide value-relevant information presented in a concise and well-connected manner to facilitate the information acquisition and analysis process of analysts during their earnings forecasting tasks. Empirical evidence has found that information contained in an

[10] Recent evidence from practice shows a growing number of financial analysts are incorporating environmental, social, and governance factors in their assessment of the fundamental value of companies (Global Sustainable Investment Alliance 2014). The empirical findings from both the behavioral and archival research suggest that greater consideration of non-financial information results in more accurate forecasts of firm performance.

integrated report is value-relevant and has an incremental effect over existing corporate reporting in improving analysts' forecast properties (Barth et al. 2017; Zhou et al. 2017).

However, the credibility of reported information could have a significant impact on how much analysts rely on such information (Lang and Lundholm 1996; Williams 1996). Similarly, Maines et al. (2002) suggest that for non-financial information to be useful for decision making, it should be both relevant and reliable. Previous research reveals that high quality audits increase reporting reliability by reducing both intentional and unintentional measurement errors (Becker, DeFond, Jiambalvo, and Subramanyam 1998; Watkins, Hillison, and Morecroft 2004) and allows investors/analysts to make a more precise estimate of firms' value (Titman and Trueman 1986). Not only do users' perceptions of reporting reliability increase with audit quality (Teoh and Wong 1993; Krishnan 2003; Khurana and Raman 2004), but users in the form of analysts make better decisions in the form of more accurate and less dispersed forecasts when audit quality is high (Behn, Choi, and Kang 2008). Analysts would likely consider a high-quality audit reliable because it reduces both intentional and unintentional reporting errors.

Integrated reports incorporate both financial and non-financial information and there are significant challenges associated with finding cost-effective ways to enhance the credibility of such information (IAASB 2016). CA coordinates assurance activities to maximize coverage and efficiency. As companies communicate through their CA report on the credibility-enhancing mechanisms within the company, and how these mechanisms are coordinated, report users, including analysts, have more confidence that an appropriate assurance coverage has been delivered in an integrated, effective, and

cost-efficient manner. When analysts' confidence in the credibility of information is increased by CA, they can accelerate the incorporation of value-relevant information contained in an integrated report into their forecasts, which may result in fewer errors. It is therefore expected that the communication quality of CA will be associated with more accurate analysts' forecasts, as formulated in H1:

H1: Companies with enhanced communication quality of CA will have lower analysts' earnings forecast errors.

CA and Analysts' Earnings Forecast Dispersion and Bid–Ask Spread

As discussed in the literature review, a negative association between increased reporting quality and information asymmetry is often found in archival studies. Analysts' forecast dispersion and the bid–ask spread are two of the mostly commonly used proxies for information asymmetry (Leuz and Verrecchia 2000; Daske, Hail, Leuz, and Verdi 2008; Lang, Lins, and Maffett 2012; Daske, Hail, Leuz, and Verdi 2013; Peters and Romi 2015).

Analysts' forecast dispersion reflects uncertainty about the firm's information environment (Imhoff and Lobo 1992; Payne and Robb 2000) and greater dispersion indicates less agreement among analysts due to the inability or unwillingness of some analysts to fully and objectively gather and process information (Herrmann and Thomas 2005). Analysts with more precise information regarding future earnings are more likely to be in agreement, and thus the forecast dispersion should be smaller (Herrmann and Thomas 2005; Behn et al. 2008). As such, analysts' forecast dispersion is expected to be high when the uncertainty is high, which could be due to a lack of publicly available value-relevant information, and/or due to a high level of skepticism among analysts about the quality of publicly available information (Lang and Lundholm 1996). In

particular, analysts' disagreement spikes when the difference in their assessment of uncertainty is large (Cujean and Hasler 2017).

As <IR> makes more value-relevant information publicly available, the uncertainty due to a lack of publicly available information is reduced. Nonetheless, as discussed earlier, as a new reporting model containing various types of information of a qualitative and forward-looking nature, <IR> is susceptible to "greenwashing". This may prevent analysts relying on information contained in the integrated report, even if it is value-relevant. The communication of CA in an integrated report adds credibility to the information, which helps to alleviate uncertainty caused by skepticism as to the report's credibility/quality of information, prompting analysts to incorporate the information provided into their earnings forecasting tasks. As the level of uncertainty in the information reduces, and as analysts use a more homogenous set of information, the consensus among analysts is expected to increase, leading to less dispersed forecasts. Therefore, a negative association is expected between the communication quality of CA and the dispersion of analysts' forecasts.

The bid–ask spread is another common measure for information asymmetry and stock liquidity (Leuz and Verrecchia 2000; Daske et al. 2008; Lang et al. 2012; Daske et al. 2013). We use the bid–ask spread to complement the dispersion of analysts' forecast analyses, as bid–ask spread is reflective of general investors' trading behavior in response to information asymmetry. It is posited that when reporting quality increases and more relevant information becomes public, investors are less likely to be prone to adverse selection, and are therefore less likely to price protect or exit the market to avoid trading with more informed investors (Brown and Hillegeist 2007; Leuz and Wysocki 2016). Barth et al. (2017) find that <IR> quality is negatively associated with

the bid–ask spread, demonstrating that <IR> provides relevant information that reduces information asymmetry and makes investors more willing to trade. However, again, if the integrated report is not perceived to be credible, the benefit of <IR> in reducing information asymmetry and improving stock liquidity will be minimal as investors will not have confidence in using the information. The description of CA in companies' integrated reports provides comfort to investors as to the credibility and quality of the report, which makes them more willing to trade in these companies' stocks at a reasonable price, and therefore reduces the bid–ask spread. H2 therefore predicts that:

H2: Companies with enhanced communication quality of CA will have lower analysts' earnings forecast dispersion and lower bid–ask spreads.

Combined Assurance and the Company's Information Environment

Although the description and communication of CA could enhance analysts' and investors' confidence in the credibility and quality of integrated reports, the benefit may not be significant if the information contained in integrated reports does not constitute a major source of new information for decision-making purposes. The theoretical model by Merton (1987) asserts that the effect of higher quality disclosures is less significant when the company has more advanced information sharing mechanisms available. In the context of <IR>, Zhou et al. (2017) find that the benefit of improved disclosure in an integrated report is most significant when the information environment of companies is weaker and the benefit tends to diminish as the information environment improves, as companies may have other avenues through which to disseminate information.

As the effect of <IR> is expected to be less significant when the reporting company has a strong information environment, the effect of CA in enhancing the credibility of an integrated report is also expected to be context-specific. When the information

environment is strong, analysts and investors may rely on other mechanisms than CA to confirm claims made in integrated reports, or otherwise assess the credibility of the information produced. As a result, the benefit of CA as a credibility-enhancing mechanism may be less significant. However, when the information environment is limited, that is, when the integrated report serves as a major new information source of the company, the different ways of disclosing and communicating CA in an integrated report can generate significantly different perceptions among analysts and investors. Hence, the benefit of CA as a credibility-enhancing mechanism may be conditional on the information environment of the company. We thus examine the following hypothesis:

H3: The negative relationship between CA and analysts' forecast errors/analysts' forecast dispersion/bid–ask spreads will be less significant for those reporting companies with a large analyst following.

RESEARCH METHODOLOGY

Sample and Data

The sample for this study consists of the top 100 companies listed on the JSE by market capitalization, as of December 31 each year, from 2009 to 2015. Our sample is limited to the top 100 companies because we use the independent rankings of <IR> quality provided by EY as one of our measures to control for the quality of integrated reports, and EY only ranks the Top 100 companies (EY 2016). As outlined by Barth et al. (2017) who used the same rankings in their examination of the benefits of <IR>, the rankings provided by EY have the benefit of being independently rated by a panel of experts in corporate reporting, which focuses on the quality of the disclosure, specifically whether the integrated report gives readers a sense of the firm's strategy and value-creation process (Barth et al. 2017, 44). In addition, it is recognized that these top

100 companies account for approximately 95 percent of the total market capitalization of the JSE at 31 December 2015 (EY 2016).

The sample period starts from 2009 since CA was first recommended in 2009 in King III. We obtain annual fundamental data, market data, and exchange rate data from Global Compustat, analysts' forecast data from I/B/E/S, and bid–ask price information from Datastream. The final sample is 591/592/564 observations (131/121/116 unique companies) for analysts' forecast accuracy/dispersion/bid–ask spread analyses.[11] Table 1 lists the sample selection process.

[Insert Table 1 here]

Measuring Combined Assurance (CA)

The independent variables of interest to test our hypotheses are the implementation and communication quality of CA in the integrated report. We develop separate measures of the implementation and communication quality of CA. We first measure the implementation by identifying all companies that report the adoption of CA,[12] using a dichotomous variable (*CA_dummy*), which is coded as one if the company indicates that CA is in place and zero otherwise. The second measure is a continuous measure (*CA_qual)* that evaluates the communication quality of CA among those CA adopters from the following three elements:[13] (1) CA model description – How well is CA

[11] We lost some further observations for bid–ask spread analyses because the coverage of companies in I/B/E/S, from which we obtain analysts' forecasts data, differs from the companies covered in DataStream, from which we obtain the bid/ask prices.

[12] The existence of CA is identified by searching for communication about it in companies' annual reports. Some common wordings about the existence of CA include: "a combined assurance approach has been adopted", "the company has adopted a Combined assurance framework", "the Group follows an effective combined assurance model in which…". We also gained confidence that companies that do not disclose CA do not implement such models in practice by checking a sample of the companies that do not explicitly disclose CA in their annual reports and not finding any characteristics consistent with adopting CA practice (such as reference to lines of defence) in their corporate governance and risk management.

[13] The three elements that we use to capture the communication quality of CA are informed by the descriptions of CA in King III, the discussions of lines of defences from professional bodies such as the

described in the integrated report? (2) CA conclusion – Is there a conclusion made by the governing body on the basis of CA? and (3) CA presentation – Is information on CA presented in a self-contained manner or rather scattered through the integrated report? The coding framework used for *CA_qual* is included in Appendix 3, with the final value ranging between 0–3, reflecting an equal weighting[14] for each of the three elements.

To minimize potential subjectivity arising from the coding process, a 100 percent double coding process was employed to code each company's communication of CA against the coding framework in order to determine the communication quality of CA. Two independent coders applied the coding framework with high consistency. The initial agreement rate was 90.2 percent, and all disagreements were reconciled through rounds of discussion.[15] We use *CA_qual* in all our analyses and also report results using *CA_dummy* in the sensitivity analysis.

Research Model

The following OLS regression models are used to test H1 and H2 as in Dhaliwal et al. (2012) and Daske et al. (2008, 2013), with the addition of a list of non-financial information reporting variables to be explained later in this section:

$$FCERROR_{i,t+1} / FDISP_{i,t+1} = \beta_0 + \beta_1 CA\_qual_{i,t} + \beta_2 IR\_Qual_{i,t} + \beta_3 CSR_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 VAREARN_{i,t} + \beta_6 ANANO_{i,t} + \beta_7 FFIN_{i,t} + \beta_8 LOSS_{i,t} + \beta_9 HORIZON_{i,t} + \text{Year fixed effects} + \varepsilon_{i,t} \quad (1)$$

$$SPREAD_{i,t+1} = \beta_0 + \beta_1 CA\_qual_{i,t} + \beta_2 IR\_Qual_{i,t} + \beta_3 CSR_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 VAREARN_{i,t} + \beta_6 ANANO_{i,t} + \beta_7 FFIN_{i,t} + \beta_8 LOSS_{i,t} + \beta_9 BM + \beta_{10} LEV + \text{Year fixed effects} + \varepsilon_{i,t} \quad (2)$$

In order to test H3, we augment models (1) and (2) with the interaction term between CA (*CA_qual*) and the number of analysts following (*ANANO*).

