Risk reporting: A review of the literature and implications for future research*

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Tamer Elshandidy**

University of Bradford

T.Elshandidy@bradford.ac.uk

Philip J. Shrives

Northumbria University

Philip.Shrives@northumbria.ac.uk

Matt Bamber

University of Toronto

matt.bamber@rotman.utoronto.ca

Santhosh Abraham

Excelsior College

SAbraham1@excelsior.edu

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**Correspondence should be addressed to Tamer Elshandidy, Bradford University School of Management, the University of Bradford, Emm Lane, Bradford, BD9 4JL. Email: T.Elshandidy@bradford.ac.uk

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Abstract:

This paper provides a wide-ranging and up-to-date (1997-2016) review of the archival empirical risk-reporting literature. The reviewed papers are classified into two principal themes: the incentives for and/or informativeness of risk reporting. Our review demonstrates areas of significant divergence in the literature specifically: mandatory versus voluntary risk reporting, manual versus automated content analysis, within-country versus cross-country variations in risk reporting, and risk reporting in financial versus non-financial firms. Our paper identifies a number of issues which require further research. In particular we draw attention to two: first, a lack of clarity and consistency around the conceptualization of risk; and second, the potential costs and benefits of standard-setters' involvement.

JEL Classifications: D82 ; G14 ; G18 ; M41 ; M42
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1. Introduction

A substantial body of risk-reporting regulations (e.g., ICAEW, 1997, 2011; SEC, 1997, 2010) has emerged demanding greater quantity and quality in firms' risk reporting. A series of accounting scandals and the recent financial crisis have emphasized the importance of this topic. Hence, there has been a great deal of scrutiny of firms' risk-reporting practices (e.g., Pérignon & Smith, 2010; Singleton-Green, 2012). Various groups of stakeholders have urged regulators to act to ensure that users of financial statements are protected from material levels of information asymmetry (Bamber & McMeeking, 2015). The complexities and controversiality of regulating risk-reporting practices, as well as the regulations themselves, have played a major role in the emergence of a large and growing risk-reporting literature.

This study collates and critically discusses the recent risk-reporting research, highlights trends and patterns, and suggests opportunities for future research. The following aspects of this article are noteworthy: it focuses on archival empirical studies of external risk reporting; it is a wide-ranging review of recent literature (1997-2016); and it complements and extends previous reviews (i.e., Ryan, 1997, 2012a).

Our review considers literature that deals with external risk reporting as part of a firm's disclosure strategy, which we organize around two themes: (i) the underlying drivers and determinants (the main incentives) that motivate firms to provide risk information; and (ii) whether externally reported risk information is informative, by observing its impact on market indicators (e.g., the stock price, investor-perceived risk, market liquidity). This focus allows us to build on the recent trend in the literature for examining the narrative sections of firms' annual reports (for a review see, Beattie, 2014). The study of risk reporting has been facilitated by the availability of machine-readable data and the increased(-ing) sophistication of automated content analysis software, methodologies, and techniques (for a review see, Li, 2010; Loughran & McDonald, 2016). Thus, our paper also supplements these recent reviews of narrative disclosures and content analysis with a practical focus on risk reporting.

Our article provides a wide-ranging review of the recent literature. We cover papers published between 1997, the year of the last published similarly wide-ranging survey of Ryan (1997), and 2016 that have appeared in an internationally recognized peer-reviewed journal. We define such journals according to the UK's Association of Business Schools (ABS) journal quality ranking guide (i.e., those termed 3 star and 4 star journals), the Australian Business Deans' Council, ABDC, (i.e., those termed A or A star journals), or the Financial Times 50 journals (FT50), which are compiled based on the Business School research rank in America and Canada. We review 32 papers. Table 1 provides details of these, categorizing each according to their primary theme (i.e., incentives, informativeness, or both).

[Insert Table 1 about here]

Our article complements Ryan (1997) and extends Ryan (2012a). Our survey reviews work on risk disclosure that has been published after Ryan (1997) and synthesizes its principal themes into incentives for risk disclosure and/or informativeness of risk information. Ryan (1997) concludes that disclosure guidelines should concentrate on providing useful decision-making information to help investors identify sources of risk. This information should enable investors to determine both the *ex-ante* exposure to risk and the *ex post* realization of risk. Ryan (2012a) focuses mostly on the potential opportunities offered by risk information and concludes that firms do not appear to estimate – and auditors, analysts, and others do not appear to evaluate – fair values with as much effort if these values are *disclosed* rather than *recognized*.

Our review differs significantly from Ryan's (2012a) highly-selective and primarily policy-oriented risk-reporting survey. For example, our paper discusses the distinctions between, and implications of, research on (i) mandatory versus voluntary disclosures, emphasizing differences between the incentives for, and informativeness of, risk reporting; (ii) quantitative versus qualitative disclosures; and (iii) risk reporting in the US versus international settings.

Our paper makes three important contributions to knowledge. First, we provide an up-to-date review of the recent risk-reporting literature. We identify existing gaps and provide

suggestions as to how future research might fill them. Second, this paper exposes the significant areas of divergence in the literature in relation to key risk-reporting themes. Highlighting and discussing these areas provides the opportunity to offer suggestions for future research, collaboration, and reconciliation, particularly across countries. Finally, given that the international standard-setters are reassessing their stance on disclosure requirements while at the same time developing a risk-reporting framework, our study provides guidance on the various differences between risk-reporting approaches. Specifically, our paper identifies important areas of divergence between the US-based and EU/Australasian (AUS)-based research on risk reporting and, in so doing, establishes a wider understanding of the debate on international convergence. These areas include the following: (i) the majority of EU/AUS research focuses on why firms might reveal risk information while the majority of US research is concerned with how the market reacts to risk information that is principally provided under Securities and Exchange Commission (SEC) requirements; (ii) US-based research predominantly focuses on mandatory disclosure while the EU/AUS work considers voluntary, quasi-voluntary or quasi-mandatory, and mandatory disclosure; and (iii) the methodological approach varies with EU/AUS-based research generally employing manual data collection and analysis, and focusing on shorter time periods (normally one year), while recent US-based research shows a preference towards computerized content analysis approaches that allow the gathering of extensive datasets over longer time periods. Figure 1 summarizes the criteria for paper selection, identifies the main themes, and provides details of those divergent features.

[Insert Figure 1 about here]

This paper proceeds as follows: Sections 2, 3 and 4 critique the recent archival empirical research on the incentives for, and informativeness of, risk reporting. Section 5 identifies the key areas of divergence between these studies, draws conclusions, and proposes a number of avenues for future research.

2. Empirical research on the incentives for risk reporting

This section discusses studies that examine why firms reveal different quantities and qualities of risk information. Three main methodological approaches have been adopted to address the 'incentives' question. The most common is that of manual and/or automated content analysis using either number of sentences or words, or both. Among the 16 studies that focus on incentives, five adopt a manual approach, and three utilize an automated approach. Six studies adopt some form of disclosure index and two use questionnaires. Given that the two questionnaire-based studies preceded the others, we begin our discussion there. We then proceed to the content analysis studies, leading to those that specifically employed disclosure indices. Additional related details are provided in Table 2 (jurisdiction, sample, findings, theory, and limitations).

[Insert Table 2 about here]

2.1 Questionnaires

We identified two studies utilizing a questionnaire approach. Solomon (1999) surveys 40 UK-based institutional investors to investigate the extent to which UK investment institutions are likely to adopt a single (managing the foreign exchange risk of their own portfolios) or a dual (also encouraging their investee firms to engage in a hedging relationship) strategy to reduce expected losses related to foreign exchange risk. She finds an increased awareness of the importance of managing foreign exchange risk. Institutional investors are likely to pay attention not only to their own portfolios but also to those of their investee firms. She also finds that UK institutional investors demanded more information on how firms manage their risks than currently was being disclosed.

Based on 97 questionnaires, Solomon et al. (2000) find UK institutional investors generally do not favor a regulated corporate risk disclosure environment or a general statement of business risk. Respondents indicated that risk disclosures were informative in relation to their portfolio investment decisions but were neutral in attitude towards other aspects. The variations

in attitudes towards risk disclosures among UK institutional investors seem to be driven by the type of fund managed and their investment horizons. Solomon et al. (2000) also develop a framework portraying how various stages (e.g., identification, estimation and disclosure of risk) are required to achieve better reporting of firms' riskiness. Concentrating on the reporting of information about firms' riskiness, they find UK institutional investors rely on corporate reports as a key source of risk information, preferring the voluntary format.

In this first group, the two studies emphasize some important aspects which are repeated in the next two groups of studies. They claim that risk information in annual reports is useful and that mandatory requirements can encourage additional discretionary risk reporting.

2.2 Content analysis

The second group uses manual or automated content analysis. First, we examine those using the manual approach. One of the most influential, arguably, is Beretta and Bozzolan (2004). Shevlin (2004) claims their work signifies a step forward in the construction of a measure suitable for voluntary disclosure research. They propose a framework, comprising four dimensions, to analyze firms' risk disclosures, namely: *quantity, density, depth, and outlook profile*.[1] They argue that attention must be paid not only to the volume of disclosure but also to the questions of what is disclosed and how. They find that the quantity of risk disclosure for their sample of Italian firms is mainly driven by firm size as opposed to industry type. Interestingly, however, the results for the overall quality of risk disclosure suggest that neither size nor industry dominates the managerial risk disclosure decision, but rather the influence of these two factors varies across the four dimensions. Beretta and Bozzolan (2004: 265) conclude with the claim that their proposed synthetic measure of risk reporting "can be used to rank the quality of the disclosure of risks."

[1] The definitions of these dimensions are interesting. Rather than being 'as is', the raw *quantity* of disclosure (number of risk-reporting related phrases in the Management Discussion and Analysis [MD&A]) is adjusted for two external factors to create a relative measure: (i) industry, and (ii) size. *Density* is defined as the ratio between the number of sentences in which risk information is provided over the total number of sentences included in the MD&A. In their framework, *depth* is defined by two properties: (i) the sign of the economic impact (i.e., positive, negative, equal, or not disclosed) of the risk-related disclosure; and (ii) the measures used to communicate the expected performance. *Outlook profile* refers to how management communicate the approach adopted to face the risks identified, thus distinguishing between those who simply identify risks and those who provide information about how management intend to mitigate them (Beretta & Bozzolan, 2004: pp. 271-275).

Although Beretta and Bozzolan's (2004) study has been influential, Shevlin (2004) and Botosan (2004) assert that it is difficult to apply the proposed methodology as it requires an intensive manual data collection period and involves substantial subjectivity in its application. Shevlin (2004) also raises questions about the gap between the dimensions of the proposed framework and their underlying theoretical development. Despite this, he proposes two areas of extension: First, developing and testing predictions about the cross-sectional variation in the synthetic risk disclosure measure developed by Beretta and Bozzolan (2004; described above) would help to explain firms' choices over the voluntary risk disclosure level. Second, examining whether this measure is associated with firms' equity and debt cost of capital would shed light on usefulness – in a conventional economic sense – of risk information. In her discussion of Beretta and Bozzolan (2004), Botosan (2004) provides an alternative method for measuring the quality of a firm's risk disclosure. She draws on the definition of quality of information from the extant International Accounting Standards Board's (IASB) conceptual framework i.e., quality is a function of relevance, reliability, understandability and comparability.

Also addressing this issue of the quantity and quality of risk reporting, Miihkinen (2012) investigates the impact of the implementation of a detailed Finnish risk-reporting standard on firms' overall risk disclosure. To obtain quantity and quality scores, he uses manual content analysis based on both the number of words and sentences (see Table 2, content analysis [code unit]) a firm discloses in its annual report's risk review section. Quality scores are calculated using the principal component of three proxies, namely: *quantity of disclosure* (number of words), *coverage of disclosure* (concentration of disclosure topic among five types), and *the semantic properties of the disclosure* (contains two dimensions, *depth* and *outlook*, the former looking at both quantitative and qualitative effects of risk disclosure, the latter looking at action taken and/or programs planned to reduce risk). He finds that both quantity and quality increase as a result of the implementation of this new Finnish standard; although it should be noted that the level of quantitative disclosure was not found to increase significantly which could mean that this more comprehensive

information is symbolic in nature, rather than substantive. This conclusion is consistent with Abraham and Shrives' (2014) findings, albeit in a different jurisdiction (i.e., the UK). Miihkinen's (2012) findings indicate that the quality of risk disclosure is associated with size, profitability, listing status, risk, growth, and foreign ownership. In further analyses, he finds that the observed impact of the risk standard, and other incentives, are more pronounced among loss-making firms, and that poorly-performing firms are likely to face more pressure from investors to provide high-quality risk information as a response to their business risk.

Another study adopting manual content analysis is the frequently cited Linsley and Shrives (2006). It seeks to identify the main drivers of the quantity of aggregate risk disclosure by classifying each sentence into the following categories: financial/non-financial, monetary/non-monetary, good news/bad news, and forward-looking/historic. The findings show that firm size, and to a lesser extent environmental risk are statistically associated with risk disclosure, whereas gearing, asset cover, and other measures of risk (i.e., beta and the book-to-market value of equity) are not. Abraham and Cox (2007) adopt a similar approach – manual content analysis – to investigate the impact of corporate governance factors on risk disclosure. They identify and subsequently classify risk disclosure sentences into one of the following four categories of risk: total, business, financial, and internal control. Following this, they count the number of words within each sentence. They also consider the location of the risk disclosure within the annual report. This is potentially an important issue, as the location of risk disclosure can detract from its usefulness (Ryan, 2012a). Using data from a UK context, they find that the number of executive directors and the number of independent non-executive directors is significantly positively related to higher levels of aggregated risk reporting. Other factors which are also positively and significantly related include lower institutional ownership and dual-listing (UK/US). These results are consistent across three of the four categories, namely: total, business, and financial. However, the results related to the levels of internal control risk reporting are mixed.

Lastly in this series of papers adopting a manual approach, Ntim et al. (2013) examine the effect of corporate governance on the quality and extent of risk disclosure in South African companies. In this case, they count risk-related sentences and employ a self-developed 50-item index to measure the quality of this disclosure. They find risk disclosure to be largely non-financial, historical, qualitative (non-monetary) in nature, and consisting of good news. They also find corporate risk disclosure is negatively related to block ownership and institutional ownership and positively related to board diversity, board size, and the number of independent non-executive directors.

