The Effect of Business Strategy on Risk Disclosure

VÉRONIQUE WEBER*··· and ANKE MÜßIG*

*Department of Economics and Management, Faculty of Law, Economics and Finance, University of Luxembourg, Luxembourg and **Ministère du Travail, de l’Emploi et de l’Économie sociale et solidaire, Luxembourg

ABSTRACT For a sample of nonfinancial and non-utility firms from the European Economic Area in 2005–2017, we find that a firm’s business strategy is a determinant of the amount of risk factor information in the annual report. Firms with an innovation-oriented prospector strategy report more about their risk factors than firms with an efficiency-oriented defender strategy. This is because, first, these innovation-oriented prospectors face greater risks and uncertainties and the regulator and enforcement institution expect them to report these accordingly in the annual report. Second, given the discretion the firms have in disclosing risks, prospectors are more likely to engage in voluntary disclosure. It seems that the benefits outweigh the costs of revealing proprietary information. Further, our findings reveal that business strategy influences the coverage of the main risk topics and risk disclosure complexity. Additionally, the influence of business strategy on risk disclosure is stronger for small, young, and low-technology firms.

Keywords: risk disclosure; business strategy; automated content analysis

1. Introduction

Risk disclosure has gained substantial attention from regulators, investors, academics, and other stakeholders in recent years (e.g. Elshandidy et al., 2018; Financial Reporting Council (FRC), 2009; Institute of Chartered Accountants in England and Wales, 1999, 2002; Investor Responsibility Research Center Institute (IRRCi), 2016). With increased interest, investors and regulators have raised concerns about the current risk reporting practices of firms. Risk disclosures have been criticized for being lengthy (Beatty et al., 2019) and too general and generic (IRRCi, 2016). The information provided is said to be repetitive, unclear, and difficult to understand (IRRCi, 2016). There seems to be a certain consensus that risk disclosure needs to improve. The first step towards better risk disclosure is to fully understand risk disclosure.

This study helps to better understand the factors that determine management’s choice of how much and what risk information to disclose in their annual reports in the European context. Since risk disclosure is weakly regulated in Europe, it is important to investigate what drives firms to...
report their risks in this quasi-voluntary (Dobler et al., 2011) or quasi-mandatory setting (Mazumder & Hossain, 2018). Over the past decades, researchers have investigated the determinants and incentives of how much and what risk information firms reveal (Elshandidy et al., 2018). Corporate size, the leverage ratio, profitability, and risk factors have been found to be determinants of risk disclosure (Khlif & Hussainey, 2016). Recent studies show that factors that go beyond firm fundamentals play a role too. Dobler et al. (2016) reveal that cultural factors influence firm risk disclosure. They find that most of Hofstede’s (2001) cultural values, namely, power distance, uncertainty avoidance, individualism, and long-term orientation, are determinants of risk disclosure, when controlling for the legal system (Dobler et al., 2016). Further, Ríos-Figueroa (2016) finds that economic and political factors, such as the control of corruption and regulation quality, positively affect the level of risk disclosure. We add to the discussion of determinants of risk disclosure beyond firm fundamentals by investigating whether a firm’s business strategy influences how much, what, and how the firm reveals information on its risk exposure in the annual report.

This study focuses on listed European Economic Area (EEA) companies. These companies prepare their annual financial statements according to International Financial Reporting Standards (IFRS), and IFRS 7 requires firms to provide in their financial statements a description of the qualitative and quantitative nature of the risks arising from financial instruments. Further, the International Accounting Standards Board (IASB, 2010) has issued an IFRS Practice Statement presenting a framework for management commentary that recommends information on the firm’s risk exposure. However, the Practice Statement is a recommendation only, and not mandatory. At the European Union (EU) level, Directive 2013/34/EU provides details on the mandatory management report. A firm’s management report should describe in the annual financial statements the principal risks and uncertainties that the firm faces. Risk disclosure in the EU and its quasi-voluntary (Dobler et al., 2011) or quasi-mandatory nature (Mazumder & Hossain, 2018) give managers discretion in the amount of risk information to reveal in the annual report.

Using a sample of 2,344 nonfinancial and non-utility firms from 30 EEA countries, we analyse whether business strategy, using the measure of Bentley et al. (2013) and the definition of Miles and Snow (1978, 2003), is a determinant of risk disclosure in the annual report, as measured by the natural logarithm of the number of risk-related sentences in the annual report. Miles and Snow (1978, 2003) define three types of business strategies: defenders, prospectors, and analysers. Miles and Snow’s defenders are characterized by a stable organizational structure with a narrow product focus (Bentley et al., 2013; Higgins et al., 2015). These firms compete on prices, services, and quality. In contrast, prospectors have a flexible organizational structure that allows them to adapt quickly to product mixes. These firms compete for innovative market leadership (Bentley et al., 2013; Higgins et al., 2015). Analysers use hybrid strategies and incorporate the characteristics of both prospectors and defenders (Miles & Snow, 1978, 2003).

Previous studies find that firms adopting a prospector strategy are more likely to provide voluntary disclosure (Bentley-Goode et al., 2019). Lim et al. (2018) find that business strategy is a determinant of the complexity of annual reports. They determine that prospector firms use more complex language in their annual reports than defender firms and that prospectors’ annual reports have a more negative tone than defenders’. In addition, the authors find that prospectors’ annual reports include more words related to uncertainty. We complement these studies by analysing and finding that business strategy is a determinant of a firm’s risk disclosures. Thus, we provide further evidence of the influence of a firm’s business strategy on its disclosure behaviour. More precisely, we find that prospectors are more likely to reveal risk information in their annual report than defenders.
There are several reasons for this. First, firms adopting a prospector strategy have a business model that is typically characterized by more uncertainty (Bentley-Goode et al., 2019; Hsieh et al., 2019). In addition, prospectors engage in risky projects (Lim et al., 2018; Rajagopalan, 1997). Choosing a certain business strategy leads to higher risk exposure. The business strategy is a part of the risk profile of firms. A higher risk level implies higher information asymmetry among investors (Deumes & Knechel, 2008). According to agency theory, reporting and informing stakeholders about the risk factors in the annual report can reduce agency costs and information asymmetry between managers and shareholder (Watts & Zimmerman, 1983). Compared to defender firms, prospector firms might also be exposed to greater public visibility. According to legitimacy theory, informing about risks helps stakeholders’ evaluation of potential litigation risk and reputational risks. To prevent future negative reactions (e.g. stock price crashes), prospector firms signal legitimacy by immediately disclosing their risks and not withholding negative information (Oliveira et al., 2013). Second, according to organizational theory, prospectors reveal more voluntary information (Bentley-Goode et al., 2019). We expect this to also be the case for risk disclosure, because of its quasi-voluntary or quasi-mandatory nature. Third, firms face a trade-off between the costs and benefits of reporting private risk information (Abraham & Shrives, 2014; Verrecchia, 1983). By revealing too little information, firms could appear to have poor risk management; by revealing too much information, firms risk giving away valuable information to competitors. This is particularly true for prospectors. Prospectors rely more on external financing and should thus disclose more information to demonstrate transparency to existing and potential future stakeholders. However, given that their business model focuses on innovative leadership, they should be careful about disclosing too much private information to their competitors. Firms risk incurring proprietary costs. Our findings seem to provide evidence that, for prospectors, the benefits outweigh the costs; that is, for prospectors, it is more valuable to engage in extensive risk disclosure than to reveal little information. Overall, our results suggest that a firm’s business strategy is an important attribute that explains the firm’s risk disclosure behaviour.

In addition to studying how much risk information is disclosed, we analyse what information is conveyed and how. We find that a firm’s business strategy determines how the firm covers the main risk topics, that is, systematic, idiosyncratic, financial, tax, and legal risk factors, with defenders more likely than prospectors to provide a balanced description of these main risk topics. Further, our results reveal that business strategy is a determinant of the complexity of risk disclosure. Prospectors use more complex language when describing their risk factor exposure than defenders, reflecting the complexity of their business activities. Our study makes several contributions. First, it contributes to the risk disclosure literature by increasing our understanding of the determinants of risk disclosure. Our setting, that of European listed firms, is ideal for studying the determinants of risk disclosure, since regulations leave a great deal of discretion to managers on what, how, and how much to report about their firms’ risk factors. In line with previous studies that find that factors other than firm fundamentals, such as cultural values or board characteristics, drive risk reporting, we show that firms adopting different business strategies report their risk factor exposure differently. A firm’s business strategy influences what and how much risk information it reveals. Further, our sample period from 2005 to 2017 allows us to draw conclusions on the effect of the global financial crisis (GFC). There is limited evidence of the impact of the crisis on risk reporting in Europe. Second, this paper adds to the growing body of risk disclosure studies within the European setting. Given increased interest in the topic, studies analysing risk reporting in Europe have gained momentum. Risk disclosure has been studied for U.K. firms (e.g. Abraham & Cox, 2007; Abraham & Shrives, 2014; Elzahar & Hussainey, 2012; Klaus, 2005; Linsley & Shrives, 2006; Rajab, 2009; Rajab & Handley-Schachler, 2009), Italian firms (Beretta &
Bozzolan, 2004; Elshandidy & Neri, 2015), and Finnish firms (Miihkinen, 2012, 2013), amongst others. Some studies focus on more than one EU country (e.g. Dobler et al., 2011, 2016; Elshandidy et al., 2015). However, to date, cross-country evidence on risk reporting is limited (Dobler et al., 2016; Elshandidy et al., 2018). We follow the call of Elshandidy et al. (2015) to increase the number of countries in risk reporting studies. Further, large-sample evidence of the risk disclosure behaviour of non-U.S. firms is limited (Lang & Stice-Lawrence, 2015), mainly because of the time-consuming and often manual collection of annual reports. Thus, by focusing on 30 EEA countries, we provide valuable insights into the determinants of risk disclosure across countries that prepare their annual reports within the same accounting framework, painting a rather complete picture of risk reporting in Europe. Although the mandatory risk disclosure requirements are loosely formulated in the EU, the risk reporting behaviour of firms across our sample has a certain homogeneity. Our results suggest that a firm’s business strategy profile is a strong determinant of how it reports risks, irrespective of national differences. Further, previous cross-country studies have failed to combine country- and firm-specific effects in their analysis (Elshandidy et al., 2018). We fill this gap by including in our analysis institutional factors and other country-specific factors, such as the legal system and cultural values, and firm-specific effects, such as firm size, profitability, leverage, and business strategy – our variable of interest.