Institute of Internal Auditors (2013), as well as the guidance from ISAE 3000 (2013) on the communication elements expected in a credibility-enhancing report.

[14] In sensitivity analyses, we separately analyze and report the effects of each component of CA.

[15] The Pearson/Spearman/Cronbach's Alpha/Standardized Cronbach's Alpha/Cohen's Kappa are 0.958/0.954/0.975/0.975/0.683 respectively, all significant at $p<.000$, based on the two coders' total scores for CA communication quality. We use the reconciled scores between two coders for the analyses.

We employ several measures to address potential endogeneity concerns. First, we use the lead-lag approach, by lagging the dependent variable by a year compared with all the independent variables, as a measure to address simultaneity issues (Dhaliwal et al. 2011). Second, we report results with company fixed effects to control for unobserved company characteristics that might be correlated with our dependent variables. Third, we model the determinants of companies' decision to implement CA and use Heckman's two stage analysis to test our results. Finally, we use propensity score matching as a sensitivity analysis. All results are reported with standard errors clustered at company level to address the dependency concern.

The dependent variables are (i) analysts' forecast errors (*FCERROR)*, measured as the average of the absolute errors of all forecasts for target earnings made in the 12 months after the fiscal year end of the integrated report, scaled by the share price at the fiscal year end, (ii) analysts' forecast dispersion (*FDISP)*, measured as the average standard deviation of analyst EPS median forecasts made in months 1–12 after the fiscal year end scaled by the share price at the fiscal year end, and (iii) bid–ask spread (*SPREAD*), which is the average of the daily quoted spreads in months 1–12 after the fiscal year end, measured as the difference between the bid and ask price divided by the midpoint, that is, (Ask – Bid) / ((Ask + Bid) / 2). All measures are consistent with previous literatures (e.g., Daske et al. 2008, 2013; Dhaliwal et al. 2011; Barth et al. 2017; Zhou et al. 2017). We use the average effect (months 1–12), following Lang and Lundholm (1996), Hope (2003), Dhaliwal et al. (2012) and Zhou et al. (2017).[16] We use the natural logarithm of all three dependent variables in the regression analyses to remove the skewness in data, following Daske et al. (2008, 2013).

[16] Sensitivity analyses show that our results are not sensitive to alternative horizons (e.g., 4–15 month).

The control variables, which are constructed as in Dhaliwal et al. (2012) and Daske et al. (2008, 2013), include *SIZE*, measured as the natural logarithm of the company's total assets at the end of each fiscal year, and the number of analysts following (*ANANO*), measured as the number of analysts following the company through the year, averaged over fiscal months 1–12 (Hope 2003; Dhaliwal et al. 2012). Earnings volatility (*VAREARN)* is also controlled for, measured as the natural logarithm of the times-series standard deviation of earnings per share computed using a rolling window of a minimum of three years up to 10 years prior to the year concerned, as more volatile earnings are more difficult to forecast (Dhaliwal et al. 2012). Financial opaqueness (*FFIN)*, a dichotomous variable coded –1 if the absolute value of a company's scaled accruals (*ABSACC*), averaged over the prior three years, is greater than the median of *ABSACC* for the same industry and the same year, and zero otherwise, is included following Dhaliwal et al. (2012), with a higher value reflecting better financial transparency. *LOSS*, an indicator variable that equals one if the company reports negative earnings in the prior year, and zero otherwise, is included as the informativeness of earnings for future cash flows is weaker among loss-making than among profit-making companies, and analysts therefore have greater difficulty in forecasting the earnings of those companies (Hope 2003; Dhaliwal et al. 2012).

We include analysts' forecast horizon (*HORIZON)* as an additional variable for analysts' forecast analyses, which is measured as the length of time between the forecasting date and the earnings announcement date, and is likely to affect the amount of information available to analysts (Dhaliwal et al. 2012). We control for book to market ratio (*BM*) and leverage (*LEV*) in the analyses for bid–ask spreads (*SPREAD*) following Lang et al. (2012). *BM* is the book to market ratio as of fiscal year end and

LEV is the ratio of total debt divided by total assets as of fiscal year end and we expect to see positive signs on both variables.

In addition to the above control variables, we have also added the following control variables relating to non-financial information reporting. First, we control for the first-order effect of the disclosure quality of the integrated report by including *IR_Qual*, which is a dichotomous variable coded one if the disclosure quality of the integrated report is greater than the sample median and zero otherwise. The disclosure quality of an integrated report is found to be negatively associated with analysts' forecast errors, dispersion (Zhou et al. 2017), and bid–ask spreads (Barth et al. 2017). We obtain the disclosure quality of a company's integrated report from two sources: (1) the disclosure scores as used in Zhou et al. (2017)[17] between 2009 and 2012; and (2) the rankings by EY[18] as published in the Excellence in Integrated Reporting Awards (EY 2014–2016) between 2013 and 2015. The measure of EY rankings is used in Barth et al. (2017). Similar to the coding framework used in Zhou et al. (2017), the score used in the EY rankings are based on the guiding principles and content elements of the <IR> framework (Barth et al. 2017, 49) and the EY rankings and the disclosure scores used in Zhou et al. (2017) are reported to have high levels of consistency (Barth et al. 2017; Zhou et al. 2017).

We further control for the issuance of standalone CSR reports (*CSR*), which is a dummy variable coded one if the company issues a standalone CSR report in addition to the annual (integrated) report during the fiscal year, and zero otherwise. Previous studies (Dhaliwal et al. 2011, 2012) have observed that the issuance of a standalone CSR report

[17] The total disclosure score of an integrated report is developed from Zhou et al. (2017) measuring the level of alignment of an integrated report with the <IR> framework. It is a continuous variable ranging between 0 and 31.

[18] We code the EY rankings into an ordinal variable between 1 and 5 with 1 being "Progress to be made", 2 being "Average", 3 being "Good", 4 being "Excellent" and 5 being "Top".

can help improve the information environment of companies, and therefore help to reduce the cost of capital and improve analysts' earnings forecast accuracy.[19]

RESULTS

Descriptive Statistics

Table 2 provides summary statistics for all variables in the study. Overall, 51 percent (304) of the sample communicate in their integrated annual report that they have CA in place (*CA_dummy*) and the average *CA_qual* score is 0.421 out of 3. The decision to have CA (*CA_dummy*) appears to be sticky overtime in that most (81%) of the CA adoption status remains during the sample period.[20] There are reasonable variations in the communication quality of CA (*CA_qual*) with the average change in score being 0.1, which is around 25% of the average of the *CA_qual* measure (0.421).

The sub-sample analysis contained in Table 2, of companies communicating that they utilize or do not utilize CA, suggests that companies that utilize CA have less dispersion (*FDISP*) and smaller bid–ask spreads (*SPREAD*). These companies tend to produce better integrated reports (*IR_qual*) and have more volatile earnings (*VAREARN*). They are also observed to have a greater analyst following (*ANANO*) and better financial reporting transparency (*FFIN*), as well as longer analysts' forecast horizons (*HORIZON*).

<Insert Table 2 here>

Correlation Matrix

[19] All variables except those with natural upper and lower bounds are winsorized at the 1 and 99 percentiles.

[20] We do observe 15 (3%) instances when companies have CA in year *t* but drop out in year *t* + 1 and another 88 (16%) instances when companies do not have CA in year *t* but adopt the practice in year *t* + 1.

Table 3 provides the Pearson/Spearman correlation matrix among all variables in the study, with Spearman correlations above the diagonal. The univariate results suggest that the communication quality of CA (*CA_qual*) is negatively and significantly (p<0.05, Spearman correlations) associated with all three dependent variables, lending some support for our hypotheses. It is also positively and significantly (p<0.05, Pearson correlations) related to the total disclosure score of the integrated report (*IR_qual*, 0.0864), company size (*SIZE*, 0.1313), the number of analysts following (*ANANO*, 0.1051), financial transparency (*FFIN*, 0.1372), and leverage (*LEV*, 0.1028). The adoption of CA (*CA_dummy*) has an expected high correlation with *CA_qual* (0.6556, p<0.01, Pearson correlation), as does the expected correlation between analysts' forecast errors and dispersion (0.5582, p<0.01, Pearson correlations). Overall, the correlations all appear as expected and there are no particularly high levels of correlation to suggest potential multicollinearity issues.

<Insert Table 3 here>

Hypothesis Testing

H1: Analysts' Forecast Accuracy

H1 hypothesizes that companies' communication of CA provides useful information to analysts and thus will improve analysts' forecasts properties; in particular, analysts' forecast errors are expected to be reduced. The results for testing H1 are presented in Table 4. All results are reported using one-tailed tests, consistent with our directional hypotheses. We present two results for the dependent variable (DV): column 1 presents our base model results, including the disclosure quality of the integrated report (*IR_qual*) only. We use this as our base model since the hypothesized effect of CA works through adding credibility to the underlying integrated report. Column 2 displays

results when we add the communication score of *CA* into the model, in order to test if *CA* has incremental effect on the DVs once *IR_qual* is controlled for.[21]

<Insert Table 4 here>

In column (1) we observe a negative and significant effect on the disclosure quality of integrated reports, *IR_qual* (t = –3.084, p<0.01), suggesting that companies with better disclosed integrated reports have fewer analysts' forecast errors. This result is consistent with Zhou et al. (2017) and supports the notion that <IR> is useful to capital market participants such as analysts. When we include *CA_qual* into the model as reported in column (2) to see if CA has an incremental effect in reducing analysts' forecast errors, we find a negative effect of *CA* on analysts' forecast errors (t = –1.632, p<0.10). In the meantime, the significance of the disclosure quality of the integrated report (*IR_qual*) persists in column (2). The results suggest that the communication of CA in the integrated report helps analysts to forecast more accurately. The results are obtained once the quality of the underlying integrated report has been controlled for, suggesting that CA provides an incremental effect over and above <IR> to analysts. To conclude, we find support for H1 in that the communication of CA is found to be helpful in reducing analysts' forecast errors.

H2: Analysts' Forecast Dispersion and Bid–Ask Spread

H2 hypothesizes that the communication of CA helps reduce analysts' forecast dispersion as well as bid–ask spread of reporting companies due to the benefit of reduced information asymmetry. The results for H2 are presented in Table 5 columns (1) and (2) for analysts' forecast dispersion and columns (4) and (5) for bid–ask spread. Similar to the presentation in Table 4, we report in columns (1) and (4) where only the

[21] We have also used the adoption of CA in its dichotomous form (*CA_dummy*) in the regression and we obtain qualitatively similar results.

disclosure quality of the integrated report (*IR_qual*) is included, and we then add *CA_qual* in columns (2) and (5).