Recently, accounting research has shifted towards automated approaches for content analysis, and to this end, our review identifies three papers employing this approach in the field of risk reporting. Elshandidy et al. (2013) investigate the impact of corporate risk levels on aggregated, voluntary, and mandatory risk disclosure in annual report narratives. Utilizing a list of risk-related words (e.g., risk, shortage, threat, and uncertain), they produce aggregated risk scores. Selecting words to be included in lists, such as this, is a non-trivial endeavor. To help mitigate this problem, Elshandidy et al. (2013: 324) draw on three sources of information: prior academic and professional research on risk concepts, Roget's Thesaurus, and other words indicative of risk, identified by reviewing the annual report narratives. They identify mandatory risk scores by developing a list of six themes or topics that reflect the mandatory requirements of the Accounting Standards Board (ASB) and the IASB. These are: contingencies, segment reporting, foreign exchange transactions, substance of transactions or investments, related-party disclosures, and derivatives. They subtract the mandatory risk score from the aggregate risk scores to obtain voluntary risk scores. They note that while the aggregated risk scores are consistent with the voluntary risk scores in relation to risk levels, those scores, however, are inconsistent with the mandatory scores in relation to risk levels. This suggests that each disclosure type (i.e., mandatory and voluntary) has a different set of drivers. After discriminating between high- and low-risk firms based on their betas, they find that high-risk firms are more

likely to disclose both mandatory and voluntary risk information in response to their corporate risk levels.

Adopting a similar approach but on a larger scale, Elshandidy et al. (2015) explore whether, and if so to what extent, firm and country characteristics influence variations in mandatory and voluntary disclosure. They draw on data from non-financial firms across three countries. This jurisdictional analysis shows that UK and German firms tend to use voluntary risk reporting to complement mandatory risk reporting, whereas US firms use voluntary risk reporting to substitute mandatory risk reporting. Their results document that variations in mandatory and voluntary risk reporting are influenced by systematic risk, the legal system, and cultural values. They also find that the legal system and cultural values have high explanatory power for mandatory risk reporting variations over time, but are less important in explaining variations in voluntary risk reporting between firms in different countries.

Finally, considering quality and quantity of information, Malafronte et al. (2016) adopt an automated content analysis approach to study the incentives for risk reporting in insurance firms. The results show that European insurers focus on quantity rather than quality of risk information. The amount of risk information provided in an annual report is associated with size and technical provision[2], and country-level characteristics. Interestingly, they also find that managers provide more risk information to highlight their independence from the global financial crisis. For example, they find that the CEO's letter to shareholders often describes and discusses how the firm has faced and/or overcome the crisis. Indeed, they find that most companies in their sample use their risk disclosure to talk about the financial crisis, as opposed to ignoring it, and to explain how they are – or how they enacted strategies to make themselves appear – independent from it.

[2] Technical provisions represent the amount that an insurer requires to fulfil its insurance obligations and settle all expected commitments to policyholders and other beneficiaries arising over the lifetime of the insurer's portfolio of insurance contracts.

Summarizing this second group, inevitably, different studies produce different results because they use different methods and samples, from different times, and examine different countries. However, a clear implication is that size is positively associated with increased disclosure, and another is that regulation can lead to more voluntary reporting, such that mandatory and voluntary reporting are often complements rather than substitutes. In addition, risk reporting tends to be more non-financial than financial, historic rather than future orientated, good news rather than bad, and qualitative rather than quantitative.

2.3 Disclosure indices

The third group we identify employs a topic that has a long history in accounting – the disclosure index. Indeed, there is a comprehensive review of the early papers in this field which dates back to 1991 (Marston & Shrives, 1991). Our review starts somewhat later, with Marshall and Weetman (2007), who examine the risk information asymmetry gap by comparing UK and US non-financial firms' external risk reporting against the managerial information set; determining the former by way of a disclosure index and the latter by way of a survey. The index is constructed around the themes covered by the survey. In other words, they do not measure compliance with UK or US accounting standards *per se*, but focus on issues that they expect to be disclosed based on responses to their survey. Ultimately, this covers the key theme of foreign exchange risk disclosure. They find that disclosures provided by firms in both jurisdictions are incomplete. They show the information gap to be lower in the USA – where firms have higher levels of financial risk – and the gap is greatest for firms operating in competitive product markets. In contrast, the UK evidence suggests that the information gap is narrowest when financial risk is higher. They argue that regulators should be given flexibility to determine risk disclosure requirements according to jurisdiction-specific management disclosure practices.

Deumes and Knechel (2008) employ a risk reporting disclosure index – based on six separately identifiable internal control factors, to investigate whether, and if so to what degree, the legal regulatory environment and the existence of agency conflicts incentivize the voluntary

provision of risk information. They find that economic incentives for voluntary internal control reporting exist in a low-regulation context, as in the Netherlands. Additionally, they find a negative relationship between the extent of internal control disclosure and management and block holder ownership, as well as a positive relationship between the extent of such disclosure and financial leverage. They suggest that regulators might wish to allow firms flexibility in their risk-related internal control reporting choices.

Looking at initial public offerings (IPOs) on the London Stock Exchange, Hill and Short (2009) undertake a manual content analysis of firms' risk warning statements and IPO prospectuses to develop an index based upon the existence of risk warning disclosures. They analyze risk topics into the following seven categories: (i) internal risks; (ii) external risks; and (iii) corporate development; (iv) third-party risks; (v) information risks; (vi) ongoing claims and disputes; and (vii) 'boiler plate' disclosures. Following this coding exercise, they draw on frameworks developed in prior work – namely, Beattie, McInnes and Fearnley (2004), Beretta and Bozzolan (2004), and Linsley and Shrives (2006) – to assess the quality of risk disclosure over time (1991-2003). They analyze the types of disclosure along the following dimensions: (i) time orientation; (ii) financial/non-financial; (iii) quantitative/qualitative; (iv) economic sign; and (v) risk management strategies. They find that while firms tend to reveal a high proportion of forward-looking information, they tend to reveal a low proportion of information on internal controls and risk management. The results also document that managerial ownership is negatively associated with risk disclosure.

Taylor et al. (2010) find that levels of corporate governance and the need to raise capital are positively related to the 'extent' of Australian firms' mandatory and discretionary financial risk disclosure; where extent is measured using an index comprising 27 financial risk management disclosure items consisting of 13 mandatory items and 14 discretionary ones. The results also indicate that an overseas exchange listing is negatively associated with these firms' financial risk disclosures. Interestingly, being cross-listed also has a negative impact on the

quantity of both mandatory and voluntary risk information. Taylor et al. (2010) also note significant positive impact of International Financial Reporting Standards (IFRS) adoption on that information being revealed. Finally, they find that larger and highly leveraged firms tend to provide more risk information.

Using the disclosures of European banks (85 banks from 20 EU countries) as their context, Barakat and Hussainey (2013) investigate the direct and joint effects of governance, regulation, and supervision on the quality of operational risk disclosure. They define direct effects as firm-level managerial risk disclosure decisions, and joint effects as a function of contagion, driven by a combination of availability of information through other sources and mandatory requirements of accounting standards. They use a self-constructed disclosure index to measure operational risk disclosure, composed of 14 main themes[3], and comprising 4 sub-items per theme[4] (binary-coded, maximum score 56 points). They find that bank governance has a significant positive impact on operational risk disclosure, and that supervision is an essential element of that impact.

Also using banks' risk reporting as their context, Al-Hadi et al. (2016) investigate the impact of a risk committee and its characteristics on market risk disclosure. Interestingly, they examine banks' disclosures in a less developed market, namely in the Gulf Cooperation Council (GCC) region. The GCC is a regional political organization comprising the energy rich Gulf monarchies, namely Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. They find that banks with a separate risk committee provide more market risk disclosure. These banks' decisions regarding the disclosure of risk information are also influenced by risk

[3] These themes are as follows: (i) amount of regulatory capital for operational risk; (ii) measurement approach of regulatory capital for operational risk; (iii) strategies and processes of operational risk management; (iv) structure and organization of the operational risk management function; (v) scope and nature of the operational risk reporting system; (vi) operational risk transfer/mitigation/hedging techniques; (vii) operational value-at-risk; (viii) internal audit function/internal control system; (ix) key risk indicators/early warning systems; (x) self-assessment techniques; (xi) scorecard models/scenario analysis/stress tests; (xii) operational risk event databases; (xiii) legal risks; and (xiv) additional information on operational risk exposure and management.

[4] These 14 main themes have four standardized sub-items which lead to the maximum score of 56 points: (i) qualitative information; (ii) quantitative information; (iii) forward-looking information; and (iv) graphical illustration or tabular presentation.

committee characteristics including size and the qualification status of the members. The results are more pronounced for more mature banks.

To summarize, this third group of studies shows that risk disclosures are often more extensive in larger companies or companies with superior corporate governance. Several of these studies advise regulators to allow some flexibility regarding disclosure so that companies can follow the spirit of risk reporting, without the constraints on the flow of information which might arise from over-regulation (Deumes & Knechel, 2008; Marshall & Weetman, 2007). This is consistent with the recommendation from the second group of studies (using content analysis) that flexible regulation can encourage more voluntary reporting. The 'comply or explain' approach used in corporate governance may be the way to encourage better reporting. The rationale behind 'comply or explain' is that it allows the market to decide what is (ir)relevant. Under this system, regulators set out a code which listed companies may either comply with, or if they do not comply, explain publicly why they do not.

Overall, research in this area examines factors (at firm and country levels) that motivate firms to provide information about their risks in their annual reports. Table 3 lists these 16 articles on incentives for risk reporting, identifies areas of divergence (based on method and context), thereby suggesting a way forward for future research (see Section 5).

[Insert Table 3 about here]

3. Empirical research on the informativeness of risk reporting

This section discusses studies examining whether risk information is informative for shareholders, reviewing 12 papers that can be broadly classified based on their datasets and the methods used to measure risk disclosure and informativeness. Table 4 provides more details on these papers, summarizes their findings, and provides insights into potential extensions and/or limitations.

[Insert Table 4 about here]

Much of the work related to the informativeness of risk disclosure is based on US companies (nine articles out of 12). Further, the majority of studies rely on either a manual or an automated content analysis technique, utilizing sentence and/or word as a unit of coding to quantify risk information that is then examined for statistical associations with various stock market indicators. Our discussion below is divided into two broad themes based on US and non-US research that examines the informativeness of risk disclosure. Within each theme, we highlight variations in the methods employed to measure risk disclosure informativeness.

3.1 Risk reporting: US Evidence

Among the nine papers that use US datasets, the early evidence (i.e., Akhigbe & Martin, 2008; Hodder & McAnally, 2001; Jorion, 2002; Rajgopal, 1999; Roulstone, 1999) is based on small sample sizes that are industry-orientated (oil and gas, non-financial firms, and financial firms). However, the recent US-based research (i.e., Bao & Datta, 2014; Filzen, 2015; Hope et al., 2016; Kravet & Muslu, 2013) makes use of much larger datasets, of structured filings (i.e., 10-Ks) that are publicly available, and advances in machine-learning based techniques which make quantification-based measures more straightforward to perform.

Rajgopal (1999) is among the early studies examining the informativeness of FRR No. 48 disclosures. [5] He uses US oil and gas firms as the context to his study. He finds that market risk disclosure is positively associated with equity return sensitivity to oil and gas price changes, suggesting that such disclosure is informative. His findings also show that investors are sensitive to the various formats in which information is presented, in this case, tabular and sensitivity analysis.[6] The results suggest that these formats provide different information, each is incrementally valuable, and they are not substitutes for each other.

[5] This Securities and Exchange Commission Financial Reporting Release requires companies to disclose both quantitative and qualitative information about potential losses arising from the use of financial instruments, and covers interest rates, commodity prices, foreign currency rates, and equity investments. In so doing, companies have the choice of disclosure formats - tabular, sensitivity analysis, and Value at Risk (VaR) – as well as three measurement bases - cash flows, earnings, and fair values.

[6] Note, Rajgopal (1999) does not discuss the Value at Risk format.

In contrast to Rajgopal's (1999) conclusion that the different disclosure formats are incrementally informative, Hodder and McAnally (2001) suggest that FRR No. 48 disclosures hamper investors' comparisons of companies because of the flexibility over disclosure formats and measurement basis. Furthermore, they claim that FRR No. 48 requirements related to the disclosure of quantitative information are not sufficiently informative to enable investors to evaluate market risk exposure fully. They propose a methodology for converting the quantitative information content of market risk disclosures under the tabular format to sensitivity measures (pp.67-71), and also from the tabular format to Value at Risk (pp.71-74).

On the same theme, Roulstone (1999) finds that whilst there is evidence of an increase in the amount of financial risk disclosure following the release of FRR No. 48, there is variation across firms, a lack of detail regarding the assumptions and limitations in sensitivity and VaR disclosures, and a lack of firm-specific information. In a similar vein, but focusing on financial firms, Jorion's (2002) investigation of the relation between VaR disclosures and the subsequent variability of banks' unexpected trading revenues, finds VaR disclosures useful in predicting trading revenue in the banking sector, for a sample of eight banks. Using a self-constructed disclosure index to measure the VaR disclosure for the largest 10 US banks from 1996 to 2005, Pérignon and Smith (2010) find that there is an upward trend in the quantity of VaR disclosure and historical simulation is by far the most common method used in calculating VaR.[7] They also find that VaR disclosure is not informative as it does not impact the future volatility of trading revenues.

The five above-mentioned papers focus principally on the impact of risk regulations (i.e., SEC requirements) on market indicators. A further important consideration which can affect managerial disclosure decision-making is the level of corporate governance. Akhigbe and Martin

[7] Their index comprises six components: (i) VaR characteristics (holding period and confidence level), (ii) summary VaR statistics, (iii) summary information about the previous year's VaR, (iv) histogram or plot of daily VaRs, (v) definition of trading revenues (hypothetical revenues and non-inclusion of trading fees) and histogram or plot of daily trading revenues, and (vi) backtesting (number of exceptions, i.e., days when actual trading loss is greater than VaR, and explanations of these exceptions).