Third, to the best of our knowledge, this is the first study to implement the business strategy measure of Bentley et al. (2013) on a European sample. Our descriptive statistics show that the business strategies of the firms in our sample are largely in line with those of U.S. firms. However, in contrast to previous studies in the U.S. setting, where samples typically count more prospectors than defenders (Bentley et al., 2013; Bentley-Goode et al., 2019; Higgins et al., 2015; Navissi et al., 2017), our sample counts more defenders than prospectors. This could suggest that European firms are less innovative than U.S. firms and that they drift more towards the defender side of the business strategy spectrum than the prospector side.

This study will be of interest for standard setters, accounting enforcement institutions, and auditors. Risk disclosure practice in both the United States and Europe has prompted calls to improve reporting (e.g. FRC, 2009; IRRCi, 2016). The first critical step to improving risk disclosure is to fully understand firms’ risk disclosure behaviour. Our study indicates that firm-specific business strategy is one of the driving factors of risk disclosure. Which business strategy a firm pursues is at its full discretion, a choice that is not directly influenced by standard setters. Hence, in line with prior studies (e.g. Dobler et al., 2011; McChlery & Hussainey, 2021), we conclude that improving risk disclosure is mainly a question of incentives and firm-specific attributes rather than a question for standard setters. Understanding the determinants of corporate risk disclosure and the limitations of regulatory interventions in improving risk disclosure is, however, of importance for standard setters, too. It should help standard setters define minimum threshold levels. It is of importance to accounting enforcement institutions and auditors, to understand the ‘client’s business’ comprising the firm’s attributes related to its risk disclosure behaviour. Understanding the determinants of risk disclosure, including the firm’s business strategy, will assist in formulating assertions on the appropriateness and completeness of risk disclosures. To illustrate, our findings indicate that a firm following a defender strategy seems to have less incentive to disclose its risks. Taking into consideration the information needs of external decision makers, the firm’s auditor can urge these firms to disclose its risks more appropriately.

This paper proceeds as follows. Section 2 reviews the business strategy literature and risk disclosure literature and presents our hypothesis. Section 3 describes our research design and defines the variables. Section 4 reports the main findings, including robustness checks. Section 5 presents additional analysis. Section 6 concludes the study.
2. Literature Review and Hypothesis Development

2.1. Literature Review on Business Strategy

A firm’s business strategy influences its operating complexity and its environmental uncertainty (Bentley et al., 2013; Lim et al., 2018). Prospectors adopt an innovation-oriented strategy and thus constantly seek new business opportunities, whereas defenders focus on establishing a leadership position in their existing business (Hsieh et al., 2019; Miles & Snow, 1978, 2003).

Further, a firm’s business strategy influences its information environment (Bentley-Goode et al., 2019). Bentley-Goode et al. (2019) suggest that prospectors issue more press releases and management earnings guidance. In addition, they find that analysts cover more prospectors than defenders. Khedmati et al. (2019) find a relation between business strategy and the cost of equity capital. They show that investors demand lower rates of return when investing in firms with pure business strategies, such as prospectors or defenders, than they do when investing in firms with a hybrid business strategy, that is, analyser firms. In contrast to our study, their analysis focuses on the difference between pure and hybrid strategies. The authors abstain from comparing the effects of the two pure business strategies, that is, defenders versus prospectors. Guo (2017) suggests that business strategy influences the magnitude of intra-industry information transfer between firms. Information transfer levels are higher if the announcing firm adopts a prospector strategy, and lower if the receiving peer company is a prospector, since prospectors’ market value is weakly correlated with overall industry trends (Guo, 2017).

Further, a firm’s business strategy influences its business and strategic decisions. Higgins et al. (2015) find that firms with a prospector strategy are more likely to engage in tax avoidance than firms with a defender strategy. Chen and Jermias (2014) find that business strategy impacts the use of performance-linked compensation. Cinquini and Tenucci (2010) link business strategy to strategic management accounting and find that defenders are more likely to use costing techniques, in line with their cost leadership strategy. Maniora (2018) analyses the relation between business strategy and the mismanagement of sustainability issues and reveals that prospectors are more likely than defenders to intentionally mismanage sustainability issues.

Previous evidence on how business strategy influences firms’ disclosure behaviour is limited. Lim et al. (2018) analyse the relation between business strategy and disclosure complexity, that is, the readability and tone of annual reports. They find that prospectors’ annual reports are less readable than those of defender firms, with prospectors using more complex language. Further, the authors find that prospectors’ annual reports have a more negative and uncertain tone than defenders, whose annual reports have a more litigious tone. Thus, Lim et al. (2018) focus on how the information in the annual report is conveyed without studying what information is conveyed. Rather than focusing on the tone or readability of the annual report, we focus on what information is conveyed, namely, that of the firm’s exposure to risks in the mandatory risk factor description.

2.2. Literature Review on the Determinants of Risk Disclosure

Our study investigates the relation between firms’ business strategy and corporate risk disclosure in the period after the adoption of Directive 2013/34/EU, amended by Directive 2014/95/EU. The legal requirements stipulate the minimum content, quality, and quantity of risk disclosure within the EU while leaving firms such disclosure discretion that the disclosure regime is characterized as quasi-voluntary or quasi-mandatory. With this setting, the study at hand contributes to the growing body of literature analysing what drives corporate risk disclosure beyond regulatory intervention. It thus enriches the literature on (i) voluntary and mandatory corporate risk disclosure and (ii) the determinants and incentives of corporate risk disclosure.
The recent study by Leopizzi et al. (2020) shows, in the Italian context, that the EU regulatory intervention only partially increased the level of nonfinancial risk disclosure and that firms still focus on past and present risks rather than providing forward-looking information. This confirms the seminal findings of the early cross-country comparison by Dobler et al. (2011). Because mandatory and voluntary risk disclosures share the same content (i.e. the firm’s risk exposure), firms are more likely to make voluntary disclosure decisions and assess the net benefits considering the level of mandatory risk disclosure (Noh et al., 2019). The decision to voluntarily disclose information seems to be conditional on the level of mandatory disclosure (Noh et al., 2019) and depends on the incentives offered in the specific context (Dobler et al., 2011). For example, Hope et al. (2016) document that firms with high proprietary costs have fewer incentives to provide specific risk-factor disclosures. Chiu and Lee (2013) suggest that firms use voluntary disclosure to complement mandatory risk information, especially when the latter presents new risk factors. Arena et al. (2021), for the oil industry, find that voluntary risk disclosure increases with the level of mandatory risk disclosure up to a threshold, above which companies reduce their voluntary risk disclosures. By contrast, for the same industry, McChlery and Hussainey (2021) conclude that mandatory disclosure requirements cannot be seen as a significant driver of risk disclosure. In addition, they find an inverse relation between the level of risk and risk reporting. This result is in contrast with the recent studies by Elshandidy et al. (2013) and Gondakis et al. (2020) and can be explained by a ‘concealing motive’ that the specific context is facilitating (as already proposed by Dobler et al., 2011). Indeed, it is known in the risk disclosure literature that the costs of disclosure can outweigh the benefits, irrespective of the level of risk exposure (Akamah et al., 2018; Cannizzaro & Weiner, 2015). These factors could be decisive in terms of less disclosure, especially in a quasi-voluntary, quasi-mandatory, or voluntary disclosure context. Hence, there is an equilibrium between agency costs and benefits (Cabedo & Tirado, 2004) that impacts risk disclosure and information asymmetry.

The generalization of prior studies’ findings on the incentives and determinants of corporate risk disclosure is limited, possibly because of their concentration on specific industries and countries. The most recent generalization of prior findings of the vast literature on firm-specific determinants (e.g. Dey et al., 2018; Elshandidy et al., 2015; Habtoor et al., 2017; Linsley & Shriges, 2006) is that of Khlif and Hussainey (2016). Conducting a meta-analysis of 42 empirical studies, they find that firm-specific attributes – notably, corporate size, leverage ratio, profitability, and risk factors – positively influence risk disclosure. They show that specific corporate attributes are moderated by legal and institutional systems, uncertainty avoidance, the disclosure regime (mandatory versus voluntary), industry type, and the proxies used to measure corporate characteristics. In addition to these firm fundamentals, other factors that influence management’s choice to disclose risk information, such as cultural values, have been researched. Elshandidy et al. (2015) find that the levels of mandatory and voluntary risk reporting are influenced by cultural values, which can explain the variations of risk reporting across firms and countries. Dobler et al. (2016) find that some of Hofstede’s (2001) cultural values, such as power distance, uncertainty avoidance, individualism, and long-term orientation, influence how firms report their risk factors. Ríos-Figueroa (2016) uses Gray’s (1988) cultural values of secrecy and conservatism, but reports no significant influence on the level of risk disclosure. Further, corporate governance characteristics (e.g. Amrin, 2019; Elshandidy & Neri, 2015; Habtoor & Ahmad, 2017; Mokhtar & Mellett, 2013), especially board characteristics, have been found to influence firm risk disclosures. Moumen et al. (2016) and Ntim et al. (2013) find that the board’s structure plays an important role in companies’ risk disclosure behaviour. For example, women on the board have a positive and significant impact on risk disclosure (Khandelwal et al., 2020; Seebeck & Vetter, 2021). Habtoor et al. (2019) enrich prior literature on the role of corporate ownership on risk disclosure (e.g. Al-Maghzom et al., 2016; Allini et al., 2016; Elzahar &
Hussainey, 2012) by showing that companies with higher levels of royal and government ownership disclose more risk-related information than companies with greater family and institutional ownership.

To conclude, the empirical findings on the drivers of risk disclosure beyond the required mandatory threshold level are mixed. In addition, seminal theoretical studies (Bagnoli & Watts, 2007; Einhorn, 2005) point out that the relation between mandatory and voluntary disclosure is more complex than their being merely complements or substitutes. Risk disclosure attributes appear only partially linked to local disclosure regulations (Dobler et al., 2011) and the level of risk exposure (Akamah et al., 2018; Cannizzaro & Weiner, 2015; McChlery & Hussainey, 2021), suggesting that disclosure incentives rather than regulation play a vital role. This is the present study’s point of departure. Our research design holds fixed disclosure requirements as predefined by the EU accounting framework (Directive 2013/34/EU, amended by Directive 2014/95/EU), enabling us to investigate in isolation how a firm’s specific business strategy incentivizes its joint disclosure of mandatory and voluntary risk information.