Column (1) shows that the disclosure quality of integrated reports (*IR_Qual*) is negatively related to analysts' forecast dispersion (t = –1.709, p<0.05), suggesting that higher quality integrated reports are also beneficial in improving the consensus in analysts' forecasting. When we include *CA_qual* in column (2), we find it is negatively and significantly associated with analysts' forecast dispersion (t = –2.980, p<0.01) as hypothesized. In the meantime, the *IR_qual* continues to be negatively and significantly related to analysts' forecast dispersion in both columns (1) and (2).

With regards to bid–ask spread, we find in column (4) that the disclosure quality of the integrated report (*IR_qual*) is negatively associated with the bid–ask spread (t= –1.648, p<0.05), suggesting that companies with better disclosed integrated reports tend to have lower information asymmetry. The results are consistent with those reported in Barth et al. (2017). When we add *CA_qual* into the model as displayed in column (5), we do not observe a statistically significant effect of *CA_qual* (t = –0.317, p>0.1). Our results suggest that while the communication of CA in the integrated report helps reduce uncertainties in analysts' forecast, it does not have significant incremental effect to further reduce information asymmetry among investors. In this way, H2 is found to be only partially supported.

H3: The Interaction Effect of CA and Information Environment

In H3, we hypothesize an interaction effect between CA and the information environment of reporting companies on all three dependent variables. We test H3 by augmenting models used to test H1 and H2 with the interaction term between *CA_qual*[22] and the number of analysts following (*ANANO*). The results for H3 testing of analysts'

[22] We obtain qualitatively similar results if we interact the dichotomous CA_dummy with *ANANO*.

forecast errors, dispersion, and bid–ask spreads are presented in column (3) of Table 4 and columns (3) and (6) of Table 5 respectively.

With regards to analysts' forecast errors, we identify from column (3) of Table 4 that the interaction term of *CA_qual*ANANO* (t = 1.101, p> 0.1) is not statistically significant, suggesting that the benefit of communicating CA to analysts in their earnings forecast tasks does not diminish as the information environment improves for reporting companies. For results on analysts' forecast dispersion as reported in column (3) of Table 5, we fail to identify a significant interaction between *CA_qual* and companies' information environment (t = 0.847, p> 0.1). The results indicate that the benefit of CA in reducing analysts' forecast dispersion persists, even as the information environment of reporting companies improves.

The result for bid–ask spread is reported in column (6) of Table 5. We find that *CA_qual* has a negative and significant association with bid–ask spread when the number of analysts following is small (t = –1.763, p< 0.05), suggesting that the communication of CA is effective in reducing bid–ask spread for companies with a weaker information environment. We also observe a positive and significant interaction effect of *CA_qual*ANANO* (t = 2.002, p< 0.01) as hypothesized, indicating that the negative association between *CA* and bid–ask spread diminishes as the number of analysts following grows, which proxies for a better information environment of reporting companies. In conclusion, we find partial support for H3 in that the effect of CA is contingent on the information environment of reporting companies to reduce bid–ask spread. Specifically, companies with a weaker information environment tend to benefit from the communication of CA in reducing their bid–ask spread, but such benefit decreases as the information environment of reporting companies gets better.

<Insert Table 5 here>

Results from Heckman's Two Stage Analyses

Our main findings as reported previously could be subject to potential endogeneity concerns that companies self-select themselves into the decision to adopt CA, since it is a voluntary practice. In our main analyses we have attempted to address this issue with company-fixed effects models. In this section, we provide further analyses using Heckman's two stage analyses as an alternative measure to address the potential endogeneity concern.

We follow Zhou et al. (2017) and model the decision to adopt CA in our first stage model using probit[23] regression. Since there has been no research on the decisions to adopt CA per se, we follow previous studies on the decisions to purchase third-party assurance (Simnett et al. 2009; Peters and Romi 2015) and include the following determinants into our first stage model. In particular, we control for company fundamental characteristics *SIZE*, *LEV, LOSS*, *BM*, and *VAREARN* (as previously defined), *ROA* as the net income before extraordinary items over total assets and *FOREIGNSALES* as the percentage of foreign sales over total sales. We control for the information environment of the company by including the number of analysts' following (*ANANO*), analysts' forecast dispersion (*FDISP)*, and bid–ask spread (*SPREAD*) as previously defined. Finally, we control for the overall reporting/earnings quality and the tendency to report on CSR issues by including financial opaqueness (*FFIN*) as previously defined, *BIG4* as a dummy variable coded one if the financial statements within the integrated report are audited by a Big4 Accounting firm, and *CSR* as a dummy variable if the company issues a standalone CSR report in the year.

[23] We also used logistic regression, and conditional fixed-effects logistic regression and we obtain qualitatively similar results.

In addition to these variables, we have followed Zhou et al. (2017) in using *IR_policy* as the exclusion restriction in our first stage analysis. *IR_policy* is a dummy variable coded one if the company's annual report is subject to the mandatory <IR> adoption policy, that is, if the company's fiscal year starts on or after March 2010 and zero otherwise. Following Zhou et al. (2017), we argue that this variable is suitable as the exclusion restriction because it is expected to be positively related to the adoption of CA given it is highly encouraged along with the mandatory adoption of IR. In the meanwhile, this policy effect is expected to be exogenous to the dependent variables in the second stage. We report the results from the first stage in Table 6(a). It shows that the decision to adopt CA is positively significantly related to the mandating of <IR> (*IR_policy*, z = 10.36, p<0.000) and the financial statement audit quality (*BIG4*, z = 1.97, p<0.048). On the other hand, companies with more complex operations (*FOREIGNSALES*, z = –2.27, p<0.023) and higher information asymmetry (*SPREAD*, z = –2.66, p<0.008) are less likely to implement CA. The positive and significant coefficient on *IR_policy* provides some support for the use of this variable as an exclusion restriction in stage one. We derive the Inverse Mills Ratios (*IMR*) from the first stage model and add it to the second stage models, which are the models used in our main analyses. We report the results from the second stage model in Table 6(b). Once the IMR is added to the second stage model, all our results not only hold, but have become more significant, suggesting that the use of two stage analyses have addressed the endogeneity issue to some extent and lending additional support for the main results.

<Insert Tables 6(a) and (b) here>

Additional Analyses

Components of CA scores

In our main analyses, we have used a composite score to measure the communication quality of CA (*CA_qual*) encompassing three elements: the CA model description, the conclusion on the CA model, and the presentation of the CA model. In order to provide further insights as to which of these three elements is most significant in reducing information asymmetry as observed in our main analyses, we first decompose the composite measure into the following three dummy measures to capture the presence or absence of each element.

*CA_ML*_dummy: a dummy variable coded one if there are descriptions of the CA model in the integrated report and zero if no descriptions at all.

*CA_CL*_dummy: a dummy variable coded one if there is a conclusion made by the governing body on the quality of the CA model, the reliability of reporting information, or the effectiveness of internal controls and zero if no such conclusions.

*CA_PS*_dummy: a dummy variable coded one if information on CA is presented in a self-contained manner and zero if it is scattered through the integrated report.

Further, we use the following two scores to capture the variations in the communication quality of two elements, that is, the CA model description and the CA model presentation.

CA_ML: how well is CA described in the integrated report? With zero being no description at all to three being very well described.

CA_PS: is information on CA presented in a self-contained manner or scattered throughout the integrated report? With zero being completely scattered throughout and three being all information on a standalone section.

We re-run our main analyses using these five component CA measures (untabulated). Overall, the results stay qualitatively similar when the component CA measures are used, although it appears that the results on analysts' forecast accuracy are mainly

driven by the presence/absence of a conclusion from the CA model (*CA_CL_*dummy), suggesting that a clear conclusion made from the audit committee on the quality of the CA model is beneficial in reducing information asymmetry.

First Time Adopters

To provide more insights into the effect of CA on the information environment of reporting companies, we perform additional tests on first time adopters by creating a dummy variable (*CA_firsttime*) coded one if this is the first year that CA is adopted within a company and zero otherwise. We have identified 93 first time CA adopters in our sample and we re-run our analyses with *CA_firsttime* as our independent variable (untabulated). We find consistent, albeit weaker, results for analysts' forecast accuracy and bid–ask spread, however, the reduction on analysts' forecast dispersion does not appear to be significant for first-year adopters. Compared with our main analyses, where we get consistent results on the reduction of analysts' forecast dispersion, the benefits of reducing disagreement/uncertainty among analysts seem to accrue overtime rather than being a one-off first time effect.[24]

Controlling for the Effect of CSR Assurance

As mentioned previously, it is possible to obtain separate assurance on CSR information in addition to the required financial statement audit as a way to add credibility to an integrated report, although such separate assurance is unlikely to achieve the purpose of enhanced credibility on the entire integrated report, covering only a sub-section of the resources and relationships covered under <IR>, and not addressing guiding principles

[24] The non-significant results of CA in reducing analysts' forecast dispersion for first-time adopters are consistent with an experimental study by Hoang and Simnett (2017), which finds that the communication of CA does not make a difference to non-professional investors' judgments. One potential explanation provided for this is that CA still a novel concept, so investors do not incorporate CA communication into their judgments in the early years. There could be a "learning effect" where it takes a few years for analysts and other investors to familiarize themselves with CA before the model takes effect on analysts' forecasts and bid–ask spreads.

such as connectivity of different information sources (such as financial and non-financial information). In this section, we explore whether the effect of CA persists while controlling for CSR-only assurance. The distinction between CSR assurance and CA is that CSR assurance is an independent assurance engagement conducted by a third-party while CA is a corporate governance and risk management framework that is coordinated and implemented by the audit committee of the reporting company. Further, CSR assurance is on CSR information only while CA coordinates the assurance efforts from multiple parties, including internal auditors, external auditors, and management, and results in a conclusion on the quality of the entire integrated report from the governing body of the company. We hand-collected information on whether the company has purchased third-party assurance on its standalone CSR reports and re-ran our analyses with an indicator variable (*CSR_ASU*), which is coded 1 if the company has third-party assurance on the CSR report.

We find that the CA measure remains significantly associated with the dependent variables as found in our main analyses. In the meantime, we do not observe any significant relation between CSR-only assurance and the dependent variables (untabulated). The results suggest that i) the effect we have observed for CA in our main analyses is incremental to CSR-only assurance and ii) having CSR-only assurance does not seem to be sufficient to add to the credibility of the integrated report, which entails both financial and non-financial information.

Other Sensitivity Analyses

We performed an array of further sensitivity analyses on our results. We varied the time horizon used to calculate the dependent variables. In our main analyses, we used months 1 to 12 after the fiscal year end to capture the average effect, which we varied by using months 4 to 15 after. Our results stay qualitatively similar for the alternative time

horizon used. We also used unscaled measures for analysts' forecast errors and dispersion instead of the scaled measure used in our main analyses, given Cheong and Thomas's (2011) findings that analysts' forecast properties do not vary with scales. We obtain similar results regardless of whether scaled or unscaled measures are used.[25]

We have also dropped the observations in 2015 for analysts' forecast analyses because a number of companies were not included in 2015 due to the requirement for one year ahead forecast data and earnings data. The dropping of 2015 data did not change our main results on analysts' forecast errors or dispersion. We have also re-run our analyses with only those companies that were included across the entire sample period.[26] We find that the results (untabulated) on analysts' forecast dispersion remain similar to the main analyses while the (conditional) effect on analysts' forecast accuracy (bid-ask spread) is no longer significant, which could be due to the lack of power given a significant amount (over 40%) of the data has to be dropped with the restriction.