(2008) test the effects of corporate governance and disclosure on firms' risk after SOX (2002).[8] Their testing is based on estimated changes in capital market measures of total risk, idiosyncratic risk, and systematic risk that occur between the pre-SOX period and the post-SOX period. Their prediction of increased levels of risk disclosure was based on the idea that SOX should provide higher levels of assurance. They find that financial firms were rewarded (punished) for stronger (weaker) disclosure and stronger (weaker) governance.

Unlike early US-based research on the informativeness of FRR No. 48, recent US-based research (three out of the 12 papers) focuses on the informativeness of item 1A, Risk Factors, of the 10-K filing, mandated in 2005. This US-based research is aided by advanced qualitative data analysis tools that permit more customized data gathering across a larger sample of firms and have attracted much interest from researchers in examining the informativeness of the risk information.

Kravet and Muslu's (2013) is among the first to test for the informativeness of narrative risk disclosures. Their study employed a machine-learning content analysis approach, which involved designing a Practical Extraction and Report Language (PERL) code to parse the annual report into sentences. The code then tagged a sentence as risk-related if it included at least one risk-related keyword (self-developed 'bag-of-words' based on reading 100 randomly selected annual reports).[9] They use a sample of 28,110 firm-year observations from 1994 to 2007 to investigate how changes in risk disclosures are related to changes in investor and analyst activities before and after 10-K filings. To that end, they suggest three arguments. The first is *the null argument*, which predicts that analysts will not revise their forecasts differently if they assess risk disclosures to be uninformative. Kravet and Muslu (2013) define these uninformative disclosures as boiler-plate, which would mean that the risk disclosure is overly generalized and therefore

[8] Firms' risk is measured by volatility of stock returns, beta, and the variance of the residuals from the ordinary least squares estimation of the single-factor market model using daily returns.

[9] The risk-related words are as follows: can/cannot, could, may, might, risk*, uncertain*, likely to, subject to, potential*, vary*/varies, depend*, expos*, fluctuat*, possibl*, susceptible, affect, influenc*, and hedg*. Words marked with a * also include derivatives of the original.

does not affect users' perceptions of risk. The second argument, a *divergence* argument, states that risk disclosure increases users' risk perceptions by revealing previously unknown risk factors. The third argument, a *convergence* argument, states that risk disclosure decreases users' risk perceptions by confirming a company's known risk factors. Generally, their findings support the divergence argument, implying that risk disclosure is informative. However, they find stronger relations between industry-level risk disclosure and investors' perceptions of risk than for firm-level disclosure. This finding supports criticism in prior work that company-specific risk information is lacking in annual reports (e.g., Schrand & Elliott, 1998; Kaplan, 2011).

Re-examining the three competing arguments put forward by Kravet and Muslu (2013), Bao and Datta (2014) examine a sample of 7,679 US firm-year observations from 2006 to 2010. In contrast to prior work which employed a pre-determined set of key words or sentences to detect risk information, instead they use the Latent Dirichlet Allocation topic model (LDA) to classify and quantify risk information in the narrative sections of 10-Ks.[10] This work is, to date, the most comprehensive categorization of the content of risk disclosure within 10-Ks. They identify 30 types of risk disclosure and examine the impact of each type on the volatility of the stock return.[11] They identify different informativeness patterns. Specifically, they find that, while 22 types are non-significant (supporting the null argument), three types of risk disclosure (funding, macroeconomic cyclical industry, and credit risks) are positively related to investor-perceived risk (supporting the divergence argument), and the other five types (human resources, regulation changes, infrastructure, operation disruption, and debt risks) are negatively related to it (supporting the convergence argument).

Using a different source and approach to quantifying risk information, Filzen (2015) examines the informativeness of risk disclosure by focusing on updates within the risk factor statements in quarterly reports, using a sample of 13,165 firm-quarters. The findings support

[10] LDA is a probabilistic modeling technique used to identify underlying topics that occur within, for example, the risk factors section or any other section of the 10-K filing, or any other events such as conference calls. It extrapolates backwards to those topics that could have generated the outcomes.

[11] See Bao and Datta (2014, Figure 6, page 1382) for a list of the 30 types of risk.

Kravet and Muslu's (2013) *divergence* argument regarding informativeness. Filzen (2015) shows that risk factor updates are associated with adverse outcomes as measured by abnormal returns and negative earnings revelations.

3.2 Risk reporting: Non-US evidence

A second stream of research examining the informativeness of risk disclosure is non-US-based (three out of 12 papers: two within the UK and one within Egypt). Relying on four FTSE100-listed Food Producers and Processors companies between 2002 and 2007, Abraham and Shrives (2014) measure the quality of risk disclosure informativeness as a function of three themes, namely (i) that risk factor disclosure should be specific to the company, (ii) that managers evaluate their risk disclosures on a regular basis, identifying significant events[12] *ex ante* to avoid repetitious annual reporting; and (iii) that actual risk experiences are discussed in the risk-factor statements. An innovative and distinguishing feature of their content analysis approach is the use of plagiarism detection software (Ferret) to check for similarities in risk sentences over time. In line with prior work (e.g., Linsley & Shrives, 2006; Kravet & Muslu, 2013), the authors query whether non-specific (boilerplate) risk disclosure limit its usefulness. This provides a similarity measure (continuous) ranging from 0 (no copying detected) to 1 (everything copied). Combined with their content analysis, the authors categorise disclosure into substantive and symbolic; where the former describes company specific disclosure whilst the latter describes information that is general in nature and which might apply to any business or any business within the industry. They find that companies provide a large amount of risk disclosure which is general rather than specific, and where the substance of the risk-factor discussion remains the same over time (Cadbury: 71%; Tate and Lyle: 100%; Associated British Foods: 57%; Unilever: 60%). Thus, they conclude that firms provide more symbolic disclosure than substantive.[13]

[12] Significant events are identified based on news events with economically significant price changes over a five-year period.

[13] Unchanging disclosures may indicate a failure to adapt reporting to specific circumstances, but they may be useful to readers if they clearly indicate that the risk profile of the firm has remained the same. While the text of the disclosure should change as the risk profile alters, changing the structure or minor details of the text's content for

Linsley and Lawrence (2007) take a different perspective on informativeness by examining levels of readability and obfuscation of the risk disclosure, rather than stock market indicators. They use the Flesch Reading Ease formula to measure the readability of the risk disclosure, and coefficients of variation are used to measure obfuscation. Their study finds that the mean readability scores for the risk disclosure of the 25 largest non-financial firms on the UK FTSE 100 are all below 50, signifying 'difficult' or 'very difficult' to read. However, they find no evidence to suggest that directors are deliberately obfuscating or concealing bad risk news through their writing style. They conclude that, despite suggestions that companies provide greater amounts of risk information (e.g., ICAEW, 1997), this will not necessarily lead to improved risk communication unless directors write with greater clarity.

Elbannan and Elbannan (2015) examines whether bank risk disclosures are associated with operating performance and market valuation within the Egyptian context. This paper examines the impact of risk disclosure on various operating performance measures, based on the balanced scorecard and stock market performance.[14] They find risk disclosure to be positively associated with operating performance and market indicators during the non-financial crisis period (2002-2008), but the association is weaker during the financial crisis (2009-2011). They also find that informativeness is conditional on the risk disclosure area i.e., credit, liquidity, market, or interest rate risk.

To summarize, a few common themes emerge across this body of work. Studies suggest that in US and Egyptian contexts, risk disclosures may influence capital market participants, whereas in the UK there is limited evidence of this (e.g., Abraham & Cox, 2007; Elshandidy et al., 2013; Linsley & Shrives, 2006). Meanwhile, the observed informativeness varies across companies and risk areas. Table 5 presents the reviewed papers that study informativeness of

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the sole purpose of making it appear different is not desirable. However, an advantage of using a form-oriented content analysis approach is that this issue can be addressed in the analysis.

[14] Elbannan and Elbannan (2015: 193) measure operating performance as a multi-dimensional concept comprised of financial, customer, internal business processes, and learning and growth dimensions.

risk disclosure, identifies areas of divergence (based on method and context), thereby suggesting a way forward for future research (See Section 5).

[Insert Table 5 about here]

4. Empirical research investigating incentives and informativeness

In his review of textual analysis of corporate disclosures, Li (2010) highlights the importance of examining informativeness in combination with managerial incentives. This combination was highlighted as one area for future research on risk reporting by Kravet and Muslu (2013). Although studies investigating both incentives and informativeness are relatively uncommon, we have identified four recent papers that do so, as detailed in Table 6.

[Insert Table 6 about here]

The first paper is Campbell et al. (2014), which examines 9,076 firm-year observations from 2005 to 2008. It examines whether the content of item 1A–Risk Factors is reflective of the firm's risk level and whether risk information is associated with systematic risk, idiosyncratic risk, information asymmetry, and firm value. In line with other studies (e.g., Elshandidy et al., 2013, 2015; Kravet & Muslu, 2013), the authors employ an extensive word list[15] to identify risk information. This enables them to classify risk-related statements into one of the following groups: financial, systematic, idiosyncratic, legal and regulatory, or tax. They find a positive association between risk factor disclosure and pre-disclosure levels of firm risk, and that the types of risks a firm faces are associated with the types of risks disclosed in the risk-factor section. In contrast to Abraham and Shrives (2014), this suggests that, within these broad categories, firms are disclosing substantive company-specific risk information rather than symbolic, generic risk information. In other words, managers provide risk information which is meaningful according to the specific risks that their firm faces. In relation to informativeness, they find that changes in risk disclosure (unexpected risk disclosure) influence investors' assessments of firm risk and value, in support of the *divergence* argument (Kravet & Muslu, 2013).

[15] For the Campbell et al. (2014) word-list, see their Table 9, Appendix 3, pp. 443-452.

Second, Elshandidy and Shrives (2016) examine whether risk, ownership structure, capital structure, external equity financing, and borrowing are associated with risk disclosure and whether the tone of risk disclosure affects investors' risk perceptions for a sample of German non-financial firms. In line with Campbell et al. (2014), they find that risk disclosure is more significantly associated with the underlying risk of a firm (i.e., market beta) than other incentives (i.e., ownership structure, capital structure, external equity finance, and borrowing). In relation to informativeness, they find that the tone of risk disclosure is associated with investors' risk perception. Specifically, the German market tends to positively (negatively) price good (bad) news about risk, either by improving (worsening) market liquidity by mitigating (exacerbating) information asymmetries, or by decreasing (increasing) investor-perceived risk.

Elshandidy and Neri (2015) study a sample of non-financial firms in the UK and Italy and examine how corporate governance influences firms' decisions to reveal risk information mandatorily and/or voluntarily, and then study the impact of observed risk reporting on market liquidity. They find corporate governance factors to be associated with risk disclosure in both countries, but more strongly with voluntary disclosure among UK firms and mandatory disclosure among Italian firms. In both countries, risk disclosure is positively associated with market liquidity, but voluntary disclosure is found to have a stronger association than mandatory disclosure.

Finally, Hope et al. (2016) examine the informativeness of risk information using a computing algorithm to quantify firms' levels of 'specificity'. The scoring system identifies the inclusion of specific items in firms' qualitative risk-factor disclosures. For example a firm will score higher where risk-factor disclosures include: the names of persons, locations, and organizations; quantifications of risk, such as values in percentages and money values in dollars; and chronological information, such as times and dates. They scale the volume of such disclosure by the total number of words in the risk-factor disclosure section. The higher the 'specificity' score, the more specific the risk disclosures are. They find that the overall proportion

of specific risk disclosure is low (5% of total disclosures). However, they also find a strong positive association between specificity and both short-term price reactions and trading volumes, subsequent to the 10-K filing. Thereby, they suggest that more specific risk-factor disclosures benefit users of financial statements. Concerning the informativeness of risk disclosure, the study also shows that companies with higher proprietary costs provide less specific risk information.

Table 7 presents the reviewed papers that deal with both incentives and informativeness, identifies areas of divergence (based on method and context), thereby suggesting a way forward for future research (see Section 5).

[Insert Table 7 about here]

5. Discussion, challenges, and directions for future research

A number of key themes emerge from the prior literature. In the following sub-sections, we collate these themes, discuss the limitations of the prior work, and identify gaps in the literature. We begin by identifying the following issues that primarily divide the literature: (1) incentives versus informativeness; (2) type of disclosure (i.e., voluntary versus mandatory); (3) type of content analysis (i.e., automated versus manual); (4) type of analysis (i.e., within-country versus cross-country variations); and (5) type of sector (i.e., financial versus non-financial). For each issue, we highlight and suggest how researchers might approach inherent problems. These issues are the five design decisions that must be considered by researchers undertaking risk-reporting research. Further limitations exist, including risk-related conceptual aspects (i.e., concept, types, and measurement), and the potential role of the standard-setters in developing and improving risk reporting.

5.1. Grouping previous literature

5.1.1. Incentives versus informativeness: Divergence

This issue is the first of five that divide the EU/AUS and US risk-reporting literatures. The heavily regulated risk-reporting environment in the USA has encouraged research in that

jurisdiction towards investigations of the informativeness of the mandated risk disclosures. Meanwhile, research in the EU/AUS – where disclosure of risk has traditionally been voluntary – has broadly focused on the incentives question.[16] The SEC highlights and actively seeks to address the issue of whether the disclosed risk information is actually informative for investors and companies, and not simply compliant with the regulations. Academic research has picked up this baton, and the issues of *de jure* compliance, boiler-plate disclosures and substantive versus symbolic disclosures is a common theme throughout this risk reporting review.

There are a handful of papers that defy this discernible trend, i.e., informativeness in EU/AUS-based research and incentives in US-based. Dobler (2008) and Kravet and Muslu (2013), for example, note that the incentives to disclose is an important issue in both high and low-regulated environments, and these incentives have been empirically examined in the USA (Campbell et al., 2014; Hope et al., 2016), Finland (Miihkinen, 2012, 2013), and Germany (Elshandidy & Shrives, 2016).