2.3. Hypothesis Development

We expect firms that adopt an innovation-oriented prospector strategy to be more likely to communicate information on risk factors in their annual reports through three channels. First, the business activities of prospectors are characterized by high levels of innovation and research and development, which are typically riskier (Lim et al., 2018). In addition, prospectors typically invest in risky projects (Rajagopalan, 1997) and even tend to overinvest in risky but high-return projects (Navissi et al., 2017). Since prospectors typically focus on risky and innovative projects, they are exposed to greater uncertainty (Bentley-Goode et al., 2019). Prospectors face greater ambiguity, and hence greater non-probabilistic uncertainty (Hsieh et al., 2019). Because of the innovative nature of a prospector strategy, cause and effect relations are less known and more unpredictable for firms choosing it than for firms adopting a defender strategy (Hsieh et al., 2019). Agency theory suggests that a firm’s disclosure behaviour is determined by the balance between agency costs and benefits, rather than based on the level of risk exposure. Thus, the direction of the relation between the risk exposure induced by the business strategy and corporate risk disclosure behaviour cannot be theoretically predicted. Empirical studies provide mixed evidence for the relation between a firm’s risk exposure and its risk disclosure behaviour (for a positive relation, see Elshandidy et al., 2013; Gonidakis et al., 2020; for a negative relation, see Akamah et al., 2018; Cannizzaro & Weiner, 2015; McChlery & Hussainey, 2021). From a normative regulator’s point of view, the annual report should reflect higher risk exposure; in a (quasi-)mandatory setting, prospectors should report their risky investments, projects, and business activities accordingly. On the contrary, efficiency-oriented defender firms adopt a less risky and less uncertain business strategy (Lim et al., 2018). In our quasi-mandatory setting, we therefore expect defenders to reveal less information on risk factors.

Second, according to organizational theory, prospectors engage in greater voluntary disclosure (Bentley-Goode et al., 2019). Prospectors have more incentives to reveal information voluntarily, because they have greater incentives to reduce information asymmetry, rely more on external financing, tend to be less profitable, and place more emphasis on brand-building marketing strategies than defenders do (Bentley-Goode et al., 2019). Since, within our study setting, risk disclosure is mandatory but guidance on how and what to report about risk factors is scant, managers have a high degree of flexibility and discretion on how to report their risk factors. Thus, we expect firms adopting an innovation-oriented prospector strategy to reveal more risk information.

Third, according to proprietary costs theory, managers face a trade-off between the costs and benefits of risk reporting, and thus between reporting too much and reporting too little (Abraham
If firms report too little risk information, this can signal poor risk management; if they report too much, they could incur proprietary costs. This dichotomy seems to hold particularly for prospectors choosing an innovation-oriented business strategy. Since they rely more on external financing, they could be punished for not revealing enough risk information. This can signal poor risk management to their potential investors. Thus, these firms would benefit from revealing more risk information. At the same time, due to the innovative nature of their business and products, they could be reluctant to reveal too much risk information, and therefore private information, to potential competitors.

Based on all the arguments above, we hypothesize that prospectors are more likely to reveal risk information and to make extensive risk disclosures.

3. Research Design

To test our hypothesis, we estimate the following ordinary least squares (OLS) model:

\[
RiskDisclosure_{i,t} = \beta_0 + \beta_1 BusinessStrategy_{i,t} + \beta_2 FirmSize_{i,t} + \beta_3 Leverage_{i,t}
+ \beta_4 Profitability_{i,t} + \beta_5 Loss_{i,t} + \beta_6 HistoricBeta_{i,t}
+ \beta_7 HistoricVolatility_{i,t} + \beta_8 TradingVolume_{i,t} + \beta_9 CrossListing_{i,t}
+ \beta_{10} YearDummies + \beta_{11} IndustryDummies + \beta_{12} CountryDummies + \epsilon_{i,t}
\]

3.1. Dependent Variable

We download the annual reports of 2,344 nonfinancial and non-utility firms from 30 countries comprising the EEA from Thomson Reuters Eikon. The downloaded Acrobat files were converted into text files for text extraction. In a first step, the extracted texts were cleaned. The texts were split into sentences before the cleaning rules were applied. Only sentences that contained at least 50% letters, fewer than 20% non-alphanumeric characters, and at least 30 letters with fewer than 30 digits were retained (Lang & Stice-Lawrence, 2015). We used the English version of the annual reports published by the firms. Previous studies show that annual reports in the native language convey the same information as in English (Campbell et al., 2005; Zreik & Louhichi, 2017).

Our dependent variable, \(RiskDisclosure\), is the natural logarithm of the number of risk-related sentences in the annual report. A sentence is classified as risk related if it contains at least one risk keyword from the list developed by Elshandidy et al. (2013). Using sentences as coding units instead of words avoids counting the same information or idea twice (Abraham & Cox, 2007; Abraham & Shrives, 2014; Dobler et al., 2011; Kravet & Muslu, 2013; Linsley & Shrives, 2006). Further, consistent with Elshandidy et al. (2013) and Kothari et al. (2009), we do not limit our study to a specific section of the annual report but, rather, analyse the annual report as a whole.

3.2. Independent Variable of Interest

The independent variable of interest in our model is the firm business strategy. We use the measure of business strategy of Bentley et al. (2013), which relies on Miles and Snow’s (1978, 2003) definition of defenders, analysers, and prospectors. The measures are formed by computing six variables: (1) the ratio of research and development expenses to sales, (2) the ratio of the number of employees to sales, (3) the one-year percentage change in sales, (4)
the ratio of selling, general, and administrative expenses to sales, (5) the standard deviation of the number of employees, and (6) the ratio of net property, plant, and equipment to total assets. These six variables are proxies for a firm’s (1) investment in the development of new products, (2) production and distribution efficiency, (3) overall investments, (4) marketing expenses for product market opportunities, (5) managerial stability, and (6) capital intensity (Bentley et al., 2013; Bentley-Goode et al., 2019). The values of these variables are expected to be higher for prospectors, except capital intensity, which is expected to be higher for defenders.

All six variables are computed using the average over a rolling five-year window, since business strategies are stable over time (Bentley et al., 2013; Hambrick, 1983; Snow & Hambrick, 1980). Next, the six variables are ranked into quintiles by year and by industry. All firm–year observations are attributed a value between one and five, based on their quintile rank. The quintile ranks are added up, which results in a single measure ranging between six and 30, which is our independent variable of interest, BusinessStrategy. Defenders and prospectors are at the respective ends of the spectrum of BusinessStrategy, with defenders characterized by values between six and 12, prospectors by values between 24 and 30, and analysers by values between 13 and 23. Consistent with previous studies (Bentley et al., 2013; Bentley-Goode et al., 2019; Higgins et al., 2015; Lim et al., 2018; Navissi et al., 2017), we focus on the two ends of the spectrum, that is defenders and prospectors, and use analysers as the benchmark.

3.3. Control Variables

All the control variables were obtained from Thomson Reuters Eikon’s Datastream and are as follows: FirmSize is the natural logarithm of total assets for the financial year (Elshandidy & Neri, 2015); Leverage is short- and long-term debt, divided by the common equity of the firm (Elshandidy & Shrives, 2016); and Profitability is the return on assets (Khlif & Hussainey, 2016; Miihkinen, 2012). A firm’s size and its leverage ratio and profitability have proven to be determinants of its risk reporting (Khlif & Hussainey, 2016). The variable Loss is a dummy variable taking the value of one if the firm reported a negative income for the financial year, and zero otherwise (Kravet & Muslu, 2013); HistoricBeta is the average beta coefficient from the regression of the firm’s stock return on the market return over the last five years (Miihkinen, 2012); and HistoricVolatility is the average volatility of stock returns over the last five years. Previous studies on the relation between risk and risk disclosure have been mixed, with evidence showing a positive relation (Elshandidy & Neri, 2015; Miihkinen, 2012), as well as a negative one (McChlery & Hussainey, 2021). Some studies do not find a significant relation (Dobler et al., 2011; Linsley & Shrives, 2006). The variable TradingVolume is the trading volume divided by the number of shares, and CrossListing is a dummy variable taking the value of one if the firm is cross listed on a U.S. exchange, and zero otherwise. Miihkinen (2012) finds that a foreign listing status is an important determinant of risk disclosure.

4. Main Empirical Findings

4.1. Descriptive Statistics

Table 1 shows descriptive statistics for all the variables in our main regression model. The table shows statistics for the full sample and for prospectors, defenders, and analysers separately. The full sample consists of 12,065 firm–year observations, of which 656 are prospector firm–year observations and 1,290 are defender firm–year observations. For our dependent variable Risk Disclosure, we show descriptive statistics for its natural logarithmic transformation and for the raw measure, that is the sentence count. On average, over the sample period, firms published
Table 1. Descriptive statistics

|                        | Full sample (N = 12,065) | Prospectors (N = 656) | Defenders (N = 1,290) | Analysers (N = 10,119) |
|------------------------|--------------------------|------------------------|-----------------------|------------------------|
|                        | Mean | St. dev. | p25 | Median | p75 | Mean | Median | Mean | Median | Mean | Median |
| **RiskDisclosure**     | 5.319 | 0.691  | 4.92 | 5.366  | 5.799 | 5.241 | 5.283  | 5.134 | 5.187  | 5.348 | 5.394 |
| **BusinessStrategy**   | 17.108 | 3.779  | 14   | 17    | 20   | 25.055 | 25    | 10.912 | 11    | 17.383 | 17 |
| **FirmSize**           | 12.804 | 2.234  | 11.243 | 12.737 | 14.335 | 11.813 | 11.387 | 12.425 | 12.183 | 12.916 | 12.843 |
| **Leverage**           | 0.185  | 0.386  | 0.006 | 0.069  | 0.221 | 0.102  | 0.009  | 0.228  | 0.078  | 0.185  | 0.072 |
| **Profitability**      | 2.816  | 13.958 | 1.05 | 4.95   | 8.79 | -11.727 | -2.61 | 4.115  | 4.585  | 3.593  | 5.14  |
| **Loss**               | 0.242  | 0.428  | 0    | 0     | 0    | 0.543  | 1     | 0.223  | 0     | 0.224  | 0    |
| **HistoricBeta**       | 0.852  | 0.497  | 0.51 | 0.795  | 1.15 | 0.99   | 0.94   | 0.773  | 0.72   | 0.854  | 0.8   |
| **HistoricVolatility** | 0.407  | 0.18   | 0.276 | 0.368  | 0.496 | 0.522  | 0.492  | 0.381  | 0.349  | 0.403  | 0.366 |
| **TradingVolume**      | 0.668  | 1.022  | 0.118 | 0.352  | 0.769 | 0.839  | 0.441  | 0.546  | 0.238  | 0.672  | 0.362 |
| **CrossListing**       | 0.133  | 0.339  | 0    | 0     | 0    | 0.18   | 0     | 0.048  | 0     | 0.141  | 0    |