Finally, we use the propensity score matching to match companies that have adopted CA versus those that have not on all control variables that we have included in research models (1) and (2). We use the nearest neighbor match with caliper of (0.005) and ended up with a sample of 428/488/460 observations for analysts' forecast accuracy/dispersion/bid–ask spread analyses respectively. We observe that while the results[27] (untabulated) on analysts' forecast dispersion and bid–ask spreads are consistent with our main analyses, the result on forecast accuracy no longer appears significant, which could to some extent be due to the decrease in sample size as a result

[25] We tested different levels of winsorization including 5% and 10% and our results stay robust.

[26] We are left with 406 observations (58 unique companies) out of the 700 observations (Top100 companies across 2009–2015) as a result of the restriction. After taking into account missing values for the analyses, the sample size now becomes 363/384/354 (compared to 591/592/564) for analysts' accuracy/dispersion/bid–ask spread analyses respectively.

[27] The average treatment effect between treatment group and control group is 0.07 (t = 0.32) for forecast accuracy, –0.69 (t = –3.41) for forecast dispersion and –0.07 (t = –0.50) for bid–ask spreads.

of the matching process. Overall, our sensitivity analyses reveal that while the results on analysts' forecast dispersion and bid–ask spread stay robust, the results on analysts' forecast accuracy appear sensitive to certain conditions.

DISCUSSION AND CONCLUSION

The study identifies and examines an innovative credibility-enhancement mechanism, CA, which aims to optimize the assurance coverage obtained from management, internal assurance providers, and external assurance providers in order to ensure that "significant risks facing the company are adequately addressed" (IODSA 2009, 62). We examine whether this new credibility-enhancing technique results in a reduction of analysts' forecast errors, dispersion, and bid–ask spread. We find evidence that the implementation and the communication quality of CA is negatively and significantly related to both analysts' forecast errors and dispersion. Whilst we do not find support for the hypothesis that this new credibility-enhancing technique is beneficial in reducing bid–ask spreads for the overall sample, in accordance with our expectations, sub-sample analysis shows that such benefit is significant among companies for which the information environment is weaker. Overall, the results provide support for the notion that CA is an effective new credibility-enhancing mechanism on integrated reports that is valued by capital market participants, especially analysts in their earnings forecasting tasks.

This paper has important and timely research, practice, and policy implications. First, this study provides empirical evidence that CA benefits capital market participants, which addresses the lack of research into the effect of alternative credibility-enhancing mechanisms and risk management practices, such as the three-lines-of-defence model. Second, the study has practical implications for report preparers who seek to improve the credibility and decision usefulness of their corporate reports. A further analysis on

the components of CA communication quality reveals that the results on analysts' forecast accuracy are associated with the presence/absence of a conclusion from the CA model. This suggests that while CA is a potentially cost-effective alternative to obtaining external assurance on the whole integrated report, its usefulness ultimately depends on its effective communication to report users. Third, the paper has important regulatory and standard-setting implications for the journey towards <IR> assurance in demonstrating that CA is beneficial to capital market participants. These findings shed new light into the exploration and development of assurance and other credibility-enhancing mechanisms for <IR>, and are of interest to both the IIRC and the IAASB Integrated Reporting Working Group, as well as the AUASB. Being informed about the benefits of CA, these regulators can consider more education about, and recommendations relating to, the implementation of CA, as well as the incorporation of CA concepts into their next discussion papers.

Although CA is highly encouraged by King III code, it is not mandated during our sample period. The voluntary nature of CA makes the empirical tests subject to endogeneity concern. We have acknowledged the challenge and taken multiple measures as discussed in the research methodology section to address this concern. Further, although the paper studies the context of <IR> in South Africa, CA as a novel credibility-enhancing mechanism could have much broader applications as it could be applied in other contexts where traditional credibility-enhancing mechanisms, such as third-party auditing/assurance, prove to be challenging and/or cost-prohibitive, such as when non-financial information is presented on its own (e.g., in a CSR report) or together with financial information (in an integrated report).

REFERENCES

Adams, C. 2004. The ethical, social and environmental reporting-performance portrayal gap. *Accounting, Auditing & Accountability Journal* 17: 731–757.

Adams, C., and C. Larrinaga-González. 2007. Engaging with organisations in pursuit of improved sustainability accounting and performance. *Accounting, Auditing & Accountability Journal* 20 (3): 333–355.

Ballou, B., R. J. Casey, J. H. Grenier, and D. L. Heitger. 2012. Exploring the strategic integration of sustainability initiatives: Opportunities for accounting research. *Accounting Horizons*. 26 (2): 265–288.

Barth, M. E., S. F. Cahan, L. Chen, and E. R. Venter. 2017. The economic consequences associated with integrated report quality: Capital market and real effects. *Accounting, Organisations and Society* 62: 43–64.

Becker, C. L., M. L. DeFond, J. Jiambalvo, and K. R. Subramanyam. 1998. The effect of audit quality on earnings management. *Contemporary Accounting Research* 15 (Spring): 1–24.

Behn, B. K., J. H. Choi, and T. Kang. 2008. Audit quality and properties of analyst earnings forecasts. *The Accounting Review* 83: 327–349.

Brown, S., and S. Hillegeist. 2007. How disclosure quality affects the level of information asymmetry. *Review of Accounting Studies* 12: 443–47.

Casey, R., and J. Grenier. 2015. Understanding and contributing to the enigma of corporate social responsibility (CSR) assurance in the United States. *Auditing: A Journal of Practice & Theory* 34 (1): 97–130.

Chen, H., J. Z. Chen, G. J. Lobo, and Y. Wang. 2011. Effects of audit quality on earnings management and cost of equity capital: Evidence from China. *Contemporary Accounting Research* 28: 892–925.

Cheong, F. S., and J. Thomas. 2011. Why do EPS forecast error and dispersion not vary with scale? Implications for analyst and managerial behavior. *Journal of Accounting Research* 49 (2): 359–401.

Cohen, J., and R. Simnett. 2015. CSR and assurance services: A research agenda. *Auditing: A Journal of Practice and Theory* 34 (1): 59–74.

Coram, P., G. Monroe, and D. Woodliff. 2009. The value of assurance on voluntary nonfinancial disclosure: An experimental analysis. *Auditing: A Journal of Practice & Theory* 28: 137–152.

Cujean J., and Hasler M. 2017. Why does return predictability concentrate in bad times? *The Journal of Finance* 72 (6): 2717–2758.

Daske, H., L. Hail, C. Leuz, and R. Verdi. 2008. Mandatory IFRS reporting around the world: Early evidence on the economic consequences. *Journal of Accounting Research* 46: 1085–1142.

Daske, H., L. Hail, C. Leuz, and R. Verdi. 2013. Adopting a label: Heterogeneity in the economic consequences around IAS/IFRS Adoptions. *Journal of Accounting Research* 51: 495–547.

Dawn Group. 2015. *Integrated Report 2015*. Available at http://www.dawnltd.co.za/img/Reports/DAWN%20IR15%20-%20Final%20web%20secv2.pdf.

DeFond, M. L., and J. Zhang. 2014. A review of archival auditing research. *Journal of Accounting and Economics* 58 (2-3): 275–326.

Deloitte. 2014. *Audit Committee Resource Guide.* Available at https://www2.deloitte.com/content/dam/Deloitte/za/Documents/governance-

risk-compliance/ZA_AuditCommitteeResourceGuide_22052014.pdf (last accessed January 2018).

Dhaliwal, D. S., O. Z. Li, A. Tsang, and Y. G. Yang. 2011. Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting. *The Accounting Review* 86 (1): 59–100.

Dhaliwal, D. S., S. Radhakrishnan, A. Tsang, and Y. G. Yang. 2012. Nonfinancial disclosure and analyst forecast accuracy: International evidence on corporate social responsibility disclosure. *The Accounting Review* 87 (3): 723–759.

EY. 2013. *Maximizing Value From Your Lines of Defense*. Available at http://www.ey.com/Publication/vwLUAssets/EY-Maximizing-value-from-your-lines-of-defense/$File/EY-Maximizing-value-from-your-lines-of-defense.pdf (last accessed January 2018).

EY. 2016. EY's Excellence in Integrated Reporting Awards 2016. Available at http://www.ey.com/Publication/vwLUAssets/ey-excellence-integrated-reporting-awards-2016/$FILE/ey-excellence-integrated-reporting-awards-2016.pdf (last accessed January 2018).

Financial Reporting Council (FRC). 2014. Guidance on the Strategic Report. Available at https://www.frc.org.uk/getattachment/2168919d-398a-41f1-b493-0749cf6f63e8/Guidance-on-the-Strategic-Report.pdf (last accessed January 2018).

Financial Reporting Council (FRC). 2017. Audit Committee Reporting. Available at http://www.frc.org.uk/getattachment/7f97f065-d912-4ca0-a96b-1f2fd4b0a565/LAB_Final.pdf (last accessed January 2018).

Gaynor, L. M., A. S. Kelton, M. Mercer, and T. L. Yohn. 2016. Understanding the relation between financial reporting quality and audit quality. *Auditing: A Journal of Practice & Theory* 35 (4): 1–22

Global Sustainable Investment Alliance (GSIA). 2014. *Global Sustainable Investment Review*. Available at http://www.gsi-alliance.org/members-resources/global-sustainable-investment-review-2014/ (last accessed January 2018).

Healy, P., A. Hutton, and K. Palepu. 1999. Stock performance and intermediation changes surrounding sustained increases in disclosure. *Contemporary Accounting Research* 16: 485–520.

Heflin, F., K. Shaw, and J. Wild. 2005. Disclosure policy and market liquidity: Impact of depth quotes and order sizes. *Contemporary Accounting Research* 22: 829–66.

Herrmann, D., and W. B. Thomas. 2005. Rounding of analyst forecasts. *The Accounting Review* 80: 805–823.

Hoang, H. and R. Simnett. 2017. The effect of combined assurance and limited assurance on investor valuation judgments. Working paper. UNSW Sydney.

Hope, O. K. 2003. Disclosure practices, enforcement of accounting standards, and analysts' forecast accuracy: An international study. *Journal of Accounting Research* 41 (2): 235–272.

Huibers, S. 2015. *Combined Assurance: One Language, One Voice, One View*. Altamonte Springs: The Institute of Internal Auditors Research Foundation.

Imhoff, E. A., and G. J. Lobo. 1992. The effect of ex ante earnings uncertainty on earnings response coefficients. *The Accounting Review* 67: 427–439.

Institute of Internal Auditors (IIA). 2013. *The Three Lines of Defense in Effective Risk Management and Control*, Altamonte Springs: The Institute of Internal Auditors Publication.