Until recently, in Europe and Australasia, risk information was provided largely voluntarily (e.g., Buckby, Gallery, & Ma, 2015; Dobler, 2008; ICAEW, 1997, 2011; Miihkinen, 2012). Therefore, the questions of why, and to what extent, firms disclose risk information have taken precedence. However, the informativeness issue has started to be addressed in the EU/AUS context (e.g., Elshandidy & Neri, 2015; Elshandidy & Shrives, 2016; Miihkinen, 2013). This may be due to increased pressure from professional bodies (e.g., ICAEW, 2011). It may also be because data availability and more sophisticated content analysis techniques have helped to improve the accuracy of the mandatory/voluntary risk disclosure identification and analysis process. In turn, this has enabled more straightforward investigations of the associations between variations in risk disclosure and market indicators.

5.1.2. Incentives versus informativeness: Limitations and future work

[16] In Tables 2 and 4, 88% (14 out of 16) of the reviewed papers concerning incentives are within the context (jurisdiction) of Europe and Australia. Meanwhile, 75% (9 out of 12) of the reviewed papers concerning informativeness are in a US context.

The ways in which internal governance factors (e.g., management, directors, and employees) interact with external (e.g., law and regulation, ownership structure, governance rating and voting, and external auditing), and whether they motivate managerial risk disclosure decisions, remain unanswered (for a review of these factors see, Gillan, 2006: 384). External governance factors can facilitate or discourage active stakeholder participation in the management process, as external governance concerns the role of direct shareholder oversight and thus incorporates the market for corporate control (Baber, Liang, & Zhu, 2012). Internal governance factors relate to the interaction between or among firm insiders. Another area of research requiring attention is how internal control affects firms' efficiency in externally reporting their risks.

All of the previous studies are concerned with equity markets, with no study yet addressing risk reporting in debt markets. Such studies are required to identify how firms' risk disclosure strategies affect the following: (i) debt providers' decisions; (ii) credit ratings; and (iii) predicting distress, default, and bankruptcy risks. Other areas that warrant examination include: (iv) how firms manage their risks in relation to what they report on their risks; and (v) the determinants of higher (lower) levels of hedge accounting, the implications of hedge accounting as a risk management strategy, and the extent to which the markets react to variations in hedge accounting approaches. Finally, while the majority of the prior literature concentrates on risk reporting in annual reports, considering other outlets such as conference calls, earnings press releases, and media coverage might provide a clearer picture of how managers change their risk-reporting message to suit their audience (Kothari, Li, & Short, 2009; Li, 2010).

5.1.3. Voluntary versus mandatory risk reporting: Divergence

An unintended consequence of the SEC's development of FRR No. 48 was that it focused US research on mandatory reporting, while the reluctance of the IASB and other domestic standard-setters to provide similar risk disclosure regulations in the rest of the world has driven researchers working in that context to focus on the voluntary reporting. There is evidence (Elshandidy et al., 2015) that voluntary and mandatory risk disclosure may complement each

other, confirming Bagnoli and Watts' (2007) and Einhorn's (2005) findings to that effect. However, there is a second strand of research which supports a substitutive effect. Gigler and Hemmer (2001), for example, argue that mandatory disclosure requirements has a negative effect on voluntary disclosure levels and in line with this view Butler, Kraft and Weiss (2007) find mandatory disclosure to be a substitute for voluntary disclosure. This supports Dye's (1985) proposition that making disclosure mandatory may not necessarily benefit the audience, as voluntary disclosure may be lost.

5.1.4. Voluntary versus mandatory risk reporting: Limitations and future work

This divergence raises an important question: should standard-setters forge ahead with stand-alone risk-reporting regulation?[17] Our review suggests that there could be certain practical advantages to making risk disclosure mandatory, including (i) providing stakeholders, especially investors and analysts, with information to aid them to enforce management's fiduciary duties and thus contribute to the alleviation of agency problems, (ii) providing a level of public accountability and/or enforceability that would increase the credibility of disclosure, (iii) helping ease information asymmetry, and (iv) enhancing transparency, and in turn more difficult for controlling insiders to consume private benefits. However, making risk disclosure mandatory also carries potential costs, including, but not limited to, (i) engendering competitive disadvantages as companies are forced to release sensitive information, (ii) the loss of potentially useful voluntarily disclosed information, and (iii) the potential loss of meaning due to the production of boilerplate information.

Maintaining a system of informative voluntary disclosure also has benefits and costs. Potential benefits include, but are not limited to, (i) enhanced credibility and improved investor relations, (ii) access to more liquid markets, (iii) improved pricing and decision-making

[17] Schrand and Elliott's (1998) review summarizes the main discussions from the American Accounting Association (AAA) and Financial Accounting Standards Board (FASB) conference, addressing obstacles to the issuing of a risk-reporting accounting standard. They highlight that much of the extant research focuses on the *effects* of risk rather than on how investors *assess* risk, thus providing little explicit guidance as to which disclosures can aid investors' risk assessment.

capabilities, (iv) a reduction in perceived risk, increased reputations, and a lower cost of capital, and (v) reduced litigation risk. Potential costs might include (i) competitive disadvantage if sensitive information is disclosed, (ii) bargaining weaknesses related to stakeholders, (iii) increased litigation risk, and (iv) preparation and audit costs.

Judged collectively, the evidence from risk-reporting research seems to suggest that regulation can be informative in certain circumstances – e.g., for oil and gas firms (Roulstone, 1999), or, more generally, for non-financial firms (Miihkinen, 2012) – but less so in more complex cases e.g., interest rate risk (Hodder et al., 2002). However, mandating disclosure encourages higher levels of it when there is no other incentive to disclose and therefore helps to reduce information asymmetry (e.g., Dobler, 2008). Furthermore, the incentives to voluntarily disclose information appear to be relatively low precisely when they might be most desirable, for example when financial risk is high (Marshall & Weetman, 2007). While theories of voluntary disclosure may explain context-specific findings, there is no explanation of the usefulness of any single or multiple theoretical perspectives for why firms are incentivized to reveal risk information (Abraham & Shrives, 2014). This needs further exploration regardless of the methodological approach, or underpinning narrative. Future researchers need to begin developing a theory of risk disclosure (see Heinle & Smith, 2017) as well as extending the extant knowledge of theories of voluntary disclosure.

5.1.5. Manual versus automated content analysis: Divergence

Our review highlights a further key divergence in the literature. Since the technology has been available and large datasets have been accessible, much of the work originating from the USA has relied on automated content analysis. Methods are becoming increasingly complex as accounting and finance researchers learn and apply skills and techniques from other disciplines. Li's (2010) analysis encourages advancements as he challenges researchers to reach further.

In the EU/AUS, research has generally relied on the design and construction of disclosure indices to measure the quality and/or quantity of risk reporting (e.g., Beretta & Bozzolan, 2004;

Miihkinen, 2012). Often this relies on manual content analysis. Whilst automated content analysis approaches might have problems and limitations, so do manual ones (e.g., Beattie & Thomson, 2007). Recent work has attempted to address these concerns, as well as focusing on the coding reliability problems raised by, amongst others, Krippendorff (2012). Nevertheless, opportunities remain for further developments and improvements (see Beattie, 2014), in risk-reporting research, where an employable, usable, accurate and reliable 'quality' measurement system is needed.

There are exceptions to this division; more recently, automated content analysis has been employed in EU/AUS work to measure quantity, and this is where the jurisdictional literatures converge. For example, risk word lists have been developed to analyze firms' risk reporting. While this system has been criticized (Loughran & McDonald, 2016), it is a method that should be developed further. Whilst there is substantial overlap in the several 'bag-of-words' automated content analysis risk-disclosure studies (e.g., Elshandidy et al., 2013, 2015; Kravet & Muslu, 2013), agreeing on a core set of risk-related words is a non-trivial matter.

5.1.6. Manual versus automated content analysis: Limitations and future work

First, we note that prior risk reporting research has relied on the annual report or the 10-K form. Future researchers might find it worthwhile considering different outlets, especially as the annual report is suggested to play a largely confirmatory role (e.g., Gigler & Hemmer, 2001). In line with Li (2010), we urge future researchers to consider other communication events, such as conference calls. These events have the potential to provide dominant stakeholders (i.e., analysts and investors) with new information (e.g., Barker, Hendry, Roberts, & Sanderson, 2012; Matsumoto, Pronk, & Roelofsen, 2011; Roberts, Sanderson, Barker, & Hendry, 2006), possibly in non-traditional ways (e.g., through body language, reputation; see e.g., Davis, Ge, Matsumoto, & Zhang, 2014; Matsumoto et al., 2011; Mayew & Venkatachalam, 2012).

To investigate scholars' adoption of automated content analysis of risk reporting in annual reports, Bao and Datta (2014) differentiate between three main approaches: (i) the dictionary

method, (ii) supervised learning, and (iii) unsupervised learning. The dictionary method relies on the usage of a specific key word, and frequency counts, drawing general conclusions based on the quantification of the disclosures measured against market indicators, or by dividing those frequencies into certain groups or types (Elshandidy et al., 2013, 2015; Elshandidy & Neri, 2015; Kravet & Muslu, 2013; Campbell et al., 2014). The problem identified by Bao and Datta (2014) is that this method uses dictionaries to classify the documents into specific groups, which might lead to inefficiencies if the dictionaries are being applied outside of the domains for which they were originally developed (see also Li, 2010; Loughran & McDonald, 2016).

To avoid this issue, researchers can use the second approach mentioned above, supervised learning. This method relies on two steps: initially, human coders categorize a set of documents by hand; then, they train a supervised model that learns automatically how to assign categories to documents using coded data. An advantage of this approach is that its results are easily validated using designated performance statistics.

The dictionary approach benefits from its inherent simplicity, the supervised learning approach from its flexibility and ease of validation. However, both rely on a predefined categorization system. The third type, unsupervised learning (sometimes known as unsupervised clustering), refers to a class of methods that learn the underlying features of a text without explicitly imposing categories of interest. This approach uses modeling assumptions and properties of the texts to estimate a set of categories and simultaneously assign documents (or other units of analysis such as sentences) to those categories. Examples of studies that apply this approach are Bao and Datta (2014) and Dyer, Lang, and Stice-Lawrence (2016).

We suggest that all three automated approaches possess benefits and drawbacks, and whilst technology will inevitably define how the field develops, it seems that both the US and EU/AUS literatures would benefit from giving them due consideration. Equally, the US literature might benefit from closer study of individual firms' risk reporting. Ryan (2012a) concludes that the reliance on large-sample, cross-sectional data, and the application of regression analysis, might

be the underlying reason for the failure to identify risk relevance. He argues that this obscures the potential importance of individual firms' risk disclosure. Therefore, we suggest that there is a gap in the literature, which might be filled by high-quality comparative case studies.

5.1.7. Within-country or cross-country variations in risk disclosure: Divergence

Most of the papers reviewed consider just one jurisdiction (26 out of 32 papers), or on a few occasions two or three (e.g., Elshandidy et al., 2015; Elshandidy & Neri, 2015; Marshall & Weetman, 2007). Nonetheless, some recent papers look at risk practices with a multi-country design (more than three countries), either in financial firms (Abdallah, Hassan, & McClelland, 2015; Al-Hadi et al., 2016; Barakat & Hussainey, 2013), insurance firms (Malafronte et al., 2016), or non-financial firms (Dobler, Lajili, & Zéghal, 2011; Moumen, Ben Othman, & Hussainey, 2015).[18] One common practice among all the above-mentioned papers is that they control for country impact by including the country-fixed effects in their econometric models. Little attention has been paid to combining institutional factors (e.g., legal system, financial system, and cultural values) at the country level with other factors (e.g., size, risk, and growth) at the firm level. For example, while Dobler et al. (2011) and Moumen et al. (2015) control for country effects by using either a country dummy or the firm-fixed effects neither of them examine specific institutional factors in their models.

5.1.8. Within-country or cross-country variations on risk disclosure: Limitations and future work

In a single-country study, it is challenging to capture distinct features, unless those features are observable at the firm level when studying incentives (e.g., Buckby et al., 2015; Elshandidy & Shrives, 2016; Hassan, 2009; Martikainen, Kinnunen, Miihkinen, & Troberg, 2015; Miihkinen, 2012; Mokhtar & Mellett, 2013) or informativeness (Abdullah, Shukor, Mohamed, & Ahmad, 2015; Elshandidy & Shrives, 2016; Miihkinen, 2013). Associating variations in risk reporting with both firm- and country-level characteristics is becoming an increasingly important empirical

[18] Appendix 1 gives details of the other papers on risk reporting that have been mentioned in this section and were not reviewed in Sections 3, 4, and 5. It summarizes those papers' results and further classifies them based on areas of divergence.

question (Elshandidy et al., 2015; Li, 2010). Considering how firm-level factors interact with those at the country level might be of interest to professionals responsible for achieving a reasonable level of international convergence through greater international comparability and smaller observed international differences, even after the mandatory adoption of IFRS (e.g., Nobes, 2013). In addition to the problem of managing data collection in cross-country studies is that of corporate communications in different languages. One solution is to use English as a common language (for more details on these issues see for example, Jeanjean, Stolowy, Erkens, & Yohn, 2015; Lang & Stice-Lawrence, 2015). It might also be useful to consider different research designs to incorporate the impact of country level factors, for example multilevel econometric techniques, since they provide researchers with better options to capture hierarchical structure of cross-country data (e.g., Hox, 2010). Ignoring data structure can result in underestimating the standard errors of a regression's coefficients (Steele, 2008). Future research might also consider comparing risk-reporting practices between developed and less developed (emerging) markets.

5.1.9. Financial versus non-financial firms: Divergence

Our review shows that the majority of reviewed studies (23 out of 32 papers) over the past 20 years have explored risk reporting amongst non-financial firms. This is in contrast to Schrand and Elliott's (1998) early summary of risk reporting and indicates a shift in academic research from investigating risk disclosure within financial firms to a focus on non-financial firms. In this regard, it is striking that Schrand and Elliott (1998) highlight a key feature of the extant empirical risk research at that time as a focus on banks and insurance firms. These authors claim that regulators, including the FASB, require disclosure on risk exposure. This recent shift, however, is unsurprising. Financial firms are required to comply with stock market regulations as well as accounting requirements. Further, their risk management processes, practices, and strategies are often fundamentally different from those of non-financial firms and this adds a layer of

complexity to any study seeking to analyze informativeness or incentives, as well as influencing what is voluntary and what is mandatory.