This table reports descriptive statistics for the dependent variable, RiskDisclosure; the independent variable of interest, BusinessStrategy; and the control variables employed in our main regression analysis. For RiskDisclosure, we report descriptive statistics for the natural logarithmic transformation and for the raw count values (in italics). See Appendix A for variable definitions.
around 253 risk-related sentences in their annual report. Prospectors, on average, engaged in more risk disclosure than defenders. The variable BusinessStrategy has an average value of 17.108 and a median value of 17. This result is largely in line with previous studies (Bentley et al., 2013; Bentley-Goode et al., 2019; Hsieh et al., 2019; Lim et al., 2018) that show mean and median values of around 18. Consistent with previous studies on U.S. companies (Bentley et al., 2013; Bentley-Goode et al., 2019), firms adopting a prospector strategy are less profitable than firms adopting a defender strategy, as shown by the lower levels for Profitability and Loss. Consistent with the results of Hsieh et al. (2019), prospectors show lower levels for Leverage. Further, prospectors have higher values for HistoricBeta, HistoricVolatility, and Trading Volume than defenders, suggesting that prospectors face higher systematic risks. Cross-listing on a U.S. stock exchange is more common for firms adopting a prospector strategy.

Table 2 shows the mean values of the dependent variable, RiskDisclosure, and the independent variable of interest, BusinessStrategy, by industry (Panel A) and by year (Panel B). The manufacturing industry, followed by the services industry, counts the most firm–year observations in our sample. Firms from the mining industry reveal, on average, the most risk information in their annual reports over the sample period. Firms from the agriculture, forestry, and

| Table 2. Risk disclosure and business strategy by industry and year |
|----------------------------------|--------------------|------------------|------------------|
| **Panel A: Risk disclosure and business strategy, by industry** |
| Industry                        | Two-digit SIC codes | N    | Risk Disclosure | Risk Disclosure (raw) | Business Strategy |
| Agriculture, forestry, and fishing | 01–09               | 139  | 5.157           | 198.683              | 16.007            |
| Mining                          | 10–14               | 588  | 5.583           | 330.714              | 16.199            |
| Construction                    | 15–17               | 479  | 5.427           | 276.833              | 16.232            |
| Manufacturing                   | 20–39               | 5686 | 5.382           | 266.871              | 17.723            |
| Transportations and communications services | 40–48               | 883  | 5.517           | 304.853              | 16.320            |
| Wholesale trade                 | 50–51               | 500  | 5.288           | 241.738              | 16.468            |
| Retail trade                    | 52–59               | 791  | 5.283           | 233.886              | 15.731            |
| Services                        | 70–89               | 2999 | 5.097           | 200.189              | 17.014            |
| **Panel B: Risk disclosure and business strategy, by year** |
| Year                            | N    | Risk Disclosure | Risk Disclosure (raw) | Business Strategy |
| 2005                            | 288  | 4.881           | 171.094               | 17.931            |
| 2006                            | 813  | 4.791           | 152.973               | 16.777            |
| 2007                            | 859  | 4.974           | 176.700               | 16.809            |
| 2008                            | 947  | 5.127           | 203.546               | 16.835            |
| 2009                            | 1023 | 5.226           | 224.475               | 17.005            |
| 2010                            | 1073 | 5.252           | 231.866               | 17.095            |
| 2011                            | 1105 | 5.307           | 242.641               | 17.102            |
| 2012                            | 1024 | 5.326           | 248.859               | 17.225            |
| 2013                            | 1024 | 5.416           | 270.987               | 17.329            |
| 2014                            | 1065 | 5.500           | 293.431               | 17.242            |
| 2015                            | 1001 | 5.366           | 307.798               | 17.196            |
| 2016                            | 1006 | 5.616           | 321.604               | 17.146            |
| 2017                            | 837  | 5.766           | 365.992               | 17.183            |

This table reports descriptive statistics for our dependent variable, RiskDisclosure (natural logarithmic transformation and raw count values), and our independent variable of interest, BusinessStrategy, by industry (Panel A) and by year (Panel B). See Appendix A for variable definitions.
fishing industry reveal the least risk information. The mean values of BusinessStrategy across industries do not vary much; the average firm across all industries can be classified as an analyser. Panel B shows the mean values of RiskDisclosure and BusinessStrategy by year. The amount of risk information in the annual report more than doubles over the sample period; in 2005, the average number of risk-related sentences in the annual report was 171.094, whereas this number doubled to 365.992 in 2017. Figure 1 illustrates the increase in RiskDisclosure over the sample period. The mean value of BusinessStrategy remains relatively stable across the sample period.

Table 3 shows the pairwise correlations of the variables in the main regression analysis. The variable BusinessStrategy is positively and significantly correlated with RiskDisclosure. The positive correlation suggests that firms adopting a prospector strategy are associated with a higher level of risk disclosure.

4.2. Regression Results

Table 4 shows the estimation results from our risk disclosure model. Year, industry, and country dummies are included in the models. Standard errors are Huber–White heteroskedastic and clustered by firm. All continuous variables are winsorized at the first and 99th percentiles.

In column (1) of Table 4, the independent variable of interest is BusinessStrategy. The coefficient on BusinessStrategy is positive and significant at the 1% level (coef. = 0.00863, t-stat. = 3.847), suggesting that a firm’s business strategy is a determinant of its risk disclosure. In addition, the positive coefficient suggests that firms adopting a prospector strategy are more likely to engage in risk disclosure. To analyse this further, in column (2) we include Defender, a dummy variable taking the value of one if a firm’s BusinessStrategy scores between six and 12, and zero otherwise, and Prospector, a dummy variable taking the value of one if a firm’s BusinessStrategy scores between 24 and 30, and zero otherwise. The coefficient on Defender is negative and significant at the 1% level (coef. = −0.0659, t-stat. = −2.930), while the coefficient on Prospector is positive and significant at the 10% level (coef. = 0.0498, t-stat. = 1.771).
### Table 3. Pairwise correlations

| Variables         | (1)  | (2)  | (3)  | (4)  | (5)  | (6)  | (7)  | (8)  | (9)  | (10) |
|-------------------|------|------|------|------|------|------|------|------|------|------|
| (1) RiskDisclosure| 1.00 |     |      |      |      |      |      |      |      |      |
| (2) BusinessStrategy| 0.095* | 1.00 |      |      |      |      |      |      |      |      |
| (3) FirmSize      | 0.711* | 0.008 | 1.00 |      |      |      |      |      |      |      |
| (4) Leverage      | 0.041* | −0.094* | 0.083* | 1.00 |      |      |      |      |      |      |
| (5) Profitability | 0.139* | −0.175* | 0.305* | −0.036* | 1.00 |      |      |      |      |      |
| (6) Loss          | −0.143* | 0.094* | −0.293* | 0.095* | −0.668* | 1.00 |      |      |      |      |
| (7) HistoricBeta  | 0.205* | 0.096* | 0.221* | 0.017 | −0.072* | 0.079* | 1.00 |      |      |      |
| (8) HistoricVolatility | −0.266* | 0.129* | −0.417* | 0.005 | −0.361* | 0.373* | 0.421* | 1.00 |      |      |
| (9) TradingVolume | 0.120* | 0.078* | 0.190* | −0.015 | 0.031* | −0.008 | 0.184* | 0.053* | 1.00 |      |
| (10) CrossListing | 0.329* | 0.145* | 0.419* | −0.027* | 0.053* | −0.058* | 0.112* | −0.112* | 0.141* | 1.00 |

This table reports Pearson’s correlations for the dependent variable, the independent variable of interest, and the control variables in our main regression analysis. See Appendix A for variable definitions. * indicates significance at the 1% level.
perform an $F$-test of the equality of the coefficients of $Defender$ and $Prospector$. We reject the null hypothesis that the two coefficients are equal ($F$-stat. = 10.48, $p$-value = 0.0012). In line with our hypothesis, defenders (prospectors) are less (more) likely to reveal risk information in their annual reports. In column (3), we limit our sample to defender and prospector firm–year observations (Higgins et al., 2015; Lim et al., 2018), which results in 1,946 firm–year observations for the estimation of our risk disclosure model. The coefficient on $Prospector$ is positive and significant at the 1% level (coeff. = 0.113, $t$-stat. = 2.782), confirming that prospectors disclose more risk information in their annual reports relative to defenders.

The results show that the size of the firm ($FirmSize$), whether the firm recorded a loss for the financial year ($Loss$), the firm’s risk profile ($HistoricBeta$ and $TradingVolume$), and whether the firm is cross listed on a U.S. stock exchange ($CrossListing$) positively and significantly influence

### Table 4. Risk disclosure and business strategy: Main analysis

| Dependent variable | (1) $Risk Disclosure$ | (2) $Risk Disclosure$ | (3) $Risk Disclosure$ |
|--------------------|-----------------------|-----------------------|-----------------------|
| **Business Strategy** | 0.00823*** (3.847) | $-0.0659*** (-2.930)$ | $0.113*** (2.782)$ |
| Defender           | $-0.0659*** (-2.930)$ | 0.0498* (1.771)      | 0.113*** (2.782)     |
| Prospector         | 0.200*** (37.20)     | 0.200*** (37.28)     | 0.189*** (17.92)     |
| Firm Size          | $-0.0116 (-0.730)$   | $-0.0146 (-0.918)$   | 0.00618 (0.168)      |
| Leverage           | 0.0116 (0.730)       | 0.0146 (0.918)       | 0.00618 (0.168)      |
| Profitability      | $-0.00146*** (-2.618)$ | $-0.00162*** (-2.875)$ | $-0.000681 (-0.614)$ |
| Loss               | 0.0555*** (3.256)    | 0.0537*** (3.146)    | 0.0972** (2.336)     |
| Historic Beta      | 0.0873*** (5.594)    | 0.0875*** (5.618)    | 0.113*** (3.392)     |
| Historic Volatility| $-0.0132 (-0.243)$   | $-0.00474 (-0.0876)$ | $-0.0836 (-0.781)$  |
| Trading Volume     | 0.0223*** (3.070)    | 0.0234*** (4.098)    | 0.0130 (1.378)       |
| Cross Listing      | 0.0717*** (2.750)    | 0.0779*** (2.994)    | 0.128** (2.340)      |
| Constant           | 2.300*** (19.81)     | 2.439*** (22.33)     | 2.508*** (12.51)     |

| Observations       | 12,065                | 12,065                | 1,946                |
| Adjusted $R^2$     | 0.620                 | 0.620                 | 0.612                |
| Year dummies       | YES                   | YES                   | YES                  |
| Industry dummies   | YES                   | YES                   | YES                  |
| Country dummies    | YES                   | YES                   | YES                  |

This table reports the results from the OLS regressions of business strategy on risk disclosure. In specification (1), the independent variable is the business strategy measure of Bentley et al. (2013). In specification (2), we include the two dummy variables $Prospector$ and $Defender$. In specification (3), we limit the sample to prospector and defender firm–year observations. See Appendix A for variable definitions. Continuous variables are winsorized at the first and 99th percentiles. The $t$-statistics are reported in parentheses. Standard errors are heteroscedasticity robust and clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
the amount of risk information revealed in the annual report. The profitability of the firm (Profitability) negatively influences RiskDisclosure.