International Auditing and Assurance Standards Board (IAASB). 2013. *ISAE 3000 (Revised)*, Assurance engagements other than audits or reviews of historical financial information international framework for assurance engagements and related conforming amendments. International Federation of Accountants, New York.

International Auditing and Assurance Standards Board (IAASB). 2016. *Integrated Reporting Working Group Discussion Paper: Supporting Credibility and Trust in Emerging Forms of External Reporting: Ten Key Challenges for Assurance Engagements*. Available at https://www.ifac.org/system/files/publications/files/IAASB-Discussion-Paper-Integrated-Reporting_0.pdf (last accessed January 2018).

International Integrated Reporting Council (IIRC). 2013. *The International <IR> Framework*. International Integrated Report Council. Available at http://integratedreporting.org/wp-content/uploads/2013/12/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf (last accessed January 2018).

International Integrated Reporting Council (IIRC). 2014. *Assurance on <IR>: An Exploration of Issues*. Available at http://www.theiirc.org/resources-2/assurance (last accessed January 2018).

International Integrated Reporting Council (IIRC). 2015. *Assurance on <IR>: Overview of Feedback and Call to Action*, http://integratedreporting.org/wp-content/uploads/2015/07/IIRC-Assurance-Overview-July-2015.pdf (last accessed January 2018).

Institute of Directors Southern Africa (IODSA). 2009. *King Code of Governance Principles* (King III). Available at http://c.ymcdn.com/sites/www.iodsa.co.za/resource/collection/94445006-4F18-4335-B7FB7F5A8B23FB3F/King_Code_of_Governance_for_SA_2009_Updated_June_2012.pdf (last accessed January 2018).

Institute of Directors Southern Africa (IODSA). 2016. *King IV Report on Corporate Governance*. Available at http://www.iodsa.co.za/?page=KingIV (last accessed January 2018).

Khurana, I. K., and K. K. Raman. 2004. Litigation risk and the financial reporting credibility of Big 4 versus non–Big 4 audits: Evidence from Anglo-American countries. *The Accounting Review* 79 (2): 473–95.

Kothari, S. P., X. Li, and J. E. Short. 2009. The effect of disclosures by management, analysts, and financial press on cost of capital, return volatility, and analyst forecasts: A study using content analysis. *The Accounting Review* 84: 1639–1670.

KPMG. 2013. *The KPMG Survey of Corporate Responsibility Reporting 2013*. Available at www.kpmg.com/sustainability (last accessed January 2018).

KPMG. 2015. *The KPMG Survey of Corporate Responsibility Reporting 2015*. KPMG Publication. Available at http://www.kpmg.com/au/en/issuesandinsights/articlespublications/pages/corporate-responsibility-reporting-survey-2015-au-findings.aspx (last accessed January 2018).

KPMG. 2016. *Internal audit and audit committee: Effectively managing the expectations of the audit committee from an internal audit perspective*. Available at https://home.kpmg.com/content/dam/kpmg/pdf/2016/06/ch-ac-news-54-article-02-en.pdf (last accessed January 2018).

KPMG. 2017. *The KPMG Survey of Corporate Responsibility Reporting 2017*. KPMG Publication. Available at https://home.kpmg.com/content/dam/kpmg/xx/pdf/2017/10/kpmg-survey-of-corporate-responsibility-reporting-2017.pdf, (last accessed January 2018).

Krishnan, G. 2003. Audit quality and the pricing of discretionary accruals. *Auditing: A Journal of Practice & Theory* 22: 109–126

Lang, M., and R. Lundholm. 1996. Disclosure policy and analyst behaviour. *The Accounting Review* 71 (4): 467–492.

Lang, M. H., K.V. Lins, and M. Maffett. 2012. Transparency, liquidity, and valuation: International evidence on when transparency matters most. *Journal of Accounting Research*. 50: 729–774.

Lehavy, R., F. Li, and K. Merkley. 2011. The effect of annual report readability on analyst following and the properties of their earnings forecasts. *The Accounting Review* 86 (3): 1087–1115.

Leuz, C. and P. D. Wysocki. 2016, The economics of disclosure and financial reporting regulation: Evidence and suggestions for future research. *Journal of Accounting Research* 54: 525–622.

Leuz, C., and R. E. Verrecchia. 2000. The economic consequences of increased disclosure. *Journal of Accounting Research* 38: 91–124.

Manetti, G., and L. Becatti. 2009. Assurance services for sustainability reports: Standards and empirical evidence. *Journal of Business Ethics* 87: 289–298.

Maines, L. A., E. Bartov, P. M. Fairfield, D. E. Hirst, T. E. Iannaconi, R. Mallett, C. M. Schrand, D. J. Skinner, L. Vincent. 2002. Recommendations on disclosure of nonfinancial performance measures. *Accounting Horizons* 16(4): 353–362.

Mansi, S. A., W. F. Maxwell, and D. P. Miller. 2004. Does auditor quality and tenure matter to investors? Evidence from the Bond Market. *Journal of Accounting Research* 42: 755–793.

Mercer, M. 2004. How Do Investors Assess the Credibility of Management Disclosures? *Accounting Horizons* 18: 185–196.

Merton, R. C. 1987. A Simple Model of Capital Market Equilibrium with Incomplete Information. *Journal of Finance*. 42 (3): 483–510.

O'Dwyer, B., and D. Owen. 2007. Seeking stakeholder-centric sustainability assurance. *Journal of Corporate Citizenship* 25: 77–96.

O'Dwyer, B., D. Owen, and J. Unerman. 2011. Seeking legitimacy for new assurance forms: The case of assurance on sustainability reporting. *Accounting, Organizations and Society* 36 (1): 31-52.

Payne, J., and S. Robb. 2000. Earnings management: The effect of ex ante earnings uncertainty. *Journal of Accounting, Auditing & Finance* 15: 371–392.

Perego, P., and A. Kolk. 2012. Multinationals' accountability on sustainability: The evolution of third-party assurance of sustainability reports. *Journal of Business Ethics* 110 (2): 173–190.

Peters, G. F., and A. M. Romi. 2015. The association between sustainability governance characteristics and the assurance of corporate sustainability reports. *Auditing: A Journal of Practice & Theory* 34(1): 163–198.

Pflugrath, G., P. Roebuck, and R. Simnett. 2011. Impact of Assurance and Assurer's Professional Affiliation on Financial Analysts' Assessment of Credibility of Corporate Social Responsibility Information. *Auditing: A Journal of Practice & Theory* 30: 239-254.

PricewaterhouseCoopers (PwC). 2016. *Internal Audit Matters: Combined Assurance Risk Assurance*. Available at https://www.pwchk.com/en/risk-assurance/ra-combined-assurance-oct2016.pdf (last accessed January 2018)

Serafeim, G. 2015. Integrated reporting and investor clientele. *Journal of Applied Corporate Finance* 27 (2): 34–51.

Simnett R., S. Zhou, and H. Hoang. 2016. Assurance and other credibility enhancing mechanisms for integrated reporting. In *Integrated Reporting: A New Accounting Disclosure*, edited by C. Mio, 296-314. London: Palgrave Publishing.

Teoh, S. H., and T. J. Wong. 1993. Perceived auditor quality and the earnings response coefficient. *The Accounting Review* 68: 346–366.

Titman, S., and B. Trueman. 1986. Information quality and the valuation of new issues. *Journal of Accounting and Economics* 8: 159–172.

Verrecchia, R. E. 2001. Essays on disclosure. *Journal of Accounting and Economics*, 32: 97–180.

Wallace, W. 1980. *The Economic Role of the Audit in Free and Regulated Markets*. New York: Graduate School of Management, University of Rochester.

Watkins, A. L., W. Hillison, and S. E. Morecroft. 2004. Audit quality: A synthesis of theory and empirical evidence. *Journal of Accounting Literature* 23: 153–193.

Williams, P. 1996. The relation between a prior earnings forecast by management and analyst response to a current management forecast. *The Accounting Review* 71: 103–113.

Zhou, S., R. Simnett, and W. Green. 2017. Does integrated reporting matter to the capital market? *Abacus*, 53 (1): 94–132.

Appendix 1: Example Combined Assurance Report 2015 (DAWN Group 2015)

COMBINED ASSURANCE

A combined assurance model is applied to provide a coordinated approach to all assurance activities.

The combined assurance model aims to optimise the assurance coverage obtained from management, internal assurance providers and external assurance providers on the risk areas affecting the Group. Within DAWN there are a number of assurance providers that either directly or indirectly provide the Board and management with certain assurances over the adequacy and effectiveness of those controls that mitigate the risks as identified during the risk assessment process described on pages 38 and 39. Collectively, the activities of these assurance providers are referred to as the combined assurance model, which is available on DAWN's website www.dawnltd.co.za.

The DAWN Group has taken an approach designed to meet the objectives of combined assurance in a pragmatic and cost-effective manner.

PROCESS

The development of DAWN's combined assurance model entailed the following:

- risk identification;
- identification of controls;
- identification of assurance providers;
- assessment of assurance activities against controls; and
- conclusion and development of action plans.

ASSURANCE PROVIDERS

Management-based assurance

Management oversight, including strategy implementation, key performance indicators and performance measurement, control self-assessments and continual monitoring mechanisms and systems are included.

The Board obtains formal assurance from the Risk Committee, through the Audit Committee, annually on the effectiveness of the risk management processes, including the operation of internal controls over financial and IT risks, compliance with legislation and the ethical and sustainable management of the business. This assurance is confirmed by Internal Audit.

Internal assurance

Risk management (adopting an effective enterprise-wide risk management framework), compliance, health and safety and quality assurance departments are included. These departments are responsible for maintaining policies, minimum standards, oversight and risk management performance and reporting.

Independent assurance

Internal Audit

Internal Audit is an independent appraisal function, which examines and evaluates the activities and the appropriateness of the systems of internal control, risk management and governance processes. The Audit Committee is satisfied that Internal Audit has met its responsibilities for the year with respect to the Internal Audit Charter.

The Chief Audit Executive (CAE) reports to the Director: Risk and Compliance on day-to-day matters, and functionally to the Chairman of the Audit Committee. Audit plans are presented in advance to the Audit Committee and are based on an assessment of risk areas involving an independent review of the Group's own risk assessments. The CAE attends and presents its findings to the Audit Committee.

The objective of Internal Audit is to assist the Board in the effective discharge of its responsibilities. Internal Audit is a key assurance provider and provides the Board with a report of its activities which, along with other sources of assurance, is used by the Board reporting on its assessment of the Company's system of internal controls and risk management.

External Audit

The Audit Committee is responsible for recommending the external auditor for appointment by shareholders and for ensuring that the external auditor carries out an annual audit of all the Group's subsidiaries in accordance with international auditing standards and reports in detail on the results of the audit both to the management of the Group's divisions and to the Audit Committee. The external auditor is the main external assurance provider for the Board in relation to the Group's financial results for each financial year.

The Audit Committee regularly reviews the external auditor's independence and maintains control over the non-audit services provided by the external auditors.

Pre-approved permissible non-audit services performed by the external auditors include taxation and due diligence services. The external auditors are prohibited from providing non-audit services, including valuation and accounting work, where their independence might be compromised by later auditing their own work. Other non-audit services provided by the external auditors are required to be specifically approved by the Audit Committee.