5.1.10. Financial versus non-financial firms: Limitations and future work

Scope exists for future research investigating issues more closely related to the nature of financial institutions, such as the distinctiveness of risk reporting amongst competitor institutions and across jurisdictions in which regulations are more restrictive or permissive (for a recent review on banking see: Beatty & Liao, 2014). Another area in need of attention from researchers is how financial instruments should be reported, given the greater requirements imposed by regulatory bodies in this area (for a review see: Ryan, 2012b). Consistent with Ryan (2012b), we observe a need for further research investigating the extent to which and how financial firms integrate the recognized risk-related consequences of historical events (i.e., historical volatility of fair values and the current financial leverage) with future-oriented risk information related to financial instruments' major risk types (e.g., market, credit, liquidity, and information risks). Regarding firms' hedging activities, it would be worthwhile studying how and why financial firms disclose information about their use of derivatives or similar instruments (e.g., loan commitments, liquidity support arrangements, and recourse obligations in securitizations; Ryan (2012b: 298) refers to these instruments, among others, collectively as "risk-concentrated instruments") and the extent to which these instruments might aid the assessment of the quality of firms' risk management and internal control. Finally, there is limited research on how banks' transparency affects their stability and the role governance might play in observing these effects. This is particularly important as banks are quite different from other organizations in their excessive risk taking and the impact this has on the financial system as a whole (Bushman, 2014).

5.2. Further limitations and suggestions for future research

5.2.1. Risk-related conceptual aspects

We note that there are differences between researchers' definitions of key risk-related terms and phrases. In addition, the underlying concepts are sometimes not even considered by the authors, hence further attention should be paid to consider the meanings of risk, risk concepts, risk types, and risk measurement. We recommend that future researchers apply risk terminology in a way that is coherent and comparable, or state that they are doing otherwise. Further research is needed into how risk types can be generated conceptually from financial statement classifications (e.g., [i] risks related to income statements, such as volatility of revenues and net income, [ii] risks related to the statement of financial position, namely assets, liability, and equity). Regarding measurement, further research is needed to address the extent to which measures of risk types (e.g., market, credit, liquidity, and operational risks) can be aggregated and how the accounting data will fit such measures (particularly considering the differing frequencies associated with accounting versus market data). Additionally, further research is required to assess whether the current financial accounting model is suitable for capturing the financial effects of risks in the financial statements.

We also recall the suggestions of Schrand and Elliott (1998), who conclude that accurately identifying a list of risk types for all firms would be unrealistic, owing to each firm's inherent circumstances and characteristics, which in turn generate different types of risks. The model, together with the type of data and its quantifiability, are the core issues related to measurement. Schrand and Elliott (1998) explain the difficulties of using a single model of risk measurement, as not all risk types can be measured, and they assert that risk measures should rely on both historical and future data. To overcome these weaknesses, they make two suggestions: using historical measures (e.g., volatility) of risk exposure to heighten users' awareness of firms' risks, and combining historical with future data using simulation analysis. In general, quantification creates a unique set of problems but, within this context, mis-measurement could result in poor decision making. We suggest that in lieu of better alternatives, a Value at Risk (VaR) model –

based on accounting data – might be adopted where applicable and practical.[19] This is because there is general acceptance of the underlying principles of VaR and it is straightforward to interpret. However, further research would be beneficial to explore any practical problems and solutions related to adoption.

5.2.2. Standard-setters' involvement

In line with both Leuz and Wysocki (2016) and Beyer, Cohen, Lys, and Walther (2010), our paper stresses the importance of the standard-setters' role and their ability to encourage firms to produce decision-useful information. Our review suggests that the current state of risk reporting regulation is at a similar stage to that of fair-value reporting regulation before the IASB issued a specific standard covering fair-value measurement and disclosure. Current regulations on risk reporting are spread among a wide range of accounting standards (e.g., IFRS 7, 9), implying that overlap across standards is unavoidable and accurate interpretation challenging. Thus, further research is needed to gather and analyze all previous professional publications on risk reporting, and more specifically on the issue of developing a stand-alone risk-reporting accounting standard. The basis for our suggestion is that, currently, there is a great deal of energy and attention focused on reviewing how, why, and to what extent firms should reveal information about their risks. In line with Ryan's (2012a) and Dobler's (2008) arguments, and the empirical findings of Miihkinen (2012, 2013), we find scant support in the present-day literature for substantial or substantive benefits to be gained from the introduction of *more* regulation. However, there are those who claim that current regulation could be *improved*. We propose that any formal accounting standard – perhaps incorporating a 'comply or explain' philosophy – might include the requirement for individual firms to produce a comprehensive 'risk report', which would contain managerial perspectives on definitional issues such as the risk concept, risk definitions, risk types, and risk measurement (strategies, practices, policies, and assumptions).

[19] VaR identifies the maximum loss, with a certain degree of probability (i.e., 90%, 95%, and 99%), that is expected specific to a certain item (or items) (e.g., revenues, assets) over the next period (e.g., day, month, and year). For a review of VaR's methods and techniques, see Jorion (2006).

References

Abdallah, A. A. N., Hassan, M. K., & McClelland, P. L. (2015). Islamic financial institutions, corporate governance, and corporate risk disclosure in Gulf Cooperation Council countries. *Journal of Multinational Financial Management, 31*, 63-82.

Abdullah, M., Shukor, Z.A., Mohamed, Z.M., & Ahmad, A. (2015). Risk management disclosure: A study on the effect of voluntary risk management disclosure toward firm value. *Journal of Applied Accounting Research*, *16*(3), 400-432.

Abraham, S., & Cox, P. (2007). Analysing the determinants of narrative risk information in UK FTSE 100 annual reports. *The British Accounting Review*, *39*(3), 227-248.

Abraham, S., & Shrives, P. J. (2014). Improving the relevance of risk factor disclosure in corporate annual reports. *The British Accounting Review, 46*(1), 91-107.

Akhigbe, A., & Martin, A. D. (2008). Influence of disclosure and governance on risk of US financial services firms following Sarbanes-Oxley. *Journal of Banking & Finance*, *32*(10), 2124-2135.

Al-Hadi, A., Hasan, M. M., & Habib, A. (2016). Risk committee, firm life cycle, and market risk disclosures. *Corporate Governance: An International Review*, *24*(2), 145-170.

Baber, W. R., Liang, L., & Zhu, Z. (2012). Associations between internal and external corporate governance characteristics: Implications for investigating financial accounting restatements. *Accounting Horizons*, *26*(2), 219-237.

Bagnoli, M., & Watts, S. (2007). Financial reporting and supplemental voluntary disclosures. *Journal of Accounting Research, 45*(5), 885-913.

Bamber, M., & McMeeking, K. (2015). An examination of international accounting standard-setting due process and the implications for legitimacy. *The British Accounting Review*, *48*(1), 59-73.

Bao, Y., & Datta, A. (2014). Simultaneously discovering and quantifying risk types from textual risk disclosures. *Management Science*, *60*(6), 1371-1391.

Barakat, A., & Hussainey, K. (2013). Bank governance, regulation, supervision, and risk reporting: Evidence from operational risk disclosures in European banks. *International Review of Financial Analysis*, *30*, 254-273.

Barker, R., Hendry, J., Roberts, J., & Sanderson, P. (2012). Can company-fund-manager meetings convey informational benefits? Exploring the rationalisation of equity investment decision making by UK fund managers. *Accounting, Organizations and Society*, *37*(4), 207-222.

Beattie, V. (2014). Accounting narratives and the narrative turn in accounting research: issues, theory, methodology, methods and a research framework. *The British Accounting Review*, *46*(2), 111-134.

Beattie, V., McInnes, B., & Fearnley, S. (2004). A methodology for analysing and evaluating narratives in annual reports: a comprehensive descriptive profile and metrics for disclosure quality attributes. *Accounting forum*, 28(3), 205-236.

Beattie, V., & Thomson, S. J. (2007). Lifting the lid on the use of content analysis to investigate intellectual capital disclosures. *Accounting Forum*, *31*(2), 129-163.

Beatty, A., & Liao, S. (2014). Financial accounting in the banking industry: A review of the empirical literature. *Journal of Accounting and Economics*, *58*(2), 339-383.

Beretta, S., & Bozzolan, S. (2004). A framework for the analysis of firm risk communication. *International Journal of Accounting, 39*(3), 265-288.

Beyer, A., Cohen, D. A., Lys, T. Z., & Walther, B. R. (2010). The financial reporting environment: Review of the recent literature. *Journal of Accounting and Economics*, *50*(2), 296-343.

Botosan, C. A. (2004). Discussion of a framework for the analysis of firm risk communication. *The International Journal of Accounting*, *39*(3), 289-295.

Buckby, S., Gallery, G., & Ma, J. (2015). An analysis of risk management disclosures: Australian evidence. *Managerial Auditing Journal*, *30*(8-9), 812-869.

Bushman, R. M. (2014). Thoughts on financial accounting and the banking industry. *Journal of Accounting and Economics*, *58*(2), 384-395.

Butler, M., Kraft, A., & Weiss, I. S. (2007). The effect of reporting frequency on the timeliness of earnings: The cases of voluntary and mandatory interim reports. *Journal of Accounting and Economics*, *43*(2), 181-217.

Campbell, J. L., Chen, H., Dhaliwal, D. S., Lu, H., & Steele, L. B. (2014). The information content of mandatory risk factor disclosure in corporate filings. *Review of Accounting Studies, 19*(1), 396-455.

Davis, A. K., Ge, W., Matsumoto, D., & Zhang, J. L. (2014). The effect of manager-specific optimism on the tone of earnings conference calls. *Review of Accounting Studies*, *20*(2), 1-35.

Deumes, R., & Knechel, W. R. (2008). Economic incentives for voluntary reporting on internal risk management and control systems. *Auditing: A Journal of Practice & Theory, 27*(1), 35-66.

Dobler, M. (2008). Incentives for risk reporting – a discretionary disclosure and cheap talk approach. *The International Journal of Accounting, 43*, 184-206.

Dobler, M., Lajili, K., & Zéghal, D. (2011). Attributes of corporate risk disclosure: An international investigation in the manufacturing sector. *Journal of International Accounting Research*, *10*(2), 1-22.

Dye, R. A. (1985). Disclosure of nonproprietary information. *Journal of Accounting Research, 23*(1), 123-145.

Dyer, T., Lang, M. H., & Stice-Lawrence, L. (2016). The Ever-Expanding 10-K: Why Are 10-Ks Getting So Much Longer (and Does It Matter)? (Working paper, University of North Carolina).

Einhorn, E. (2005). The nature of the interaction between mandatory and voluntary disclosures. *Journal of Accounting Research, 43*(4), 593-621.

Elbannan, M. A., & Elbannan, M. A. (2015). Economic consequences of bank disclosure in the financial statements before and during the financial crisis: evidence from Egypt. *Journal of Accounting, Auditing & Finance*, *30*(2), 181-217.

Elshandidy, T., Fraser, I., & Hussainey, K. (2013). Aggregated, voluntary, and mandatory risk reporting incentives: evidence from FTSE all-share. *International Review of Financial Analysis, 30,* 320-333.

Elshandidy, T., Fraser, I., & Hussainey, K. (2015). What drives mandatory and voluntary risk reporting variations across Germany, UK, and US? *The British Accounting Review*, *47*(4), 376-394.

Elshandidy, T., & Neri, L. (2015). Corporate governance, risk reporting practices, and market liquidity: Comparative evidence from the UK and Italy. *Corporate Governance: An International Review*, *23*(4), 331-356.

Elshandidy, T., & Shrives, P. J. (2016). Environmental incentives for and usefulness of textual risk reporting: Evidence from Germany. *The International Journal of Accounting*, *51*(4), 464-486.

Filzen, J. J. (2015). The information content of risk factor disclosures in quarterly reports. *Accounting Horizons*, *29*(4), 887-916.

Gigler, F. B., & Hemmer, T. (2001). Conservatism, optimal disclosure policy, and the timeliness of financial reports. *The Accounting Review*, *76*(4), 471-493.

Gillan, S. L. (2006). Recent developments in corporate governance: An overview. *Journal of Corporate Finance*, *12*(3), 381-402.

Hassan, M. K. (2009). UAE corporation-specific characteristics and level of risk disclosure. *Managerial Auditing Journal*, *24*(7), 668-687.

Heinle, M., & Smith, K. (2017). A theory of risk disclosure. *Review of Accounting Studies, Forthcoming.*

Hill, P., & Short, H. (2009). Risk disclosures on the second-tier markets of the London Stock Exchange. *Accounting and Finance*, *49*(4), 753-780.

Hodder, L., & McAnally, M. L. (2001). SEC market-risk disclosures: enhancing comparability. *Financial Analysts Journal, 57*(2), 24-34.

Hodder, L., Kohlbeck, M., & McAnally, M. L. (2002). Accounting choices and risk management: SFAS No. 115 and US bank holding companies. *Contemporary Accounting Research*, *19*(2), 225-270.

Hope, O.-K., Hu, D., & Lu, H. (2016). The benefits of specific risk-factor disclosures. *Review of Accounting Studies*, *21(*4), 1005-1045.

Hox, J. (2010). *Multilevel analysis: Techniques and applications* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.

ICAEW. (1997). *Financial reporting of risks – Proposal for a statement of business risks*. London: Institute of Chartered Accountants in England and Wales.

ICAEW. (2011). *Reporting business risks: Meeting expectations.* London: Institute of Chartered Accountants in England and Wales.

International Accounting Standards Board. (2008). *International Financial Reporting Standard (IFRS: 7): Financial instruments: Disclosures*. London: IASB.

International Accounting Standards Board. (2014). *International Financial Reporting Standard (IFRS: 9): Financial instruments: Recognition and Measurement.* London: IASB.