4.3. Robustness Test

4.3.1. Endogeneity

To tackle endogeneity concerns, we re-estimate our risk disclosure model, lagging all the independent and control variables (Lim et al., 2018). Table 5 shows the results for the lead–lag estimation.

Column (1) of Table 5 confirms the results of Table 4; the coefficient on BusinessStrategy is positive and significant at the 1% level (coeff. = 0.00864, t-stat. = 3.782). In column (2), we

| Dependent variable | (1) | (2) | (3) |
|-------------------|-----|-----|-----|
| Risk Disclosure   |     |     |     |
| Full sample       |     |     |     |
| Business Strategy | 0.00864*** |     |     |
| Defender          |     | −0.0736*** |     |
| Prospector        |     | 0.0374 | 0.0957** |
| Firm Size         | 0.196*** | 0.196*** | 0.182*** |
| Leverage          | −0.0110 | −0.0152 | 0.00759 |
| Profitability     | −0.00142** | −0.00164** | −0.00110 |
| Loss              | 0.0455** | 0.0437** | 0.0851** |
| Historic Beta     | 0.0901*** | 0.0906*** | 0.0985*** |
| Historic Volatility | −0.0687 | −0.0587 | −0.0768 |
| Trading Volume    | 0.0238*** | 0.0251*** | 0.0141 |
| Cross Listing     | 0.0650** | 0.0718*** | 0.148** |
| Constant          | 2.494*** | 2.645*** | 2.608*** |
| Observations      | 9,153 | 9,153 | 1,468 |
| Adjusted R²       | 0.629 | 0.628 | 0.596 |
| Year dummies      | YES | YES | YES |
| Industry dummies  | YES | YES | YES |
| Country dummies   | YES | YES | YES |

Table 5. Risk disclosure and business strategy: Lead–lag estimation

This table addresses endogeneity concerns. We use OLS regression estimates with one-year lags of our independent variable of interest and of our control variables to handle any reverse causality concerns. In specification (1), the independent variable is the business strategy measure of Bentley et al. (2013). In specification (2), we include the dummy variables Prospector and Defender. In specification (3), we limit the sample to prospector and defender firm–year observations. See Appendix A for variable definitions. Continuous variables are winsorized at the first and 99th percentiles. The t-statistics are reported in parentheses. Standard errors are heteroscedasticity robust and clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
include the dummy variables Defender and Prospector. The coefficient on lagged Defender is negative and significant at the 1% level (coeff. = −0.0736, t-stat. = −3.028). The coefficient on lagged Prospector is positive but not significant (coeff. = 0.0374, t-stat. = 1.194). In column (3), we limit the sample to defender and prospector firm-year observations and find a positive and significant coefficient for the lagged Prospector variable at the 5% level (coeff. = 0.0957, t-stat. = 2.016). Overall, the results of our lead–lag estimation indicate that reverse causality is not a concern in our risk disclosure model.

4.3.2. Alternative Risk Disclosure Measures
We re-estimate our risk disclosure model using an alternative measure for RiskDisclosure, namely, the number of risk keywords of Elshandidy et al. (2013) in the annual report. We use the natural logarithm of the keyword count for the regression estimation. Specifications (1) to (3) in Table 6 report the results. The results are in line with those in our main Table 4, suggesting that the results are robust to an alternative risk disclosure measure.

In specifications (4) to (6) of Table 6, we rerun our main regression using the relative amount of risk disclosure in the annual report. We measure relative risk disclosure by the number of risk-related sentences in the annual report, divided by the total number of sentences in the annual report. Our results suggest that business strategy is not a determinant of the relative amount of risk information revealed in the annual report. This result suggests that business strategy is a determinant of the absolute amount of risk disclosure and does not seem to affect the amount of risk information in relation to the total information revealed.

4.3.3. Country Characteristics
We re-estimate our main model and include country-specific characteristics instead of country dummies. We do so in response to the critique that cross-country studies have failed to combine country- and firm-specific effects into their analysis (Elshandidy et al., 2018). We include the dummy variable CommonLaw, which takes the value of one for the United Kingdom and Ireland, and zero for all other countries, as well as CivilLaw, a dummy variable taking the value of one for Austria, Belgium, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden, and zero for all other countries. Cyprus and Malta are considered mixed law countries. We further include Hofstede’s (2001) cultural values – PowerDistance, Individualism, Masculinity, UncertaintyAvoidance, LongTermOrientation, and Indulgence – for all countries, since they have been found to be determinants of a firm’s risk disclosure (Dobler et al., 2016; Elshandidy et al., 2015).

Table 7 reports the results. Our main inferences remain unchanged: business strategy is a determinant of risk disclosure, and prospectors are more likely than defenders to report their risk factors. Our results further show that the legal system does not seem to play a role. In specifications (1) and (2), neither CommonLaw nor CivilLaw is significant; however, in specification (3), where we limit our sample to prospectors and defenders, both show a positive and significant coefficient. The variables PowerDistance and Indulgence seem to be negative determinants of risk disclosure, and LongTermOrientation is shown to be a positive determinant of risk disclosure.

5. Additional Analysis
To further enhance our understanding of the association between business strategy and risk disclosures, we study their content. Further, we study the impact of the GFC and of different firm-level characteristics, namely, the firm’s size, age, and degree of technological specialization.
Table 6. Risk disclosure and business strategy: Alternative risk disclosure measures

| Variables          | Full sample | Full sample | Defenders and prospectors only | Full sample | Full sample | Defenders and prospectors only |
|--------------------|-------------|-------------|---------------------------------|-------------|-------------|---------------------------------|
| BusinessStrategy   | 0.00876***  | (3.988)     |                                 | -0.000142   |             |                                 |
| Defender           | -0.0689***  | (-2.998)    |                                 | -0.000227   |             |                                 |
| Prospector         | 0.0515*     | (1.787)     | 0.120***                        | -0.00410*   | -0.00211   |
|                    | (2.885)     |             | (2.885)                         | (-1.811)    | (-0.137)   |
| FirmSize           | 0.202***    | (36.20)     | 0.192***                        | -3.50e-05   | -7.47e-05  | -0.000156                       |
|                    | (2.875)     |             | (17.28)                         | (-0.880)    | (-0.181)   | (-0.184)                        |
| Leverage           | -0.0128     | (-0.787)    | 0.0104                          | 0.00373***  | 0.00374*** | 0.00753***                      |
|                    | (-0.986)    |             | (0.283)                         | (3.106)     | (3.115)    | (2.677)                         |
| Profitability      | -0.00148**  | (-2.575)    | -0.000783                       | -3.19e-05   | -3.96e-05  | 0.000109                        |
|                    | (-0.847)    |             | (-0.694)                        | (-0.699)    | (-0.868)   | (1.058)                         |
| Loss               | 0.0593***   | (3.349)     | 0.0970**                        | 0.00349***  | 0.00352*** | 0.00236                         |
|                    | (3.236)     |             | (2.686)                         | (2.680)     | (2.702)    | (0.770)                         |
| HistoricBeta       | 0.0895***   | (5.541)     | 0.110***                        | -0.00154    | -0.00149   | -0.00183                        |
|                    | (5.566)     |             | (3.213)                         | (-1.200)    | (-1.164)   | (-0.693)                        |
| HistoricVolatility | -0.00114    | (-0.202)    | -0.0457                         | 0.0127***   | 0.0125***  | 0.0226***                       |
|                    | (0.147)     |             | (-0.421)                        | (3.035)     | (3.007)    | (2.880)                         |
| TradingVolume      | 0.0196***   | (3.410)     | 0.00993                         | -0.000712   | -0.000700  | -0.000599                       |
|                    | (3.607)     |             | (1.034)                         | (-1.439)    | (-1.415)   | (-0.694)                        |
| CrossListing       | 0.0764***   | (2.860)     | 0.137**                         | 0.000971    | 0.000909   | 0.000960                        |
|                    | (3.120)     |             | (2.444)                         | (0.533)     | (0.502)    | (0.287)                         |
| Constant           | 2.569***    | (21.28)     | 2.717***                        | 2.768***    | 2.020***   | 0.210***                        |
|                    | (23.78)     |             | (13.43)                         | (20.66)     | (21.37)    | (11.07)                         |
| Observations       | 12,065      | 12,065      | 1.946                           | 12,065      | 12,065     | 1.946                           |
| Adjusted R²        | 0.607       | 0.607       | 0.605                           | 0.298       | 0.298      | 0.285                           |
| Year dummies       | YES         | YES         | YES                             | YES         | YES        | YES                             |
| Industry dummies   | YES         | YES         | YES                             | YES         | YES        | YES                             |
| Country dummies    | YES         | YES         | YES                             | YES         | YES        | YES                             |