The external auditor rotates the designated audit partner at least every five years.

Appendix 1: Example Combined Assurance Report 2015 (DAWN Group 2015) - continued

Combined assurance

continued

Oversight Committees

The following committees provide assurance as stated below:

- The Audit Committee – with regard to financial and internal controls outlined in its Terms of Reference.
- The Risk Committee – with regard to the enterprise-wide risk management framework.
- The Remuneration Committee – with regard to controls in the remuneration sphere.
- The Nomination Committee – in relation to Board diversity, succession planning and corporate governance structures.
- The Social, Ethics and Transformation Committee – with regard to oversight of the Group's controls in the sphere of ethics, corporate social responsibility, sustainability and transformation.

The Audit Committee has reviewed the combined assurance framework for the Group to satisfy itself with management's initial conclusions and will continue to review it as part of its role in oversight of risk management.

In the light of its review of the combined assurance framework, the Audit Committee has recommended to the Board that appropriate assurance activities are in place in relation to the controls operating over each risk identified in the risk management process.

BOARD ASSESSMENT OF THE GROUP'S SYSTEMS OF INTERNAL CONTROLS AND RISK MANAGEMENT

Nothing has come to the attention of the Board or arose out of the internal control self-assessment process, Internal Audit or year-end external audits that causes the Board to believe that the Group's systems of internal controls and risk management are not effective or that the internal financial controls do not form a sound basis for the preparation of reliable financial statements. The Board's opinion is based on the combined assurances of external and internal auditors, management and the Audit Committee as well as central Business Systems and HR functions.

ASSURANCE

The data in this report has been assured to the extent set out below. The Group accepts that this limited assurance is not ideal, but DAWN's approach to combined assurance is at an early stage.

The annual financial statements appearing on DAWN's website have been audited by the independent auditors, PricewaterhouseCoopers Inc, and their audit report appears on page 12 of the annual financial statements.

DAWN's management and directors are responsible for the preparation and presentation of the identified sustainability information, as incorporated in the 2015 Sustainability Report, and for the information contained in the Integrated Report, in accordance with their internally defined procedures. DAWN's management and directors are also responsible for maintaining adequate records and internal controls that are designed to support the reporting process.

The Audit Committee has reviewed the sustainability issues in the Sustainability Report and in the Integrated Report to ensure that they are reliable and that there is no conflict with the financial information.

During F2015 a focused approach was applied to the determination of materiality of aspects by the Executive Committee. The Sustainability Report 2015 has therefore been prepared in accordance with the Global Reporting Initiative's G4 Guidelines – Core Option.

Information contained within the Sustainability Report and disclosures from certain external sources have been independently verified, such as the carbon footprint report (Internal Audit) and Broad-Based Black Economic Empowerment rating (Empowerdex). EcoPartners provided feedback on DAWN's 2014 Safety, Health and the Environment assessment. The Chief Audit Executive provided limited independent assurance on the Sustainability Report. External independent assurance may in the future be sought for the Sustainability Report.

COMPLIANCE

Reporting principles and frameworks used in the compilation of the Integrated Report and the Sustainability Report include:

- International Financial Reporting Standards (IFRS);
- JSE Listings Requirements;
- King III;
- South African Companies Act;
- Protection of Personal Information Act (POPI);
- Employment Equity Act;
- Labour Relations Act;
- Skills Development Act;
- Basic Conditions of Employment Act;
- Global Reporting Initiative;
- DTI Codes of Good Practice;
- Occupational Health & Safety Act (OHSA); and
- National Environmental Management Laws Amendment Act.

The Integrated Report and the Sustainability Report are also available online at www.dawnltd.co.za.

Appendix 2: Variable Definitions

Big4	A dummy variable coded 1 if the financial statement within the integrated report is audited by a Big4 accounting firm and 0 otherwise.
BM	The book to market ratio as of fiscal year end.
CA_dummy	A dummy variable coded 1 if the company declares the use of a combined assurance approach in its integrated report and 0 otherwise.
CA_qual	A composite score ranging between 0–3 from adding the scores using equal weighting from the following three elements on the communication of combined assurance (CA) in the integrated report: (1) how well CA is described in the integrated report; (2) is there a conclusion made by the governing body on the basis of CA; (3) is information on CA presented in a self-contained manner or rather scattered through the integrated report.
CA_first	A dummy variable coded 1 if it is the first year that the company has adopted CA and 0 otherwise.
CA_early	A dummy variable coded 1 if the company has adopted CA before 2011 and is adopting CA in year *t* and 0 otherwise.
CA_ML	A continuous variable from 0–3 measuring how well the CA model is described in an integrated report with 0 being no descriptions at all and 3 being described in detail.
CA_CL	A dummy variable coded 1 if there is a conclusion made by the governing body on the basis of CA.
CA_PS	A continuous variable from 0–3 measuring how information on CA is presented in the integrated report with 0 being completely scattered through and 3 being in a self-contained manner.
CA_ML_DUMMY	A dummy variable coded 1 if there is description of the CA model within the integrated report and 0 if there is no description at all.
CA_PS_DUMMY	A dummy variable coded 1 if information on CA is presented in some self-contained manner or 0 if it is completely scattered.
CSR	A dummy variable coded 1 if the company issues a standalone sustainability report in addition to the annual (integrated) report during the fiscal year, and 0 otherwise.
CSR_ASU	A dummy variable coded 1 if the standalone sustainability report is assured by an independent third-party and 0 otherwise.
FERROR	The forecast errors, measured as the logarithm of the average of the absolute errors of all forecasts made in the 12 months following the fiscal year-end concerned for target earnings, scaled by the share price at the fiscal year-end.
FDISP	The forecast dispersion, measured as the standard deviation of analyst EPS median forecast and scaled by the share price at the fiscal year-end, averaged over the 12 months following the fiscal year-end.
FFIN	A dummy variable coded –1 if a company's average absolute accruals is more than the median of those within the same industry and same year and 0 otherwise. This variable proxies for financial transparency with a higher value reflecting better transparency.
FOREIGNSALES	The percentage of foreign sales to total sales.
HORIZON	The forecast horizon, measured as the length of time between the forecasting date and the earnings announcement date.
IR_qual	A dummy variable coded 1 if the disclosure quality of the integrated report is greater than the sample median and 0 otherwise. We obtain the disclosure quality of a company's integrated report from two sources: (1) the disclosure scores as used in Zhou et al. (2017) between 2009–2012; and (2) the rankings by Ernest & Young as published in the Excellence in Integrated Reporting Awards (EY 2013–-2016) between 2013–2015.
IR_policy	A dummy variable coded one if the company's annual report is subject to the <IR> policy, i.e., if the company's fiscal year starts on or after March 2010, and 0 otherwise

INVMILLS	The Inverse Mills Ratios calculated from the first stage Heckman's model
LEV	The leverage of the company calculated as the ratio of total debt divided by total assets as of fiscal year end.
ANANO	The average number of monthly forecasts made during the 12 months following fiscal year-end.
LOSS	A dummy variable equals 1 if the company reports negative earnings in the prior year, and 0 otherwise.
ROA	The net income before extraordinary items over total assets.
SIZE	The natural logarithm of the company's total assets (in ZAR Millions) at the end of each fiscal year.
SPREAD	The average of the daily quoted spreads in months 1–12 after the fiscal year end, measured as the difference between the bid and ask price divided by the midpoint.
VAREARN	The natural logarithm of the times-series standard deviation of earnings per share computed using a rolling window of a minimum of 3 years up to 10 years prior to the year concerned.

Appendix 3: The Coding Scheme of Combined Assurance (CA)

Components	Scoring	Items
1. Description of the model		
Are the levels and lines of defence in the model explained?	**0**	There is no communication on the lines of defence
	1	At least three lines of defence are mentioned
	2	Lines of defence are described and responsibilities of each line are explicitly explained
	3	Lines of defence are described, and responsibilities of each line are explicitly explained, and the model is linked with risk management
2. Opinion/Conclusions		
On the basis of combined assurance, what kinds of conclusion are given and by whom?	**0**	No conclusion is given on combined assurance or on the basis of combined assurance
	1	The audit committee or board of directors or other committees give conclusions on combined assurance or on the basis of combined assurance. For example: *"The audit committee/board is satisfied that the assurance coverage has been optimised by combined assurance"* *"The audit committee/ board concludes that combined assurance is sufficient in addressing significant risks of the entity"* *"Nothing has come to the attention of the Board to believe that the internal controls and risk management are not effective or do not form a sound basis for the preparation of the reports. The Board's opinion is based on combined assurance".*
3. Presentation		
How connected is the combined assurance communication?	**0**	Communication is scattered all over the annual reports or combined assurance is only mentioned as a King III checklist item
	1	Some communication is at one place but the majority is scattered over some other sections with some linkages to each other
	2	Majority of combined assurance communication is at one place, with linkages and cross-references to each other
	3	A standalone report/section in the annual reports is dedicated to combined assurance communication
Total	**7**	

Table 1: Sample selection process

Top100 listed companies on JSE between 2009–2015	700
Less missing analysts' forecast accuracy/dispersion data	(90/89)
Less missing control variables data	(19)
Observations for analysts' forecast accuracy/dispersion analyses	591/592

Top100 listed companies on JSE between 2009–2015	700
Less missing bid or ask prices data	(103)
Less missing control variables data	(33)
Observations for bid–ask spread analyses	564

Table 2: Summary statistics.

Full sample and sub-sample by the adoption of CA

	Full Sample				Sample without combined assurance			Sample with combined assurance			*p*-value
Variable	*Obs*	*Mean*	*Median*	*Std. Dev.*	*Obs*	*Mean*	*Std. Dev.*	*Obs*	*Mean*	*Std. Dev.*	
FCERROR	591	0.022	0.010	0.056	308	0.021	0.036	283	0.024	0.072	0.444
FDISP	592	0.019	0.007	0.095	288	**0.030**	0.135	304	**0.009**	0.011	0.006
SPREAD	564	0.008	0.004	0.021	256	**0.011**	0.030	308	**0.005**	0.006	0.000
CA_dummy	592	0.514	1.000	0.500	288	0.000	0.000	304	1.000	0.000	N/A
CA_qual	592	0.421	0.000	0.621	288	0.000	0.000	304	0.820	0.651	N/A
IR_qual	592	0.426	0.000	0.495	288	**0.372**	0.484	304	**0.477**	0.500	0.009
SIZE	592	8.299	8.026	1.561	288	8.219	1.737	304	8.375	1.373	0.223
VAREARN	592	0.706	0.648	1.252	288	**0.462**	1.308	304	**0.937**	1.153	0.000
ANANO	592	7.687	7.875	3.914	288	**6.938**	3.799	304	**8.397**	3.894	0.000
FFIN	592	–0.380	0.000	0.486	288	**–0.434**	0.496	304	**–0.329**	0.471	0.008
LOSS	592	0.066	0.000	0.248	288	0.066	0.249	304	0.066	0.248	0.993
HORIZON	592	243.393	240.000	24.770	288	**239.830**	21.202	304	**246.769**	27.340	0.001
CSR	592	0.407	0.000	0.492	288	0.420	0.494	304	0.395	0.490	0.530
BM	592	0.583	0.470	0.501	288	**0.637**	0.572	304	**0.531**	0.418	0.0106
LEV	592	0.553	0.535	0.225	288	0.544	0.223	304	0.562	0.227	0.3386

Means in bold are those significantly different at $p<0.05$ level, two tailed.