Jeanjean, T., Stolowy, H., Erkens, M., & Yohn, T. L. (2015). International evidence on the impact of adopting English as an external reporting language. *Journal of International Business Studies*, *46*(2), 180-205.

Jorion, P. (2002). How informative are value at risk disclosures? *The Accounting Review, 77*(4), 911-931.

Jorion, P. (2006). *Value-at-Risk*, 3rd edition. McGraw-Hill, New York.

Kaplan, R. S. (2011). Accounting scholarship that advances professional knowledge and practice. *The Accounting Review*, *86*(2), 367-383.

Koonce, L., McAnally, M. L., & Mercer, M. (2005). How do investors judge the risk of financial items? *The Accounting Review*, *80*(1), 221-241.

Kothari, S. P., Li, X., & Short, J. E. (2009). The effect of disclosures by management, analysts, and business press on cost of capital, return volatility, and analyst forecasts: A study using content analysis. *The Accounting Review*, *84*(5), 1639-1670.

Kravet, T., & Muslu, V. (2013). Textual risk disclosures and investors' risk perceptions. *Review of Accounting Studies*, *18*(4), 1088-1122.

Krippendorff, K. (2012). *Content analysis: An introduction to its methodology*. Thousand Oaks, CA: Sage.

Lajili, K., & Zéghal, D. (2005). A content analysis of risk management disclosures in Canadian annual reports. *Canadian Journal of Administrative Sciences, 22*(2), 125-142.

Lang, M., & Stice-Lawrence, L. (2015). Textual analysis and international financial reporting: Large sample evidence. *Journal of Accounting and Economics*, *60*(2), 110-135.

Leuz, C., & Wysocki, P. D. (2016). The economics of disclosure and financial reporting regulation: Evidence and suggestions for future research. *Journal of Accounting Research*, *54*(2), 525-622.

Li, F. (2010). Textual analysis of corporate disclosures: A survey of the literature. *Journal of Accounting Literature, 29*, 143-165.

Linsley, P., & Lawrence, M. (2007). Risk reporting by the largest UK companies: readability and lack of obfuscation. *Accounting, Auditing & Accountability Journal, 20*(4)*,* 620-627.

Linsley, P., & Shrives, P. (2006). Risk reporting: a study of risk disclosure in the annual reports of UK companies. *The British Accounting Review, 38*(4), 387-404.

Loughran, T., & McDonald, B. (2016). Textual analysis in accounting and finance: A survey. *Journal of Accounting Research*, *54*(4), 1187-1230.

Malafronte, I., Porzio, C., & Starita, M. G. (2016). The nature and determinants of disclosure practices in the insurance industry: Evidence from European insurers. *International Review of Financial Analysis*, *45*, 367-382.

Marshall, A., & Weetman, P. (2007). Modelling transparency in disclosure: the case of foreign exchange risk management. *Journal of Business Finance & Accounting, 34*(5-6), 705-738.

Marston C. & Shrives, P. (1991). The use of disclosure indices in accounting research: A review article. *The British Accounting Review, 23*(3), 195-210.

Martikainen, M., Kinnunen, J., Miihkinen, A., & Troberg, P.(2015). Board's financial incentives, competence, and firm risk disclosure: Evidence from Finnish index listed companies. *Journal of Applied Accounting Research*, *16*(3), 333-358.

Matsumoto, D., Pronk, M., & Roelofsen, E. (2011). What makes conference calls useful? The information content of managers' presentations and analysts' discussion sessions. *The Accounting Review*, *86*(4), 1383-1414.

Mayew, W. J., & Venkatachalam, M. (2012). The power of voice: Managerial affective states and future firm performance. *The Journal of Finance, 67*(1), 1-43.

Miihkinen, A. (2012). What drives the quality of firm risk disclosure? *The International Journal of Accounting, 47*(4), 437-468.

Miihkinen, A. (2013). The usefulness of firm risk disclosures under different firm riskiness, investor-interest, and market conditions: New evidence from Finland. *Advances in Accounting, incorporating Advances in International Accounting*, *29*(2), 312-331.

Mokhtar, E., & Mellett, H. (2013). Competition, corporate governance, ownership structure and risk reporting. *Managerial Auditing Journal*, *28*(9), 838-865.

Moumen, N., Ben Othman, H., & Hussainey, K. (2015). The value-relevance of risk disclosure in annual reports: Evidence from MENA emerging markets. *Research in International Business and Finance*, *34*, 177-204.

Nobes, C. (2013). The continued survival of international differences under IFRS. *Accounting and Business Research*, *43*(2), 83-111.

Ntim, C. G., Lindop, S., & Thomas. D. A. (2013). Corporate governance and risk reporting in South Africa: A study of corporate risk disclosures in the pre- and post-2007/2008 global financial crisis period. *International Review of Financial Analysis*, *30*, 363-383.

Oliveira, J., Lima Rodrigues, L., & Craig, R. (2011). Risk-related disclosures by non-finance companies: Portuguese practices and disclosure characteristics. *Managerial Auditing Journal*, *26*(9), 817-839.

Pérignon, C., & Smith, D. R. (2010). The level and quality of Value-at-Risk disclosure by commercial banks. *Journal of Banking & Finance*, *34*(2), 362-377.

Rajgopal, S. (1999). Early evidence on the informativeness of the SEC's market risk disclosure: the case of commodity price risk exposure of oil and gas producers. *The Accounting Review, 74*(3), 251-280.

Roberts, J., Sanderson, P., Barker, R., & Hendry, J. (2006). In the mirror of the market: The disciplinary effects of company/fund manager meetings. *Accounting, Organizations and Society*, *31*(3), 277-294.

Roulstone, D. T. (1999). Effect of SEC financial reporting release No. 48 on derivative and market risk disclosures. *Accounting Horizons*, *13*(4), 343-363.

Ryan, S. G. (1997). A survey of research relating accounting numbers to systematic equity risk, with implication for risk disclosure policy and future research, *Accounting Horizons, 11*(2), 82-95.

Ryan, S. G. (2012a). Risk reporting quality: Implications of academic research for financial reporting policy. *Accounting and Business Research*, *42*(3), 295-324.

Ryan, S. G. (2012b). Financial reporting for financial instruments. *Foundations and Trends in Accounting, 6*(3-4), 187-354.

Schrand, C., & Elliott, J. (1998). Risk and financial reporting: A summary of the discussion at the 1997 AAA/FASB conference. *Accounting Horizons*, *12*(3), 271-282.

Scott, R. (2014). *Institutions and organizations*. Thousand Oaks, CA: Sage.

SEC. (1997). *Disclosure of accounting policies for derivative financial instruments and derivative commodity instruments and disclosure of qualitative and quantitative information about market risk inherent in derivative financial instruments, other financial instruments, and derivative commodity instruments*. Washington: Securities and Exchange Commission.

SEC. (2010). Securities and Exchange Commission 17 CFR parts 211, 231 and 241 commission guidance regarding disclosure related to climate change. Washington: Securities and Exchange Commission. Final rule: available at http://www.sec.gov/rules/interp/2010/33-9106.pdf

Shevlin, T. (2004). Discussion of a framework for the analysis of firm risk communication. *The International Journal of Accounting*, *39*(3), 297-302.

Singleton-Green, B. (2012). Commentary: financial reporting and financial stability: Causes and effects. *Australian Accounting Review*, *22*(1), 15-17.

Solomon, J. F. (1999). Do institutional investors in the UK adopt a dual strategy for managing foreign exchange risk? *The British Accounting Review, 31*(1), 205-224.

Solomon, J. F., Solomon, A., Norton, S. D., & Joseph, N. L. (2000). A conceptual framework for corporate risk disclosure emerging from the agenda for corporate governance reform. *The British Accounting Review*, *32*(4), 447-478.

Steele, F. (2008). Multilevel models for longitudinal data. *Journal of the Royal Statistical Society,* Series A (171), 5-18.

Taylor, G., Tower, G., & Neilson, J. (2010). Corporate communication of financial risk. *Accounting and Finance*, *50*(2), 417-446.

Table 1
The study sample is based on a search for articles dealing with risk reporting, published after 1997 in journals ranked as 3* (A) or 4* (A*) based on ABS (ABDC)

Panel A: **papers on incentives for risk reporting, presented in chronological order (16 papers discussed in Section 2, categorized in Section 5, and summarized in Table 2)**

N	Paper	Journal
1	Solomon (1999)	*The British Accounting Review (BAR)*
2	Solomon, Solomon, Norton, and Joseph (2000)	*The British Accounting Review (BAR)*
3	Beretta and Bozzolan (2004)	*The International Journal of Accounting (IJOA)*
4	Linsley and Shrives (2006)	*The British Accounting Review (BAR)*
5	Abraham and Cox (2007)	*The British Accounting Review (BAR)*
6	Marshall and Weetman (2007)	*Journal of Business Finance and Accounting (JBFA)*
7	Deumes and Knechel (2008)	*Auditing: A Journal of Practice and Theory (AJPT)*
8	Hill and Short (2009)	*Accounting and Finance (AF)*
9	Taylor, Tower, and Neilson (2010)	*Accounting and Finance (AF)*
10	Miihkinen (2012)	*The International Journal of Accounting (IJOA)*
11	Barakat and Hussainey (2013)	*International Review of Financial Analysis (IRFA)*
12	Elshandidy, Fraser, and Hussainey (2013)	*International Review of Financial Analysis (IRFA)*
13	Ntim, Lindop, and Thomas (2013)	*International Review of Financial Analysis (IRFA)*
14	Elshandidy, Fraser, and Hussainey (2015)	*The British Accounting Review (BAR)*
15	Malafronte, Porzio, and Starita (2016)	*International Review of Financial Analysis (IRFA)*
16	Al-Hadi, Hasan, and Habib (2016)	*Corporate Governance: An International Review (CGIR)*

Panel B: **papers on informativeness of risk reporting, presented in chronological order (12 papers discussed in Section 3, categorized in Section 5, and summarized in Table 4)**

N	Paper	Journal
17	Rajgopal (1999)	*The Accounting Review (TAR)*
18	Roulstone (1999)	*Accounting Horizons (AH)*
19	Hodder and McAnally (2001)	*Financial Analysts Journal (FAJ)*
20	Jorion (2002)	*The Accounting Review (TAR)*
21	Linsley and Lawrence (2007)	*Accounting, Auditing and Accountability Journal (AAAJ)*
22	Akhigbe and Martin (2008)	*Journal of Banking and Finance (JBF)*
23	Pérignon and Smith (2010)	*Journal of Banking and Finance (JBF)*
24	Kravet and Muslu (2013)	*Review of Accounting Studies (RAST)*
25	Abraham and Shrives (2014)	*The British Accounting Review (BAR)*
26	Bao and Datta (2014)	*Management Science (MS)*
27	Elbannan and Elbannan (2015)	*Journal of Accounting Auditing and Finance (JAAF)*
28	Filzen (2015)	*Accounting Horizons (AH)*

Panel C: **papers on both, presented in chronological order (4 papers discussed in Section 4, categorized in Section 5, and summarized in Table 6)**

N	Paper	Journal
29	Campbell, Chen, Dhaliwal, Lu, and Steele (2014)	*Review of Accounting Studies (RAST)*
30	Elshandidy and Neri (2015)	*Corporate Governance: An International Review (CGIR)*
31	Elshandidy and Shrives (2016)	*The International Journal of Accounting (IJOA)*
32	Hope, Hu, and Lu (2016)	*Review of Accounting Studies (RAST)*

Table 2
Summary of empirical papers, presented in chronological order, on risk reporting incentives

Study name (year)	Journal	Jurisdiction	Sample	Content analysis (code unit)	Findings	Theoretical underpinnings	Limitations and/or related suggestions
Solomon (1999)	BAR	UK	Questionnaire of 40 UK institutional investors in 1996	Not applicable	The findings document an increasing awareness of foreign exchange risk management and indicate that UK investment institutions actively managed foreign exchange risk within their investment portfolios. The paper also reports that institutional investors require their investee companies to disclose information relating to their foreign exchange risk management policies.	Not specified	(1) Further research is needed to explore investors' risk disclosure requirements.
Solomon et al. (2000)	BAR	UK	Questionnaire of 97 UK institutional investors in 1999	Not applicable	The findings indicate that institutional investors do not generally favor a regulated environment for corporate risk disclosure or a general statement of business risk. The respondents agree that increased risk disclosure would assist them in their portfolio investment decisions.	Modern portfolio and regulatory theories	(1) Further in-depth case-study research may indicate more of the dynamic nature of the risk disclosure issue.
Beretta and Bozzolan (2004)	IJOA	Italy	Non-financial firms listed on the Italian (ordinary) market in 2001	Manual content analysis (number of sentences)	The results suggest that quantity of risk disclosure is mainly driven by firms' size rather than industry type. Specifically, the results confirm that relative quantity, density, and outlook are not statistically influenced by the size or the industry, but that the latter two do seem to have a significant impact on depth (where depth is defined by two properties: (i) the sign of the economic impact of the risk-related disclosure; and (ii) the measures used to communicate the expected performance).	The costs and benefits of voluntary risk disclosure	(1) Further research is needed to examine the relevance of each dimension of the quality of risk information. (2) Future research might investigate the impact of the quality of risk disclosure on the cost of capital.
Linsley and Shrives (2006)	BAR	UK	79 FTSE 100 non-financial firms in 2000	Manual content analysis (number of sentences)	A significant association is found between risk disclosures and company size and the level of environmental risk. They argue that a lack of coherence in the risk narratives implies that a risk information gap existed and consequently stakeholders are unable to adequately assess the risk profile of a company.	Attribution theory	(1) Adopting multi-disciplinary approaches as insights drawn from areas such as sociology may present alternative methodological approaches to assist future risk disclosure research.
Abraham and Cox (2007)	BAR	UK	71 FTSE 100 non-financial firms in 2002	Manual content analysis (number of words and number of sentences)	They find that corporate risk reporting is negatively related to share ownership by long-term institutions (in this case, defined as pension funds; vis-à-vis life assurance funds which are classified as short-term institutions), and thus the results imply that this important class of institutional investor has investment preferences for firms with a lower level of risk disclosure. Concerning governance, they find that both the number of executive and the number of independent directors positively related to the level of corporate risk reporting, but not the number of dependent non-executive directors.	Agency theory	(1) Future work on risk reporting should consider that, if a firm decides to dilute its risk-related discussion very thinly within a mass of text, it may be too piecemeal to pass for risk-related information at the sentence level of analysis (Beretta & Bozzolan, 2004).
Marshall and Weetman (2007)	JBFA	UK and USA	80 non-financial (40 UK-based, 40 US-based) firms as at 1998/99	Constructed index for risk disclosure	They find that the information asymmetry gap is lower in the US, where risk reporting is more relevant and where firms have higher levels of financial risk. In contrast, the UK evidence suggests that the information gap is lowest when gearing or liquidity is higher.	Agency theory	(1) Limited sample size. (2) Incomplete disclosure due to the relatively early adoption of regulations.
Deumes and Knechel (2008)	AJPT	Netherlands	192 non-financial listed firms from 1997 to 1999	Constructed index for internal risk disclosure	They find that economic incentives for voluntary internal control reporting exist in a low-regulation environment. The paper finds evidence that the economic incentives for voluntary internal control reporting exists primarily in a low-regulation context. The paper also finds a negative relationship between the extent of internal control disclosure and blockholder ownership, and a positive relationship between the extent of risk disclosure and financial leverage.	Agency theory	(1) Subjectivity of risk disclosure index.
Hill and Short (2009)	AF	UK	420 IPO listed firms from 1991 to 2003	Risk disclosure index (existence of item(s))	The results suggest that firms tend to reveal a high (low) proportion of forward-looking information (risk management disclosure). The results document that managerial ownership is negatively associated with risk disclosure.	Not specified	(1) Further empirical work is needed to investigate whether risk information is a costly or less effective means to reduce information asymmetry.