This table reports the results from the OLS regressions of business strategy on risk disclosure, with alternative measures for RiskDisclosure. In specifications (1) to (3), we use the natural logarithm of the number of risk keywords of Elshandidy et al. (2013) in the annual report. In specifications (4) to (6), we use relative RiskDisclosure, which is our main risk disclosure variable, divided by the total number of sentences in the annual report. In specifications (1) and (4), the independent variable is the business strategy measure of Bentley et al. (2013). In specifications (2) and (5), we include the two dummy variables Prospector and Defender. In specifications (3) and (6), we limit the sample to prospectors and defenders firm-year observations. See Appendix A for variable definitions. Continuous variables are winsorized at the first and 99th percentiles. The t-statistics are reported in parentheses. Standard errors are heteroscedasticity robust and clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Table 7. Risk disclosure and business strategy: Country characteristics

| Dependent variable | Risk Disclosure | Risk Disclosure | Risk Disclosure |
|--------------------|----------------|----------------|----------------|
|                    | Full sample    | Full sample    | Defenders and prospectors only |
| **BusinessStrategy** | 0.00934***     | −0.0760***     | 0.127***       |
|                     | (4.341)        | (−3.305)       | (3.246)        |
| **Defender**        | −0.0515*       | 0.127***       | 0.183***       |
|                     | (1.839)        | (3.246)        | (18.00)        |
| **Prospector**      | 0.199***       | 0.199***       | 0.183***       |
|                     | (37.54)        | (37.59)        | (18.00)        |
| **FirmSize**        | −0.00752       | −0.0114        | 0.00477        |
|                     | (−0.451)       | (−0.681)       | (0.123)        |
| **Leverage**        | 0.00147***     | −0.00168***    | −8.57e-05      |
|                     | (2.607)        | (−2.949)       | (−0.0754)      |
| **Profitability**   | 0.0555***      | 0.0534***      | 0.112***       |
|                     | (3.188)        | (3.063)        | (2.636)        |
| **Loss**            | 0.0911***      | 0.0913***      | 0.135***       |
|                     | (5.672)        | (5.698)        | (3.694)        |
| **HistoricBeta**    | −0.0415        | −0.0319        | −0.155         |
|                     | (−0.732)       | (−0.565)       | (−1.354)       |
| **TradingVolume**   | 0.0193***      | 0.0204***      | 0.0198**       |
|                     | (3.343)        | (3.528)        | (2.069)        |
| **CrossListing**    | 0.0746***      | 0.0816***      | 0.125**        |
|                     | (2.791)        | (3.060)        | (2.200)        |
| **CommonLaw**       | 0.0667         | 0.0661         | 1.141**        |
|                     | (0.357)        | (0.356)        | (2.248)        |
| **CivilLaw**        | 0.111          | 0.119          | 1.119**        |
|                     | (0.653)        | (0.705)        | (2.558)        |
| **PowerDistance**   | −0.00337**     | −0.00333**     | −0.000564      |
|                     | (−2.114)       | (−2.100)       | (−0.301)       |
| **Individualism**   | 0.000944       | 0.000916       | −0.000633      |
|                     | (0.660)        | (0.639)        | (−0.267)       |
| **Masculinity**     | −0.000350      | −0.000229      | −0.00268       |
|                     | (−0.280)       | (−0.183)       | (−1.250)       |
| **UncertaintyAvoidance** | −0.000898     | −0.000995      | −0.00273*      |
|                     | (−0.599)       | (−0.668)       | (−1.950)       |
| **LongTermOrientation** | 0.00236**     | 0.00242**      | 0.00518**      |
|                     | (2.484)        | (2.540)        | (2.445)        |
| **Indulgence**      | −0.00461***    | −0.00441***    | −0.00573*      |
|                     | (−3.228)       | (−3.072)       | (−1.838)       |
| **Constant**        | 2.237***       | 2.369***       | 1.645***       |
|                     | (9.194)        | (9.806)        | (4.325)        |

Observations: 12,065
Adjusted R²: 0.603
Year dummies: YES
Industry dummies: YES
Country dummies: NO

This table reports the results from the OLS regressions of business strategy on risk disclosure, including country-specific characteristics instead of country dummies. We include the two dummy variables CommonLaw and CivilLaw, two proxies for the country’s legal system, and variables for Hofstede’s (2001) cultural values to account for cultural differences between countries. In specification (1), the independent variable is the business strategy measure of Bentley et al. (2013). In specification (2), we include the two dummy variables Prospector and Defender. In specification (3), we limit the sample to prospector and defender firm–year observations. See Appendix A for variable definitions. Continuous variables are winsorized at the first and 99th percentiles. The t-statistics are reported in parentheses. Standard errors are heteroscedasticity robust and clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
5.1. Risk Topic Coverage

Investors need a balanced description of the main risk factor topics to make informed investment discussions (Miihkinen, 2012). We thus want to test whether the balanced coverage of the main risk topics is influenced by the firm’s business strategy. We use a method similar to that of Miihkinen (2012) and Derouiche et al. (2020) and measure Risk topic coverage by calculating the Herfindahl index to proxy for the concentration of information across different risk factor topics. We use five main risk topics: systematic, idiosyncratic, financial, tax, and legal risk factors. We use the word lists proposed by Campbell et al. (2014) and measure the number of systematic, idiosyncratic, financial, tax, and legal words in the risk-related sentences. We measure the coverage of the main risk topics as follows:

\[
\text{Risk topic coverage} = \left(\frac{1}{H}\right)/\text{number of risk topics},
\]

where \( H \) is the Herfindahl index that measures the concentration across risk topics, \( H = \sum_{i=1}^{n} P^2_i \), with \( P \) the number of risk keywords per risk topic category in risk-related sentences, divided by the total number of keywords in the risk-related sentences across all five categories.

Table 8 reports the results. Specification (1) reveals that a firm’s business strategy is a determinant of the extent to which it covers the main risk topics. The negative sign of the coefficient on BusinessStrategy suggests that defenders are more likely to engage in extensive risk factor coverage than prospectors. This is confirmed in specification (2); the coefficient on Defender is positive and significant. Specification (3) shows that prospectors are not more likely than defenders to cover the main risk topics extensively, confirming the results of specifications (1) and (2). Our results indicate that defenders are more likely to report information in a balanced way across the five main risk topics. There could be several reasons for this. First, defenders have a more stable organization structure and thus report and cover the different risk topics in a more equal and balanced way. Second, prospectors are more reluctant to reveal information due to potential proprietary costs. Given their innovative nature, they can be more reluctant to provide broad information, to avoid giving away valuable information to their competitors. It seems that prospectors provide risk information to satisfy the specific information needs of their stakeholders, such as creditors and lenders, but tend to be more reluctant to provide risk information on topics beyond those explicitly required by stakeholders. Thus, they potentially choose wisely which risk topics to report on by highlighting some topics and concealing others.

To further understand the reporting behaviour of firms and the role of their business strategy, we look at the effect of BusinessStrategy on the aforementioned five risk factor categories separately. We use the natural logarithm of the number of systematic, idiosyncratic, financial, tax, and legal words in the risk-related sentences as dependent variables. Table 9 reports the results.

The results of Panel A in Table 9 reveal that the business strategy is a determinant of the amount of idiosyncratic, tax, and legal risk information discussed in the annual report. No such conclusion can be drawn for systematic and financial risk factor information. Further, Panel C shows that prospectors are more likely than defenders to engage in extensive risk disclosure for idiosyncratic, tax, and legal topics.

The business strategy is firm specific and related to idiosyncratic risks. Since prospectors’ market value seems to be weakly related to the overall industry trend (Guo, 2017), prospectors could have incentives to disclose unsystematic risk factors, to reduce information asymmetry and agency costs. Further, a prospector’s business strategy entails quick adaptation to changes and heavy reliance on innovativeness, which implies greater exposure to firm-specific risks compared to firms that adopt a stable defender strategy.
Consistent with Higgins et al. (2015), who find that prospectors engage more in aggressive tax behaviour, our results confirm that these firms engage in risky tax planning. Prospectors appear to have incentives to disclose these tax risks, since the benefits of disclosure seem to outweigh the costs.

Further, our results show that prospectors reveal more legal risk information than defenders. Due to their innovative nature, prospectors are more exposed to legal threats in preserving their innovativeness against competitors.

Even though prospectors are more exposed to systematic, market-wide risks (Hsieh et al., 2019), as shown by a higher average HistoricBeta over the sample period, a prospector strategy does not seem to lead to the disclosure of more or less systematic risk information. There do not appear to be any incentives for prospectors to disclose more risk information beyond

### Table 8. Risk topic coverage and business strategy

| Variables          | (1)                  | (2)                  | (3)                  |
|--------------------|----------------------|----------------------|----------------------|
|                    | Risk topic coverage  | Risk topic coverage  | Risk topic coverage  |
| Full sample        | Full sample          | Defender and prospector only |
| **BusinessStrategy** | $-0.00114^{***}$     | 0.0113**             |                      |
|                    | ($-2.643$)           | (2.367)              |                      |
| Defender           | 0.0113**             |                      |                      |
|                    | (2.367)              |                      |                      |
| Prospector         | 0.00293              |                      | -0.00202             |
|                    | (0.476)              |                      | (0.0224)             |
| FirmSize           | $-0.000979$          | -0.000904            | -0.00287             |
|                    | ($-0.945$)           | ($-0.871$)           | ($-1.203$)           |
| Leverage           | $-7.73e-05$          | 0.000543             | -0.00253             |
|                    | ($-0.0266$)          | (0.187)              | ($-0.340$)           |
| Profitability      | $-0.000117$          | -6.07e-05            | -0.000126            |
|                    | ($-1.010$)           | ($-0.528$)           | ($-0.452$)           |
| Loss               | 0.00309              | 0.00336              | 0.00523              |
|                    | (0.978)              | (1.061)              | (0.612)              |
| HistoricBeta       | $-0.00664^{**}$      | $-0.00682^{**}$      | $-0.00359$           |
|                    | ($-2.060$)           | ($-2.112$)           | ($-0.463$)           |
| HistoricVolatility | 0.0200*              | 0.0184*              | -0.0228              |
|                    | (1.902)              | (1.753)              | ($-0.898$)           |
| TradingVolume      | $-0.00165$           | $-0.00190$           | $-0.00420^{*}$       |
|                    | ($-1.264$)           | ($-1.444$)           | ($-1.817$)           |
| CrossListing       | 0.00568              | 0.00460              | -0.0100              |
|                    | (1.191)              | (0.963)              | ($-0.944$)           |
| Constant           | 0.683***             | 0.662***             | 0.727***             |
|                    | (30.14)              | (29.97)              | (17.37)              |
| Observations       | 12,055               | 12,055               | 1,943                |
| Adjusted R-squared | 0.115                | 0.115                | 0.149                |
| Year dummies       | YES                  | YES                  | YES                  |
| Industry dummies   | YES                  | YES                  | YES                  |
| Country dummies    | YES                  | YES                  | YES                  |