FERROR is the forecast errors, measured as the logarithm of the average of the absolute errors of all forecasts made in the 12 months following the fiscal year-end concerned for target earnings, scaled by the share price at the fiscal year-end. FDISP is he forecast dispersion, measured as the standard deviation of analyst EPS median forecast and scaled by the share price at the fiscal year-end, averaged over the 12 months following the fiscal year-end. SPREAD is the average of the daily quoted spreads in months 1–12 after the fiscal year end, measured as the difference between the bid and ask price divided by the midpoint. CA_dummy is dummy variable coded 1 if the company declares the use of a combined assurance approach in its integrated report and 0 otherwise. CA_qual is a composite score ranging between 0–3 from adding the scores using equal weighting from the following three elements on the communication of combined assurance (CA) in the integrated report: (1) how well CA is described in the integrated report; (2) is there a conclusion made by the governing body on the basis of CA; (3) is information on CA presented in a self-contained manner or rather scattered through the integrated report. IR_qual is a dummy variable coded 1 if the disclosure quality of the integrated report is greater than the sample median and 0 otherwise. We obtain the disclosure quality of a company's integrated report from two sources: (1) the disclosure scores as used in Zhou et al. (2017) between 2009–2012; and (2) the rankings by Ernest & Young as published in the Excellence in Integrated Reporting Awards (EY 2013–-2016) between 2013–2015. SIZE is the natural logarithm of the company's total assets (in ZAR Millions) at the end of each fiscal year. VAREARN is the natural logarithm of the times-series standard deviation of earnings per share computed using a rolling window of a minimum of three years up to 10 years prior to the year concerned. ANANO is the average number of monthly forecasts made during the 12 months following fiscal year-end. FFIN is a dummy variable coded –1 if a company's average absolute accruals is more than the median of those within the same industry and same year and 0 otherwise. This variable proxies for financial transparency with a higher value reflecting better transparency. LOSS is a dummy variable equals 1 if the company reports negative earnings in the prior year, and 0. LOSS is a dummy variable equals 1 if the company reports negative earnings in the prior year, and 0. HORIZON is the forecast horizon, measured as the length of time between the forecasting date and the earnings announcement date. CSR is a dummy variable coded 1 if the company issues a standalone sustainability report in additional to the annual (integrated) report during the fiscal year, and 0 otherwise. BM is the book to market ratio as of fiscal year end. LEV is the leverage of the company calculated as the ratio of total debt divided by total assets as of fiscal year end.

Table 3: Pearson/Spearman correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	*FCERROR*	1	0.6695***	0.2791***	–0.1214***	–0.1346***	–0.0330	0.0516	0.1848***	–0.2005***	–0.0320	0.2010***	0.0088	0.1010**	0.4685***	–0.1363***
2	*FDISP*	0.5582***	1	0.2606***	–0.1520***	–0.1509***	0.0759*	0.1441***	0.2767***	–0.0937**	–0.0546	0.2387***	0.0239	0.1884***	0.5591***	–0.1421***
3	*SPREAD*	0.0254	0.0402	1	–0.2823***	–0.2092***	–0.1933***	–0.5513***	–0.1902***	–0.5213***	–0.1081**	0.0050	–0.0640	–0.2581***	0.2229***	–0.1043**
4	*CA_dummy*	0.0517	–0.0414	–0.1988***	1	0.7737***	0.1213***	0.2072***	0.1301***	0.2059***	0.1445***	0.0378	0.0663	0.0521	–0.0400	0.0355
5	*CA_qual*	–0.0036	–0.0569	–0.1116**	0.6556***	1	0.0968**	0.1422***	0.0823*	0.1470***	0.1177***	–0.0313	0.0131	0.0467	–0.0517	0.0999**
6	*IR_qual*	–0.0107	0.0408	–0.1561***	0.1213***	0.0864*	1	0.2181***	0.1363***	0.3184***	–0.0016	0.1352***	–0.1464***	0.1345***	0.0149	0.0495
7	*SIZE*	0.0153	0.0521	–0.2761***	0.1957***	0.1313***	0.2227***	1	0.3172***	0.3938***	0.1665***	0.1297***	0.1397***	0.3745***	0.2880***	0.2813***
8	*VAREARN*	0.0544	0.2503***	–0.1840***	0.1271***	0.0602	0.1315***	0.2529***	1	0.2486***	0.0616	0.0567	0.0152	0.1647***	0.1388***	–0.1687***
9	*ANANO*	–0.0496	–0.0222	–0.3472***	0.2043***	0.1051**	0.3195***	0.4025***	0.2536***	1	–0.0397	0.0229	–0.1056**	0.2366***	–0.2208***	0.1198***
10	*FFIN*	–0.0337	–0.0615	–0.0591	0.1445***	0.1372***	–0.0016	0.1812***	0.0628	–0.0412	1	–0.0242	0.0639	–0.0804*	0.1040**	–0.0681
11	*LOSS*	0.2597***	0.2644***	–0.0185	0.0378	–0.0061	0.1352***	0.0674	0.0497	0.0191	–0.0242	1	–0.1438	0.1255	0.1774	–0.0341
12	*HORIZON*	0.0244	0.0161	0.0442	0.0013	–0.0276	–0.0983**	0.1205***	–0.0208	–0.1041**	0.0396	–0.1051**	1	0.0287	0.2703***	–0.1181***
13	*CSR*	0.0058	0.1337***	–0.1426***	0.0521	0.0527	0.1345***	0.3437***	0.1779***	0.2302***	–0.0804*	0.1255***	–0.0177	1	0.0789*	0.0239
14	*BM*	0.2235***	0.4371***	0.0949**	–0.0691	–0.0503	0.0393	0.2111***	0.0384	–0.1838***	0.0151	0.1977***	0.1404***	0.0874*	1	–0.2203***
15	*LEV*	0.0029	–0.1262***	–0.1601***	0.0351	0.1028**	0.0630	0.3890***	–0.1697***	0.1358***	–0.0504	–0.0336	–0.0938**	0.0312	–0.1341***	1

Pearson (Spearman) correlation below (above) the diagonal. ***, **, *, indicate statistical significance at the 1%, 5% and 10% levels, respectively, two-tailed

FERROR is the forecast errors, measured as the logarithm of the average of the absolute errors of all forecasts made in the 12 months following the fiscal year-end concerned for target earnings, scaled by the share price at the fiscal year-end. FDISP is he forecast dispersion, measured as the standard deviation of analyst EPS median forecast and scaled by the share price at the fiscal year-end, averaged over the 12 months following the fiscal year-end. SPREAD is the average of the daily quoted spreads in months 1–12 after the fiscal year end, measured as the difference between the bid and ask price divided by the midpoint. CA_dummy is dummy variable coded 1 if the company declares the use of a combined assurance approach in its integrated report and 0 otherwise. CA_qual is a composite score ranging between 0–3 from adding the scores using equal weighting from the following three elements on the communication of combined assurance (CA) in the integrated report: (1) how well CA is described in the integrated report; (2) is there a conclusion made by the governing body on the basis of CA; (3) is information on CA presented in a self-contained manner or rather scattered through the integrated report. IR_qual is a dummy variable coded 1 if the disclosure quality of the integrated report is greater than the sample median and 0 otherwise. We obtain the disclosure quality of a company's integrated report from two sources: (1) the disclosure scores as used in Zhou et al. (2017) between 2009–2012; and (2) the rankings by Ernest & Young as published in the Excellence in Integrated Reporting Awards (EY 2013–-2016) between 2013–2015. SIZE is the natural logarithm of the company's total assets (in ZAR Millions) at the end of each fiscal year. VAREARN is the natural logarithm of the times-series standard deviation of earnings per share computed using a rolling window of a minimum of three years up to 10 years prior to the year concerned. ANANO is the average number of monthly forecasts made during the 12 months following fiscal year-end. FFIN is a dummy variable coded –1 if a company's average absolute accruals is more than the median of those within the same industry and same year and 0 otherwise. This variable proxies for financial transparency with a higher value reflecting better transparency. LOSS is a dummy variable equals 1 if the company reports negative earnings in the prior year, and 0. LOSS is a dummy variable equals 1 if the company reports negative earnings in the prior year, and 0. HORIZON is the forecast horizon, measured as the length of time between the forecasting date and the earnings announcement date. CSR is a dummy variable coded 1 if the company issues a standalone sustainability report in additional to the annual (integrated) report during the fiscal year, and 0 otherwise. BM is the book to market ratio as of fiscal year end. LEV is the leverage of the company calculated as the ratio of total debt divided by total assets as of fiscal year end.

Table 4: Regression results of the effect of CA on analysts' forecast errors
(Dependent variable is Analysts' forecast errors (FERROR))

IVs	Predicted Sign	(1)	(2)	(3)
		DV = Analysts' forecast errors (FERROR)		
		Base model	H1	H3
		IR_QUAL only	IR_QUAL and CA_QUAL	CA_QUAL * ANANO
CA_qual	–		–0.159*	–0.358**
			(–1.632)	(–1.801)
CA_qual* ANANO	+			0.0251
				(1.101)
IR_qual	–	–0.370***	–0.364***	–0.372***
		(–3.084)	(–3.037)	(–3.045)
SIZE	–	–0.316*	–0.312*	–0.280*
		(–1.505)	(–1.490)	(–1.331)
VAREARN	+	–0.0466	–0.0527	–0.0678
		(–0.375)	(–0.428)	(–0.555)
ANANO	–	0.00201	0.00165	–0.00727
		(0.0774)	(0.0633)	(–0.263)
FFIN	–	0.0228	0.0462	0.0506
		(0.193)	(0.384)	(0.419)
LOSS	+	0.430*	0.423*	0.428*
		(1.450)	(1.404)	(1.428)
HORIZON	+	0.00102	0.000839	0.000889
		(0.414)	(0.335)	(0.356)
CSR	–	–0.144	–0.130	–0.134
		(–0.909)	(–0.813)	(–0.819)
Year fixed effects		Yes	Yes	Yes
Constant		–1.900	–1.794	–1.980
		(–0.991)	(–0.941)	(–1.037)
Observations		591	591	591
R-squared		0.066	0.071	0.073
Adjusted *R*-squared		0.0433	0.0468	0.0476

All models are run with company fixed effects. Coefficient values (Robust *t*-statistics) are shown with standard errors clustered at the company level. ***, **, *, indicate statistical significance at the 1%, 5% and 10% levels, respectively, one-tailed.
The dependent variable is FERROR: the forecast errors, measured as the logarithm of the average of the absolute errors of all forecasts made in the 12 months following the fiscal year-end concerned for target earnings, scaled by the share price at the fiscal year-end. The independent variable is CA_qual: a composite score ranging between 0–3 from adding the scores using equal weighting from the following three elements on the communication of combined assurance (CA) in the integrated report: (1) how well CA is described in the integrated report; (2) is there a conclusion made by the governing body on the basis of CA; (3) is information on CA presented in a self-contained manner or rather scattered through the integrated report. The control variables are as follows: IR_qual is a dummy variable coded 1 if the disclosure quality of the integrated report is greater than the sample median and 0 otherwise. We obtain the disclosure quality of a company's integrated report from two sources: (1) the disclosure scores as used in Zhou et al. (2017) between 2009–2012; and (2) the rankings by Ernest & Young as published in the Excellence in Integrated Reporting Awards (EY 2013–-2016) between 2013–2015. SIZE is the natural logarithm of the company's total assets (in ZAR Millions) at the end of each fiscal year. VAREARN is the natural logarithm of the times-series standard deviation of earnings per share computed using a rolling window of a minimum of three years up to 10 years prior to the year concerned. ANANO is the average number of monthly forecasts made during the 12 months following fiscal year-end. FFIN is a dummy variable coded −1 if a company's average absolute accruals is more than the median of those within the same industry and same year and 0 otherwise. This variable proxies for financial transparency with a higher value reflecting better transparency. LOSS is a dummy variable equals 1 if the company reports negative earnings in the prior year, and 0. HORIZON is the forecast horizon, measured as the length of time between the forecasting date and the earnings announcement date. CSR is a dummy variable coded 1 if the company issues a standalone sustainability report in additional to the annual (integrated) report during the fiscal year, and 0 otherwise.