Taylor et al. (2010)	AF	Australia	Sample of 111 listed resource firms from 2002 to 2006	Risk disclosure indices (existence of item(s))	The results suggest that corporate governance strength, the need to raise capital, and being locally listed influence Australian firms' decision to reveal a high level of financial risk management information, both mandatorily and voluntarily. The paper also documents a significant impact of IFRS adoption on the revealing of that information. The paper finds that larger and highly leveraged firms tend to provide more risk information than others.	Agency theory	(1) Examining the impact of individual corporate governance attributes is important to understanding firms' behavior regarding their financial risk management disclosure policies.
Miihkinen (2012)	IJOA	Finland	99 non-financial firms listed on the OMX Helsinki between 2005 and 2007	Manual content analysis (number of words and sentences)	The paper finds an increase in the quantity of risk disclosure, with more extensive and more comprehensive information following the release of a new Finnish risk reporting standard. The paper also finds larger firms that are cross-listed in the US tend to provide more quantitative risk disclosure and observes that the quality has increased over the years.	Signaling, proprietary cost and agency theories	(1) Further research is needed to test the economic consequences of risk information from equity and debt investors' perspectives.
Barakat and Hussainey (2013)	IRFA	Europe	85 banks from 20 EU member countries over three years (2008, 2009, and 2010)	A self-constructed disclosure index to measure the quality of ORD	This paper finds evidence of a significant impact of corporate governance (CG) on the quality of operational risk reporting (ORD). The study also finds bank supervision an essential factor facilitating that impact.	Legitimacy, resource dependence, and stakeholder theories	(1) Further research is needed to examine the impact of the audit committee in enhancing the quality of risk reporting. (2) The impact of operational risk reporting quality on banks' cost of capital is still an open question.
Elshandidy et al. (2013)	IRFA	UK	1216 firm-year observations for FTSE all-share non-financial firms from 2005 to 2008	Automated textual analysis (number of sentences)	The paper finds that firms characterized by higher levels of systematic risk, financing risk and risk-adjusted returns, and those with lower levels of stock return variability, exhibit higher levels of aggregated and voluntary risk disclosure. They also find mandatory risk disclosure to be influenced positively by firm size, dividend yield, and board independence, and negatively by high leverage.	Regulatory, agency, and signaling theories	(1) Further research is required to observe, and if any why, the differences in risk incentives across countries. (2) Examine whether users would value external assurance over risk disclosures made in annual report narratives.
Ntim et al. (2013)	IRFA	South Africa	50 firms from 2002 to 2011	Manual content analysis (number of sentences)	The paper finds that corporate risk disclosure is negatively related to block ownership and institutional ownership, and positively related to board diversity, board size, and independent non-executive directors.	Institutional, legitimacy, stakeholder, and agency theories	(1) Applying a multi-theoretical framework within a cross-country context needs further attention from extant work on risk reporting.
Elshandidy et al. (2015)	BAR	Germany, UK, and USA	3685 firm-year observations for Frankfurt (CDAX), FTSE, and NASDAQ all-share non-financial firms from 2005 to 2010	Automated textual analysis (number of sentences)	The results document that mandatory and voluntary risk reporting (MRR and VRR) are influenced by systematic risk, the legal system, and cultural values. They also find that country and firm characteristics have higher explanatory power over the observed variations in MRR than over those in VRR. They find that the legal system and cultural values have high explanatory power over MRR variations over time, even under the new approach of international convergence. They are less successful, however, in explaining the variations in VRR between firms across countries.	Institutional theory	(1) Future work on comparative risk reporting might increase the number of countries so as to account for a wide range of country-specific factors. (2) Further research on comparative quality of mandatory and voluntary risk disclosure is needed.
Malafronte et al. (2015)	IRFA	Europe	231 firm-year observations from 2005 to 2010	Automated textual analysis (number of sentences)	The results show that the amount of risk information provided in the annual report is significantly affected by insurers' characteristics such as size and technical provision (i.e. the main item in the balance sheet of an insurer; a high level of technical provision represents a signal of the strength of an insurance company), and country-level characteristics. The paper also finds that the amount of risk disclosure is affected by the financial crisis as firms are likely to provide more risk information to assure shareholders of the board's independence from the global crisis. To this end, they find that most companies in their sample use their risk disclosure to talk about the financial crisis, as opposed to ignore it, and to explain how they are – or how they enacted strategies to make themselves – independent from it	Not specified	(1) Future work might include comparing the European insurance industry with those of other Western countries and emerging countries.

Al-Hadi et al. (2016)	CGIR	Gulf Cooperation Council (GCC)	677 firm-year observations of financial firms from 2007 to 2011	Risk disclosure indices (existence of item(s))	This paper finds that firms with a separate risk committee are likely to exhibit more market risk disclosure than other firms. These firms' decision to provide risk information is also influenced by risk committee characteristics including size and qualification. Results are more pronounced for mature-stage firms.	Agency theory, legitimacy theory, and the resource-based theory	Future work might include: (1) Examining the impact of institutional factors on firms' decision to reveal risk information. (2) Observing the effect of market risk disclosure on information asymmetry.	

Table 3
Areas of divergence for papers on incentives for risk reporting, presented in chronological order (16 papers summarized in Table 2, discussed in Section 2, and categorized in Section 5)

N	Main classification	Method and context								
		Type of disclosure			Type of content analysis		Type of analysis		Type of sector	
		Mandatory	Voluntary	Aggregate	Manual	Automated	Within-country	Cross-country	Non-financial	Financial/insurance
1	Solomon (1999)			✓	Not applicable		✓		Not applicable	
2	Solomon et al. (2000)		✓	✓	Not applicable		✓		Not applicable	
3	Beretta and Bozzolan (2004)		✓		✓		✓		✓	
4	Linsley and Shrives (2006)		✓		✓		✓		✓	
5	Abraham and Cox (2007)		✓		✓		✓		✓	
6	Marshall and Weetman (2007)		✓		✓			✓	✓	
7	Deumes and Knechel (2008)		✓		✓		✓		✓	
8	Hill and Short (2009)			✓	✓		✓		✓	
9	Taylor et al. (2010)	✓	✓		✓		✓		✓	
10	Miihkinen (2012)	✓	✓		✓		✓		✓	
11	Barakat and Hussainey (2013)		✓		✓		✓			✓
12	Elshandidy et al. (2013)	✓	✓	✓		✓	✓		✓	
13	Ntim et al. (2013)		✓		✓		✓		✓	
14	Elshandidy et al. (2015)	✓	✓			✓		✓	✓	
15	Malafronte et al. (2016)			✓		✓		✓		✓
16	Al-Hadi et al. (2016)	✓	✓		✓			✓		✓

Table 4
Summary of empirical papers on risk-reporting informativeness, presented in chronological order

Study name (year)	Journal	Jurisdiction	Sample	Content analysis (code unit)	Findings	Theoretical underpinnings	Limitations and/or related suggestions
Rajgopal (1999)	TAR	USA	149 oil and gas firm-years from 1993 to 1996	Manual content analysis (number of sentences)	The paper finds that both disclosure formats (tabular and sensitivity) are informative (i.e., equity price sensitive to a change in oil and gas prices). These findings suggest that these FRR No.48 disclosures are useful for investors wanting to assess commodity contracts and prices in specific circumstances (e.g., oil and gas firms). However, the risk-relevance of market risk disclosures related to more complex forms of risk and in broader contexts is weak and inconsistent.	Neo-classical economic theory	(1) Research is needed to investigate how investors interpret the results of risk management activities which are presented under different formats of risk disclosure (i.e. sensitivity analysis, tabular, Value at Risk).
Roulstone (1999)	AH	USA	25 non-financial firms from 1996 to 1997	Manual content analysis (number of words)	The paper finds that the majority of the sampled firms report derivative use. The majority of registrants provide quantitative and qualitative disclosures of market risk; however, only around half of these firms discuss the details and limitations of their risk measurement models and disclosures. Overall, while registrants have greatly increased their disclosures about market risk, there is room for improvement in future filings.	Not specified	(1) Further research is needed on whether firms will change their focus due to the change in regulations (i.e., FAS No.133).
Hodder and McAnally (2001)	FAJ	USA	4 financial firms' 10-K disclosures in 1999	Manually reviewed 10-K disclosures (sentences)	The paper proposes a methodology for comparing the tabular format to the VaR format for FRR No. 48 disclosures. It finds that the tabular format provides useful information about firms' market risk (subject to limitations).	Not specified	(1) Does not directly measure the informativeness of the information required by FRR No.48.
Jorion (2002)	TAR	USA	Eight banks from 1995 to 1999	Manual (number of sentences)	The paper finds that VaR disclosures are informative since they enable investors to predict variability in trading revenues and make adequate comparisons of trading portfolios.	Not specified	(1) Methodology affects the observed quality of VaR disclosures. (2) Does not quantify the information revealed in VaR disclosures.
Linsley and Lawrence (2007)	AAAJ	UK	25 FTSE 100 non-financial in 2001	Manual content analysis (number of sentences)	The paper finds the readability of the risk disclosures to be poor or very poor. However, no evidence is found to suggest that directors are deliberately obfuscating or concealing bad risk news through their writing style.	Not specified	(1) The principal formula for readability only considers writing style, ignoring content, organization, and format, all of which can also affect reader understanding.
Akhigbe and Martin (2008)	JBF	USA	Sample of 392 banks as at the end of 2001	Manual content analysis (number of pages)	The paper studies changes in risk measures after the passage of Sarbanes Oxley. These are divided into shorter-term and longer-term measures of risk. They find that the former shift positively on average, whereas the latter shift negatively on average. They suggest that the positive shift in shorter-term measures of risk is consistent with the mandation of risk disclosure and corporate governance. They suggest that the negative shift in longer-term measures of risk is consistent with an improvement in transparency and a corresponding reduction in investor uncertainty.	Agency theory	(1) Explore the validity, costs and benefits of the assumptions made about higher (lower) levels of disclosure transparency vis-à-vis increases (reductions) in investor uncertainty.
Pérignon and Smith (2010)	JBF	USA	The largest 10 US banks from 1996 to 2005.	A self-constructed disclosure index to measure the VaR disclosure	The paper studies levels of VaR disclosure (measured by an index) and the accuracy of such disclosure (measured by number of VaR exceedances and whether VaR disclosure is associated with volatility of subsequent trading revenues). They find an upward trend in the quantity of VaR disclosure and that historical simulation is by far the most common method in calculating VaR. They also find that VaR disclosure is less informative as it does not impact future volatility.	Not specified	(1) Limited sample size which might question the generalization of the paper findings

Kravet and Muslu (2013)	RAST	USA	28,110 firm-year observations from 1994 to 2007	Automated textual analysis (number of sentences)	The paper finds that annual increases in risk disclosure were associated with increased stock return volatility and trading volumes around and after the filings, and with more dispersed forecast revisions around the filings. It also finds the results are less pronounced for firm-level disclosures that deviate from those of other companies in the same industry and year.	Not specified	(1) Further research is needed to explore the usefulness of risk information in the debt market.
Abraham and Shrives (2014)	BAR	UK	Four food producer firms from the FTSE 100 from 2002 to 2007	Manual content analysis (number of sentences)	Results suggest that company managers prefer providing symbolic than substantive disclosure. In suggesting a way forward, the authors emphasize the role that stakeholders, including managers, users, regulators, and auditors, could play in improving the quality of risk reporting.	Institutional and proprietary costs theories	(1) Applying the suggested framework to more companies. (2) More field work needed, utilizing case studies.
Bao and Datta (2014)	MS	USA	7679 firm-year observations 2006-2010	Automated textual analysis (number of words)	The authors find that around two-thirds of the types of risk disclosure lack informativeness and have no significant influence on investors' perception of risk. Moreover, they find that the informative risk types do not necessarily increase investors' perception of risk.	Not specified	(1) Further research is required to examine how some risks might be correlated to each other and the possibilities of merging them.
Elbannan and Elbannan (2015)	JAAF	Egypt	283 firm-year observations 2002-2011 of financial firms	Risk disclosure indices (existence of item(s))	They find that risk disclosure significantly influences Egyptian banks' performance and evaluation. The observed effects are weaker during than prior to the period of financial crisis. In emerging markets, such as Egypt, the regulatory supervision might not be sufficient to ensure that information provided by banks is incorporated into stock prices.	Not specified	(1) Examining the impact of regulations and the level of supervision of Egyptian banks on performance and valuation is still an open question.
Filzen (2015)	AH	USA	13,165 firm-year observations from 2006 to 2010	Automated textual analysis (the presence of a risk factor update)	This paper examines the impact of risk factor updates in quarterly reports (10-Q) on negative abnormal returns. It finds firms that update their risk disclosures in these reports to have significantly lower future earnings, more extreme negative future earnings, and lower abnormal returns around the filing dates of the 10-Q.	Not specified	(1) Future research might examine whether there is any association between risk factor disclosures and positive abnormal returns.