This table reports the results from the OLS regressions of business strategy on risk topic coverage. In specification (1), the independent variable is the business strategy measure of Bentley et al. (2013). In specification (2), we include the two dummy variables Prospector and Defender. In specification (3), we limit the sample to prospector and defender firm–year observations. See Appendix A for variable definitions. Continuous variables are winsorized at the first and 99th percentiles. The t-statistics are reported in parentheses. Standard errors are heteroscedasticity robust and clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Table 9. Risk topics and business strategy

| Panel A: Full sample |  |  |  |  |  |
|----------------------|---|---|---|---|---|
| Dependent variable   | Systematic | Idiosyncratic | Financial | Tax | Legal |
| BusinessStrategy     | 0.00268     | 0.0187***     | 0.00256   | 0.0232*** | 0.00713** |
|                      | (0.955)     | (7.263)       | (0.875)   | (3.134)   | (2.124)   |
| Control variables    | YES         | YES           | YES       | YES       | YES       |
| Constant             | 0.769***    | 1.145***      | 0.0607    | −0.852**  | −1.573*** |
|                      | (5.485)     | (7.164)       | (0.322)   | (−2.078)  | (−7.992)  |
| Observations         | 12,063      | 12,063        | 12,063    | 12,063    | 12,063    |
| Adjusted R-squared   | 0.626       | 0.543         | 0.420     | 0.109     | 0.544     |
| Year, industry, country dummies | YES | YES | YES | YES | YES |

| Panel B: Full sample |  |  |  |  |  |
|----------------------|---|---|---|---|---|
| Dependent variable   | Systematic | Idiosyncratic | Financial | Tax | Legal |
| Defender             | −0.0342     | −0.143***     | −0.0353   | −0.120   | −0.0331 |
|                      | (−1.140)    | (−5.113)      | (−1.153)  | (−1.325) | (−1.012) |
| Prospector           | 0.00411     | 0.0673*       | −0.0117   | 0.100    | 0.144*** |
|                      | (0.113)     | (1.905)       | (−0.300)  | (1.644)  | (3.018)  |
| Control variables    | YES         | YES           | YES       | YES       | YES       |
| Constant             | 0.821***    | 1.463***      | 0.113     | −0.482   | −1.474*** |
|                      | (6.203)     | (9.517)       | (0.622)   | (−1.284) | (−7.758) |
| Observations         | 12,063      | 12,063        | 12,063    | 12,063    | 12,063    |
| Adjusted R-squared   | 0.626       | 0.539         | 0.420     | 0.107     | 0.545     |
| Year, industry, country dummies | YES | YES | YES | YES | YES |

| Panel C: Defenders and prospectors only |  |  |  |  |  |
|----------------------------------------|---|---|---|---|---|
| Dependent variable                     | Systematic | Idiosyncratic | Financial | Tax | Legal |
| Prospector                             | 0.0143      | 0.226***      | 0.0619    | 0.359**  | 0.221*** |
|                                       | (0.277)     | (4.499)       | (1.085)   | (2.292)  | (3.216)  |
| Control variables                      | YES         | YES           | YES       | YES       | YES       |
| Constant                               | 0.988***    | 1.376***      | 0.419     | −0.0306  | −0.842*** |
|                                       | (3.858)     | (5.737)       | (1.460)   | (−0.0490)| (−2.821) |
| Observations                           | 1.946       | 1.946         | 1.946     | 1.946     | 1.946     |
| Adjusted R-squared                     | 0.621       | 0.540         | 0.412     | 0.098    | 0.517     |
| Year, industry, country dummies        | YES         | YES           | YES       | YES       | YES       |

This table reports the results from the OLS regressions of business strategy on five risk topics. Specifications (1) to (5) include, respectively, the five risk topics defined by Campbell et al. (2014). In Panel A, the independent variable is the business strategy measure of Bentley et al. (2013). In Panel B, we include the two dummy variables Prospector and Defender. In Panel C, we limit the sample to prospector and defender firm–year observations. See Appendix A for variable definitions. Continuous variables are winsorized at the first and 99th percentiles. The t-statistics are reported in parentheses. Standard errors are heteroscedasticity robust and clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
idiosyncratic risk factors. The costs for disclosing unspecific risks could exceed the benefits. The same intuition holds for financial risk factor information. The choice of a specific business strategy does not seem to influence a firm’s decision to report financial risk factors.

5.2. Readability

In addition to the risk disclosure content, it is important to consider how the information is conveyed to investors and other stakeholders. In Table 10, we test whether the business strategy is a determinant of risk disclosure readability, measured by Gunning’s (1952) Fog index of the risk-related sentences detected in the annual report. This approach is consistent with that of Lim et al.
who measure and find that the business strategy is a determinant of the complexity of the language and wording employed in the annual report. We follow the call of Mazumder and Hossain (2018) to focus not only on what risk information is disclosed, but also how it is disclosed. Our findings for risk disclosure are consistent with those of Lim et al. (2018); business strategy is a determinant of the complexity of risk disclosure. More precisely, prospectors use more complex language when describing their risk factor exposure than defenders, reflecting the complexity of their business activities.

5.3. Impact of the GFC

Table 11 reports the results for our risk disclosure model, including dummy variables GFC, for the financial years during the GFC, from 2007 to 2008, and Post-GFC, for the financial years after the GFC, from 2009 to 2017, and their respective interaction terms with our business strategy proxies. During the GFC, companies could have been more likely to disclose more information to reassure investors and other stakeholders (Malafronte et al., 2016). Further, it has been shown that companies tended to disclose more bad news during and after the GFC (Elshandy & Shrivies, 2016).

Column (1) of Table 11 includes GFC and Post-GFC and their interactions with Business-Strategy. The coefficients on the two interaction terms BusinessStrategy × GFC and BusinessStrategy × Post-GFC are not significant, suggesting that the influence of a firm’s business strategy on its risk disclosure behaviour was not altered during or after the GFC. In column (2), we include the two dummy variables Defender and Prospector and their interactions with GFC and Post-GFC. The interaction term Prospector × Post-GFC is positive and significant at the 5% level (coeff. = 0.155, t-stat. = 2.314), indicating that prospectors revealed even more risk information in the financial years after the GFC. However, in column (3), where we limit our sample to defender and prospector firm–year observations, we are not able to observe the same effect. The interaction term of Prospectors × Post-GFC does not show a significant coefficient. Thus, the effect of the GFC on the relation between prospector and risk disclosure seems weak. The financial crisis years do not influence or drive our main results. Consistent with the findings of Arora et al. (2021), firms seem to maintain the pattern of how they report their risks during crisis years.

5.4. Impact of Firm Size, age, and Technological Specialization

Table 12 reports the results for our subsample analysis. We re-estimate our main model for small versus large, young versus mature, and low- versus high-technology firms. In Panel A of Table 12, we rerun our main regressions for small (large) firms, that is firms with a size below (above) the median value of FirmSize. The coefficient of BusinessStrategy is positive and significant for both small and large firms. However, the magnitude of the effect of BusinessStrategy on risk disclosure seems to be smaller for large firms. Comparing specifications (2) and (3) to (5) and (6), our findings suggest that the likelihood of prospectors reporting more than defenders about their risk factors is high for small firms. We argue that this is because large firms have other incentives to report on their risk factors. Large firms operate under the scrutiny of the public eye, under increased interest from internal and external stakeholders (Amran et al., 2009; Khlif & Hussainey, 2016). Large firms face pressure to adequately report their risk factors, and, thus, business strategy is a less important determinant of risk disclosure for these firms.

In Panel B of Table 12, we rerun our main regressions for young and mature firms separately to test whether the influence of business strategy on risk disclosure depends on the stage of the
Table 11. Risk disclosure and business strategy: Impact of the GFC

| Dependent variable | Risk Disclosure | Risk Disclosure | Risk Disclosure |
|-------------------|----------------|----------------|----------------|
|                   | Full sample    | Full sample    | Defenders and prospectors only |
| BusinessStrategy  | 0.00609        | (1.545)        | 0.00559        |
| Defender          | -0.104**       | (-2.437)       | 0.00409        |
| Prospectors       | -0.0754        | (-1.191)       | 0.0511         |
| GFC               | 0.166**        | (2.128)        | 0.0597         |
| Post-GFC          | 0.656***       | (8.313)        | 0.155**        |
| BusinessStrategy × GFC | 0.00559        | (1.362)        | 0.185***       |
| BusinessStrategy × Post-GFC | 0.00171        | (0.409)        | 0.0983***      |
| Defender × GFC    | 0.00409        | (0.0836)       | 0.00409        |
| Defender × Post-GFC | 0.0511         | (1.072)        | 0.0511         |
| Prospector × GFC  | 0.0597         | (0.898)        | 0.0597         |
| Prospector × Post-GFC | 0.155**        | (2.314)        | 0.155**        |
| FirmSize          | 0.200***       | (37.23)        | 0.180***       |
| Leverage          | -0.0116        | (-0.732)       | 0.00745        |
| Profitability     | -0.00146***    | (-2.625)       | -0.000655      |
| Loss              | 0.0552***      | (3.238)        | 0.0542***      |
| HistoricBeta      | 0.0871***      | (5.557)        | 0.119***       |
| HistoricVolatility| -0.0134        | (-0.246)       | -0.0850        |
| TradingVolume     | 0.0224***      | (3.938)        | 0.0130         |
| CrossListing      | 0.0718***      | (2.751)        | 0.129***       |
| Constant          | 2.339***       | (18.41)        | 2.560***       |
| Observations      | 12,065         | 12,065         | 1,946          |
| Adjusted R²       | 0.620          | 0.619          | 0.613          |
| Year dummies      | YES            | YES            | YES            |
| Industry dummies  | YES            | YES            | YES            |
| Country dummies   | YES            | YES            | YES            |

This table reports the results from OLS regressions of business strategy on risk disclosure, focusing on the effect of the GFC. We include the two dummy variables GFC and Post-GFC to account for the financial years during the GFC (2007 and 2008) and the financial years after the GFC (2009–2017), respectively, and their respective interactions with our independent variables of interest. In specification (1), the independent variable is the business strategy measure of Bentley et al. (2013). In specification (2), we include the two dummy variables Prospector and Defender. In specification (3), we limit the sample to prospector and defender firm-year observations. See Appendix A for variable definitions. Continuous variables are winsorized at the first and 99th percentiles. The t-statistics are reported in parentheses. Standard errors are heteroscedasticity robust and clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Table 12. Risk disclosure and business strategy: Firm characteristics