Table 5: Regression results of the effect of CA on analysts' forecast dispersion and bid-ask spread

IVs	Predicted Sign	(1)	(2)	(3)	(4)	(5)	(6)
		DV = Analysts' forecast dispersion (FDISP)			DV = Bid-ask spread (SPREAD)		
		Base model	H2	H3	Base model	H2	H3
		IR_QUAL only	IR_QUAL and CA_QUAL	CA_QUAL * ANANO	IR_QUAL only	IR_QUAL and CA_QUAL	CA_QUAL * ANANO
CA_qual	–		–0.201*** (–2.980)	–0.318*** (–2.243)		–0.00919 (–0.317)	–0.136** (–1.763)
CA_qual* ANANO	+			0.0144 (0.847)			0.0157*** (2.002)
IR_qual	–	–0.195** (–1.709)	–0.178* (–1.597)	–0.183* (–1.618)	–0.0661** (–1.648)	–0.0655** (–1.637)	–0.0702** (–1.761)
SIZE	–	–0.439*** (–2.760)	–0.449*** (–2.931)	–0.427*** (–2.739)	–0.362*** (–5.248)	–0.363*** (–5.236)	–0.339*** (–4.941)
VAREARN	+	–0.0189 (–0.203)	–0.0223 (–0.233)	–0.0308 (–0.323)	–0.0423 (–0.742)	–0.0425 (–0.740)	–0.0497 (–0.863)
ANANO	–	0.0943*** (2.760)	0.0943*** (2.821)	0.0894*** (2.461)	0.00103 (0.0957)	0.00121 (0.112)	–0.00731 (–0.625)
FFIN	–	–0.0117 (–0.170)	0.0224 (0.354)	0.0253 (0.398)	–0.0389 (–1.121)	–0.0375 (–1.107)	–0.0373 (–1.111)
LOSS	+	–0.175 (–1.002)	–0.199 (–1.155)	–0.198 (–1.142)	0.0851 (1.167)	0.0834 (1.136)	0.0859 (1.203)
HORIZON	+	0.00842*** (5.004)	0.00839*** (5.108)	0.00836*** (5.081)			
CSR	–	–0.215** (–1.819)	–0.196** (–1.695)	–0.202** (–1.741)	–0.0252 (–0.600)	–0.0245 (–0.580)	–0.0283 (–0.665)
BM	+				0.470*** (7.813)	0.467*** (7.869)	0.467*** (8.024)
LEV	+				0.764*** (2.716)	0.763*** (2.711)	0.741*** (2.723)
Year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
Constant		–4.195*** (–2.786)	–3.980*** (–2.720)	–4.103*** (–2.800)	–3.281*** (–7.220)	–3.265*** (–7.110)	–3.368*** (–7.306)
Observations		592	592	592	564	564	564
R-squared		0.213	0.230	0.232	0.572	0.573	0.579
Adjusted *R*-squared		0.193	0.210	0.210	0.561	0.560	0.566

All models are run with company fixed effects. Coefficient values (Robust *t*-statistics) are shown with standard errors clustered at the company level. ***, **, *, indicate statistical significance at the 1%, 5% and 10% levels, respectively, one-tailed. The dependent variable for model 1, 2 and 3 is FDISP: the forecast dispersion, measured as the standard deviation of analyst EPS median forecast and scaled by the share price at the fiscal year-end, averaged over the 12 months following the fiscal year-end. The dependent variable for model 4, 5 and 6 is SPREAD: the average of the daily quoted spreads in months 1–12 after the fiscal year end, measured as the difference between the bid and ask price divided by the midpoint. The independent variable is CA_qual: a composite score ranging between 0–3 from adding the scores using equal weighting from the following three elements on the communication of combined assurance (CA) in the integrated report: (1) how well CA is described in the integrated report; (2) is there a conclusion made by the governing body on the basis of CA; (3) is information on CA presented in a self-contained manner or rather scattered through the integrated report. Please refer to Appendix 2 for all other variable definitions.

Table 6 Heckman's two stage analyses

Table 6a: First stage analysis – Determinants of CA

IVs	DV = CA_dummy
BIG 4	–0.7089***
	(1.97)
SIZE	–0.0095
	(–0.09)
VAREARN	0.1048*
	(1.36)
ANANO	0.0167
	(0.57)
FFIN	0.1673
	(1.01)
LOSS	0.3341
	(0.96)
ROA	0.2563
	(0.19)
FOREIGNSALES	–0.0077***
	(–2.27)
CSR	–0.1762
	(–1.05)
BM	0.0615
	(0.29)
LEV	0.2450
	(0.49)
IR_policy	1.9346***
	(10.36)
FDISP	–0.1418
	(–1.06)
SPREAD	–0.5133***
	(–2.66)
Industry fixed effects	Yes
Constant	–5.565***
	(–3.84)
Observations	448
Adjusted *R*-squared	0.3499

A probit model is used to estimate the determinants of CA. Coefficient values (Robust *t*-statistics) are shown with standard errors clustered at the company level. ***, **, *, indicate statistical significance at the 1%, 5% and 10% levels, respectively, one-tailed. The dependent variable is CA_dummy, a dummy variable coded 1 if the company declares the use of a combined assurance approach in its integrated report and 0 otherwise. Please refer to Appendix 2 for all other variable definitions.

Table 6 Heckman's two stage analyses - continued

Table 6b: Second stage analysis – Regression results of the effect of combined assurance model on analysts' forecast accuracy, dispersion and bid-ask spread with the inverse mills ratio (INVMILLS) calculated from the first stage analysis included

IVs	Predicted Sign	(1)	(2)	(3)	(4)	(5)	(6)
		DV = Analysts' forecast errors (FERROR)		DV = Analysts' forecast dispersion (FDISP)		DV = Bid-ask spread (SPREAD)	
		H1	H3	H2	H3	H2	H3
		IR_QUAL and CA_QUAL	CA_QUAL* ANANO	IR_QUAL and CA_QUAL	CA_QUAL * ANANO	IR_QUAL and CA_QUAL	CA_QUAL * ANANO
CA_qual	–	–0.307*** (–2.443)	–0.694*** (–2.768)	–0.158*** (–2.103)	–0.423*** (–2.397)	–0.0706** (–1.865)	–0.269*** (–2.838)
CA_qual* ANANO	+		0.0474** (1.802)		0.0316** (1.758)		0.0236*** (2.419)
INVMILLS		0.204*** (2.285)	0.208*** (2.344)	0.0357 (0.752)	0.0378 (0.808)	0.0563*** (2.213)	0.0578*** (2.249)
IR_qual	–	–0.287*** (–2.259)	–0.307*** (–2.400)	–0.0919* (–1.433)	–0.105* (–1.519)	–0.0739** (–1.787)	–0.0839*** (–2.059)
SIZE	–	–0.231 (–0.871)	–0.146 (–0.561)	–0.347*** (–2.757)	–0.293*** (–2.483)	–0.250*** (–3.128)	–0.205*** (–2.636)
VAREARN	+	–0.114 (–1.086)	–0.145* (–1.393)	–0.0193 (–0.243)	–0.0346 (–0.457)	–0.0683 (–0.948)	–0.0801 (–1.102)
ANANO	–	–0.00636 (–0.164)	–0.0351 (–0.838)	0.0123 (0.637)	–0.00530 (–0.267)	–0.00159 (–0.127)	–0.0148 (–1.082)
FFIN	–	0.153 (1.236)	0.144 (1.159)	0.0929* (1.420)	0.0864* (1.324)	0.00187 (0.0465)	–0.00270 (–0.0681)
LOSS	+	0.0415 (0.190)	0.0446 (0.212)	–0.0313 (–0.329)	–0.0246 (–0.258)	0.00746 (0.0935)	0.0125 (0.162)
HORIZON	+	–0.000911 (–0.336)	–0.00124 (–0.444)	0.00872*** (6.450)	0.00853*** (6.123)		
CSR	–	–0.0252 (–0.163)	–0.0253 (–0.159)	–0.0480 (–0.533)	–0.0570 (–0.627)	0.000746 (0.0165)	–0.00645 (–0.143)
BM	+					0.464*** (7.091)	0.461*** (7.436)
LEV	+					0.409* (1.385)	0.382* (1.387)
Year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
Constant		–1.973 (–0.890)	–2.320 (–1.059)	–4.600*** (–4.201)	–4.823*** (–4.600)	–3.952*** (–7.202)	–4.170*** (–7.713)
Observations		419	419	448	448	448	448
R-squared		0.077	0.085	0.267	0.280	0.552	0.567
Adjusted *R*-squared		0.0401	0.0464	0.239	0.251	0.535	0.549

All models are run with company fixed effects. Coefficient values (Robust *t*-statistics) are shown with standard errors clustered at the company level. ***, **, *, indicate statistical significance at the 1%, 5% and 10% levels, respectively, one-tailed.

The dependent variable for model 1 and 2 is FERROR: the forecast errors, measured as the logarithm of the average of the absolute errors of all forecasts made in the 12 months following the fiscal year-end concerned for target earnings, scaled by the share price at the fiscal year-end. The dependent variable for model 3 and 4 is FDISP: the forecast dispersion, measured as the standard deviation of analyst EPS median forecast and scaled by the share price at the fiscal year-end, averaged over the 12 months following the fiscal year-end. The dependent variable for model 5 and 6 is SPREAD: the average of the daily quoted spreads in months 1–12 after the fiscal year end, measured as the difference between the bid and ask price divided by the midpoint. The independent variable is CA_qual: a composite score ranging between 0–3 from adding the scores using equal weighting from the following three elements on the reporting of combined assurance (CA) in the integrated report: (1) how well CA is described in the integrated report; (2) is there a conclusion made by the governing body on the basis of CA; (3) is information on CA presented in a self-contained manner or rather scattered through the integrated report. Please refer to Appendix 2 for all other variable definitions.