Table 5
Areas of divergence for papers on informativeness of risk reporting, presented in chronological order (12 papers summarized in Table 4, discussed in Section 3, and categorized in Section 5)

N	Main classification	Method and context								
		Type of disclosure			Type of content analysis		Type of analysis		Type of sector	
		Mandatory	Voluntary	Aggregate	Manual	Automated	Within-country	Cross-country	Non-financial	Financial/insurance
17	Rajgopal (1999)		✓		Not applicable		✓		✓	
18	Roulstone (1999)	✓			✓		✓		✓	
19	Hodder and McAnally (2001)	✓			✓		✓		✓	
20	Jorion (2002)	✓			✓		✓			✓
21	Linsley and Lawrence (2007)			✓	✓		✓		✓	
22	Akhigbe and Martin (2008)	✓			✓		✓			✓
23	Pérignon and Smith (2010)			✓	✓		✓			✓
24	Kravet and Muslu (2013)	✓				✓	✓		✓	
25	Abraham and Shrives (2014)			✓	✓		✓		✓	
26	Bao and Datta (2014)			✓		✓	✓		✓	
27	Elbannan and Elbannan (2015)			✓	✓		✓			✓
28	Filzen (2015)	✓				✓	✓		✓	

Table 6
Summary of empirical papers on risk reporting incentives and informativeness, presented in chronological order

Study name (year)	Journal	Jurisdiction	Sample	Content analysis (code unit)	Findings	Theoretical underpinnings	Limitations and/or related suggestions
Campbell et al. (2014)	RAST	USA	9076 firm-year observations from 2005 to 2008	Automated textual analysis (number of words)	Disclosed risk information has a significant association with market value and risk levels, and the authors conclude that risk information is firm-specific and useful to investors. They also find that textual risk disclosure in Section 1A (Risk Factors) of form 10-K is significantly associated with risk levels, and that the information conveyed in risk factor disclosures is reflected in systematic risk, idiosyncratic risk, information asymmetry, and firm value.	Not specified	(1) Further research is needed to measure the impact of risk disclosure on the increased probability of bankruptcy and credit default.
Elshandidy and Neri (2015)	CGIR	UK and Italy	Non-financial firms June 2005 to June 2010	Automated textual analysis (number of sentences)	The paper finds that governance factors are associated with decisions of UK (Italian) firms over whether to exhibit risk information voluntarily (mandatorily) in their annual report narratives. Furthermore, strongly governed firms in the UK tend to provide more meaningful risk information (observed through market liquidity) to their investors than weakly governed firms. In Italy, however, they find strongly governed firms risk information voluntarily, which significantly improves market liquidity.	Agency theory	(1) Examining the quality rather than the quantity of risk. (2) Scrutinizing other corporate communication outlets (e.g., Li, 2010), such as online resources, conference calls, and/or financial analysts' reports.
Elshandidy and Shrives (2016)	IJOA	Germany	Non-financial firms from 2005 to 2009	Automated textual analysis (number of sentences)	They find that the decision to provide or withhold risk information is more significantly associated with the underlying risk of a firm (i.e., market beta) than other environmental incentives (i.e., ownership structure, capital structure, external equity finance, and borrowing). The size and length of firms' annual reports are the dominant factors that explain (German) firms' provision of risk information. Also, the German market tends to positively (negatively) price good (bad) news about risk either by improving (worsening) market liquidity by removing (creating) information asymmetries, or by reducing (increasing) investor-perceived risk.	Agency theory, economic theory	(1) Investor-perceived risk can be measured directly through questionnaires rather than by relying on an indirect measure (i.e., volatility of stock returns).
Hope et al. (2016)	RAST	USA	14,865 firm-year observations from 2006 to 2011	Automated textual analysis (number of words)	They find significant evidence that more specific risk factors enable analysts to better assess firms' fundamental risk analysis. Their results suggest that risk factor disclosure is not boilerplate as some prior research has suggested (Kravet & Muslu, 2013).	Proprietary costs theory	(1) Results are based on a relatively small hand-collected sample of firms covered by the analysts from one financial institution.

Table 7
Areas of divergence papers on risk reporting incentives and informativeness (four papers summarized in Table 6, discussed in Section 4, and categorized in Section 5)

N	Main classification	Method and context								
		Type of disclosure			Type of content analysis		Type of analysis		Type of sector	
		Mandatory	Voluntary	Aggregate	Manual	Automated	Within-country	Cross-country	Non-financial	Financial/insurance
29	Campbell et al. (2014)	✓				✓	✓		✓	
30	Elshandidy and Neri (2015)	✓	✓			✓		✓	✓	
31	Elshandidy and Shrives (2016)			✓		✓	✓		✓	
32	Hope et al. (2016)			✓		✓	✓		✓	

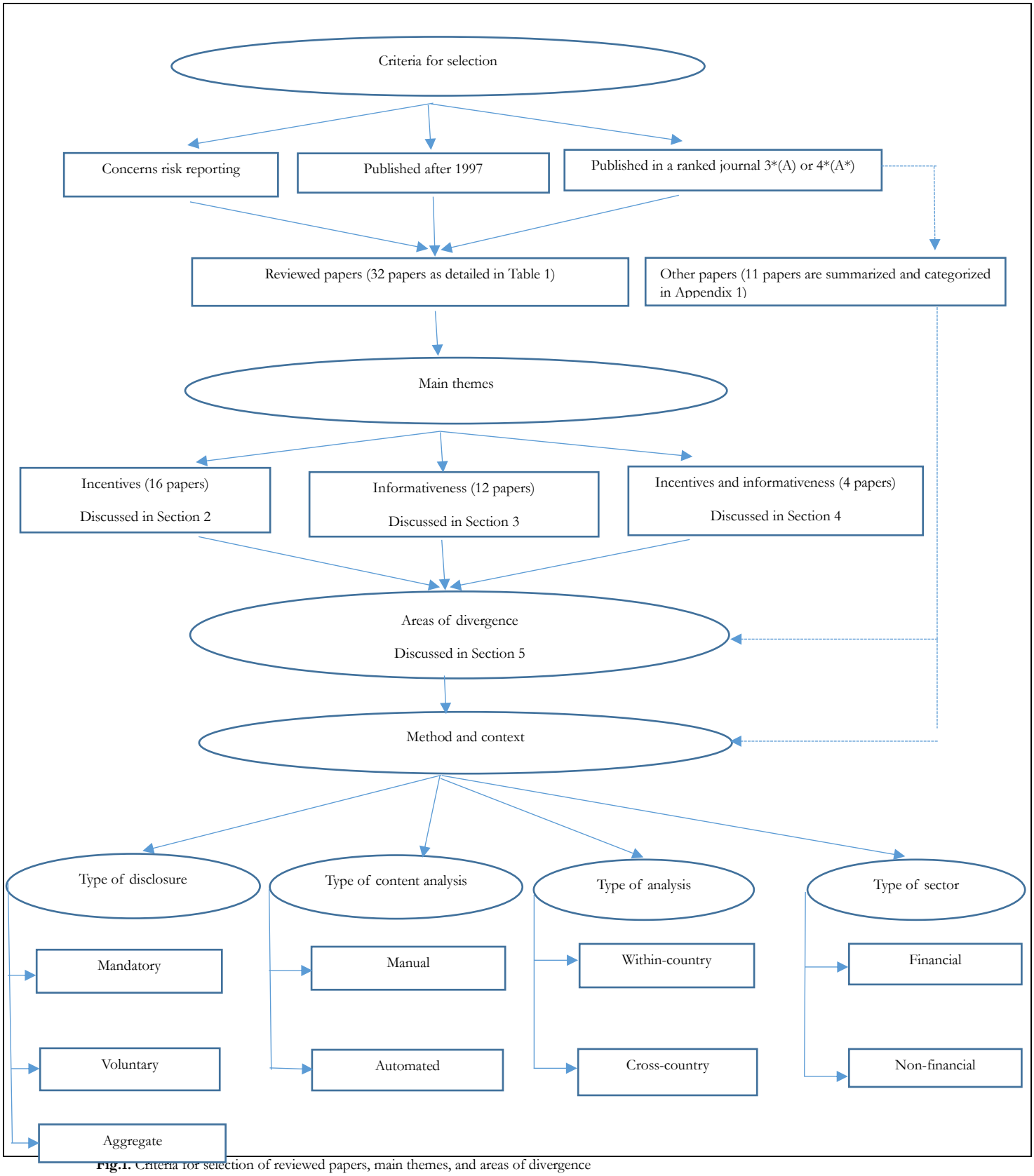

Fig.1. Criteria for selection of reviewed papers, main themes, and areas of divergence

Appendix 1

Summary of other empirical risk reporting papers, presented in chronological order, that have been mentioned in our discussion in Section 5 rather than in the main review as they do not comply with the criteria mentioned in Section 1

Panel A: **papers on risk reporting incentives**

Study name (year)	Jurisdiction	Sample	Findings	Areas of divergence								
				Method and context								
				Type of disclosure			Type of content analysis		Type of analysis		Type of sector	
				Mandatory	Voluntary	Aggregate	Manual	Automated	Within-Country	Cross-country	Non-financial	Financial/ insurance
Lajili and Zéghal (2005)	Canada	300 firms from the year 1999	This paper finds firms provide a high degree of mandatory and voluntary risk information. After analytically reviewing such information, the paper concludes that most of this information tends to lack uniformity, clarity, and quantification, suggesting a limited role for such disclosure. The paper concludes that more reforms are required to improve the quality of risk information, which could reduce information asymmetry.	✓	✓	✓	✓		✓		✓	
Hassan (2009)	United Arab Emirates (UAE)	41 firms from the year 2005	This paper finds that leverage and industry type significantly influence risk disclosure by UAE firms.			✓	✓		✓		✓	
Dobler et al. (2011)	Canada, Germany, UK, and USA	160 firm-year observations from the year 2005	This paper finds that firms do not reveal quantitative and forward-looking attributes related to risk disclosure, but qualitative and retrospective information. Observed variations in the quantity of risk disclosure are partially associated with domestic regulation, playing an important role in firm incentives. The impacts of risk factors vary by country, as US and Canadian firms' risk disclosures are positively associated with their risk levels, German firms' negatively, and UK firms' not significantly related at all.			✓	✓			✓	✓	
Oliveira et al. (2011)	Portugal	81 non-financial firms from the year 2005	This paper finds a non-significant impact of regulations on risk-reporting practices. Risk disclosure practices are likely to be categorized as generic, qualitative, and backward-looking. It finds (consistent with the agency theory) significant impacts of leverage and the board of directors on risk-reporting practices.			✓	✓		✓		✓	
Mokhtar and Mellett (2013)	Egypt	105 firms in the year 2007	Consistent with proprietary cost theory, this paper finds firms operating in highly competitive areas (measured by barriers to entry) to be likely to exhibit high levels of voluntary risk information. The results reveal that firms with larger boards, audited by one of the big 4, and with separate leadership are likely to comply with risk regulations. The paper does not observe a statistical impact in relation to sector type, firm size, liquidity, or risk-reporting practices. Generally, the results suggest the direction of association between the main independent variables and mandatory risk disclosure is different from observed trends for voluntary risk disclosure.	✓	✓		✓		✓		✓	

Abdallah et al. (2015)	The Gulf Cooperation Council (GCC) countries	424 firm-year observations for financial firms in the year 2008	This paper finds different patterns in how corporate governance affects risk disclosure practices, between Islamic and conventional financial firms. The study finds that risk disclosure varies between GCC countries, despite sociocultural and regulatory similarities.			✓	✓	✓		✓		✓
Buckby et al. (2015)	Australia	300 firm-year observations for the year 2010	This paper documents that risk disclosure does not appear to be impacted by board characteristics. It does not find a significant impact, either, for risk levels, big 4, or audit committee independence, on risk disclosure practice. It finds the presence of a risk committee to be a significant factor explaining significant differences between firms' disclosure of risk information.			✓	✓		✓		✓	✓
Martikainen et al. (2015)	Finland	59 to 85 firm-year observations for 2006-2009	This paper highlights two slightly new aspects of board characteristics in their relation to (dis)incentivising managers' revealing of high (quantity and quality) risk information. These are boards' financial incentives and competence. Directors' financial incentives (proxied by their wealth and compensation) and their competence (experience and education) are found to be empirically significant in relation to risk disclosure. The paper also finds that variations in the quality of risk reporting are significantly explained by board characteristics.		✓		✓		✓		✓	

Panel B: **Papers on risk reporting informativeness**

Study name (year)	Jurisdiction	Sample	Findings	Areas of divergence								
				Method and context								
				Type of disclosure			Type of content analysis		Type of analysis		Type of sector	
				Mandatory	Voluntary	Aggregate	Manual	Automated	Within-Country	Cross-country	Non-financial	Financial/ insurance
Miihkinen (2013)	Finland	386 firm-year observations 2006-2009	This paper finds that the quality of mandatory risk disclosure significantly mitigates information asymmetry between managers and investors, suggesting that this information is firm-specific. The paper also finds that small, high-tech and low-analyst-coverage firms are likely to provide significantly more informative risk information than other firms.		✓		✓		✓		✓	
Abdullah et al. (2015)	Malaysia	395 firms from the year 2011	This paper finds voluntary risk management disclosure improves firms' value. This is particularly true for beneficial as opposed to damaging voluntary risk management disclosures.	✓			✓		✓		✓	
Moumen et al. (2015)	12 Middle Eastern and North African (MENA) countries	809 firm-year observations for non-financial firms during 2007–2009	This paper finds voluntary risk disclosure significantly influenced by future earnings. The observed impact is moderated by the level of proprietary costs.		✓		✓			✓	✓	