**Panel A:** Small versus large firms

|                  | (1)          | (2)          | (3)          | (4)          | (5)          | (6)          |
|------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Dependent variable |              |              |              |              |              |              |
| Variables        | RiskDisclosure | RiskDisclosure | RiskDisclosure | RiskDisclosure | RiskDisclosure | RiskDisclosure |
|                  | Full sample  | Full sample  | Defenders and prospectors only | Full sample  | Full sample  | Defenders and prospectors only |
| BusinessStrategy | 0.0123***    |              |              | 0.00706**    |              |              |
|                  | (4.066)      |              |              | (2.466)      |              |              |
| Defender         | -0.0546*     | -0.0989***   |              | -0.0989***   |              |              |
|                  | (-1.705)     | (-3.438)     |              | (-3.438)     |              |              |
| Prospector       | 0.0735**     | 0.153**      | 0.0293       | 0.0829*      |              |              |
|                  | (2.022)      | (2.568)      | (0.730)      | (1.673)      |              |              |
| Constant         | 1.845***     | 2.049***     | 2.143***     | 2.727***     | 2.857***     | 3.098***     |
|                  | (10.39)      | (12.12)      | (6.318)      | (14.20)      | (15.51)      | (8.807)      |
| Observations     | 6,028        | 6,028        | 1,161        | 6,028        | 6,028        | 783          |
| Adjusted R²      | 0.496        | 0.493        | 0.488        | 0.459        | 0.460        | 0.498        |
| Control variables| YES          | YES          | YES          | YES          | YES          | YES          |
| Year dummies     | YES          | YES          | YES          | YES          | YES          | YES          |
| Industry dummies | YES          | YES          | YES          | YES          | YES          | YES          |
| Country dummies  | YES          | YES          | YES          | YES          | YES          | YES          |

**Panel B:** Young versus mature firms

|                  | (1)          | (2)          | (3)          | (4)          | (5)          | (6)          |
|------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Dependent variable |              |              |              |              |              |              |
| Variables        | RiskDisclosure | RiskDisclosure | RiskDisclosure | RiskDisclosure | RiskDisclosure | RiskDisclosure |
|                  | Full sample  | Full sample  | Defenders and prospectors only | Full sample  | Full sample  | Defenders and prospectors only |
| BusinessStrategy | 0.0112***    |              |              | 0.00871***   |              |              |
|                  | (3.718)      |              |              | (2.873)      |              |              |
| Defender         | -0.0795**    |              |              | -0.0739***   |              |              |

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1
| Panel C: Low- versus high-technology firms |
|-------------------------------------------|
| (1) | (2) | (3) | (4) | (5) | (6) |
| Low-tech firms | High-tech firms |
| Dependent variable Variables | RiskDisclosure Full sample | RiskDisclosure Full sample | RiskDisclosure Defenders and prospectors only | RiskDisclosure Full sample | RiskDisclosure Full sample | RiskDisclosure Defenders and prospectors only |
| BusinessStrategy | 0.0154* (1.868) | | | | | 0.00459 (1.036) |
| Defender | −0.0699 (−0.993) | | | | | −0.0321 (−0.403) |
| Prospector | 0.142 (1.088) | 0.131 (0.990) | | | | 0.0138 (0.357) | 0.227** (2.142) |
| Constant | 2.249*** (6.167) | 2.506*** (7.317) | 2.247*** (3.648) | | | 2.499*** (15.19) | 2.580*** (18.69) | 2.181*** (5.550) |
This table reports the results from our subsample analysis. Panel A reports the results for small versus large firms, Panel B young versus mature firms, and Panel C low- versus high-technology firms. In specifications (1) and (4), the independent variable is the business strategy measure of Bentley et al. (2013). In specifications (2) and (5), we include the two dummy variables Prospector and Defender. In specifications (3) and (6), we limit the sample to prospector and defender firm-year observations. See Appendix A for variable definitions. Continuous variables are winsorized at the first and 99th percentiles. The t-statistics are reported in parentheses. Standard errors are heteroscedasticity robust and clustered by firm.***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
firm’s life cycle. Specifications (1) to (3) show the results for firms of age below the median and specifications (4) to (6) for firms of age above the median. Consistent with Maffett (2012), we measure firm age in months, divided by 1,000. The age of a firm is determined by taking the difference between the fiscal year-end and the base date, which is the date when Datastream started following the firm. Our results show that the effect of business strategy on risk disclosure seems to be stronger for young firms than for mature firms. Young firms adopting a prospector strategy are more likely than mature prospectors to report their risks. Prospectors, especially young prospectors, reveal more information because they rely more heavily on external funds. Mature prospectors reveal less risk information than their younger counterparts, because they fear potential proprietary costs from revealing sensitive internal information to their competitors.

Further, in Panel C of Table 12, we re-estimate our model for firms operating in technologically intensive and low-technology industries, respectively. We expect prospectors to be even more likely to reveal (voluntary) risk information if they operate in a high-technology industry, characterized by a rapidly changing environment. According to organizational theory, prospectors typically have greater incentive to reveal information (Bentley-Goode et al., 2019), because of their reliance on external financing, higher agency costs, and greater emphasis on marketing strategies (Bentley et al., 2013; Bentley-Goode et al., 2019). We expect this to be particularly true for firms operating in high-technology industries. Surprisingly, the results are mixed. The coefficient on BusinessStrategy is positive and significant (coeff. = 0.0154, t-stat. = 1.868) for low-technology firms (specification (1)). However, when analysing high-technology firms and restricting the sample further to defender and prospectors (specification (6)), we find that prospectors are more likely to report risk information than defenders. This result does not seem to hold for low-technology firms (specification (3)).

6. Conclusion

Risk disclosure has been criticized for its lack of clear language (FRC, 2009), lack of specificity, and bias towards positive information (Association of Chartered Certified Accountants, 2014). To improve risk disclosure, the first step is to better understand what drives firms to report their risk factors. This study contributes to this discussion by analysing whether a firm’s business strategy influences its risk disclosure behaviour.

The findings of our study suggest that business strategy, as defined by Miles and Snow (1978, 2003), is a determinant of risk disclosure. When analysing innovation-oriented prospectors and cost-efficient defenders in more detail, we find that prospectors are more likely to report their risk factors in the annual report. We argue that this is because, first, they adopt a business strategy that is inherently riskier and confronts them with high uncertainties. In a regulated context in which risk disclosure is quasi-mandatory, the regulator and enforcement institutions urge firms with higher risk exposure to report more on their risks. Second, such a context still allows firms discretion in disclosure, and we find evidence that prospectors are more likely to reveal information voluntarily. It seems that the benefits of reporting private information outweigh the costs. Thus, we show evidence that a firm’s strategy shapes management’s underlying decision on risk reporting.

Our study further shows that the business strategy influences what and how firms report risks. Defenders are more likely to report information in a more balanced way across the five main risk topics, which are systematic, idiosyncratic, financial, tax, and legal risk factors. Prospectors are more likely to make complex risk disclosures, reflecting their complex business environment.

Additional tests show that the GFC does not seem to have affected the relation between business strategy and risk disclosure. It seems that prospectors are more likely to reveal risk information in the years following the GFC, but the effect is weak. In addition, we find that
the influence of business strategy on the amount of risk information in the annual report is stronger for small, young, or low-technology firms.

This study complements previous findings on the influence of business strategy on the information environment (Bentley-Goode et al., 2019) and on attributes of the annual report (Lim et al., 2018). These studies, however, focus on U.S. firms. Thus, to complete the picture, it would be interesting to investigate whether our results hold for U.S. firms and, in general, for firms outside the EEA.

Although this study notes valuable insights from cross-country large-scale evidence, there are the inevitable caveats. We do not consider any nuances in risk regulations across our sample countries. Before the mandatory adoption of IFRS, some countries had a stronger focus on risk reporting than others. Further, in some countries, regulators have issued recommendations that go beyond those of the IASB. Although we include country fixed effects in this study, we do not delve further into either the history of risk reporting or recommendations beyond those of the IASB.

Our findings contribute to the debate on the need to improve corporate risk disclosure. It was not the purpose of our study to investigate the value relevance of risk information provided in the European context. Instead, we investigate what drives risk disclosure beyond regulatory interventions. In a quasi-mandatory or quasi-voluntary risk disclosure setting such as ours, we confirm that firm-specific factors play an important role in risk disclosure. Thus, instead of trying to specify in detail the risk disclosure content, form, and scope, regulators could acknowledge that improving risk disclosure behaviour is rather a question of firm-specific incentives than of greater regulatory intervention. The point of departure of our consideration is that a certain concealing motive (Dobler et al., 2011) is prevalent in risk disclosure, due to the inherently unfavourable nature of risk information. Thus, a certain minimum threshold of information is necessary, especially in a context with weak incentives for voluntary disclosure but high stakeholder information demand (Elshandidy et al., 2018; Marshall & Weetman, 2007).

The regulation of risk disclosure, in the sense that firms must disclose their risk in relation to their level of risk exposure, requires enforcement institutions and auditors to individually review the appropriateness of the risk disclosure behaviour. One cannot assume that firms with high levels of risk exposure will automatically report more on their risks. Since discretion is inherent to risk disclosure, there is a balance between agency costs and benefits (Cabeza & Tirado, 2004) that is specific to the firm and affects disclosure and information asymmetry. Knowing the client’s business – which means the firm-specific determinants comprising the firm’s business strategy and incentives of risk disclosure – will enable auditors to formulate preliminary assertions on the completeness and appropriateness of the risk disclosure. For example, knowing that firms following a prospector strategy disclose more risk information, allows auditors to urge defender companies to disclose more to achieve the same disclosure level as prospectors, as well as to achieve what is normatively desired, considering that defenders would disclose less without the auditors’ intervention.

The relation between business strategy and the coverage of risk topics reveals that the riskier the strategy, the more the firm tends to report on idiosyncratic risks rather than on systematic risks, which is a way of managing risk. In this respect, it seems more beneficial for companies to reduce information asymmetry, enabling investors to mitigate risk by diversifying their investment portfolios. Hence, prospectors have an incentive to voluntarily disclose idiosyncratic risks. There seem to be fewer incentives for prospector firms to report on systematic risks, even if their exposure to these risks is higher, because the benefits of disclosure do not outweigh the costs. Since systematic risks cannot be eliminated by diversification, investors are more likely to be deterred from investing when disclosing systematic risks. Hence, there is no incentive to voluntarily disclose that the firm is facing greater systematic risks. Regulators might be able to capture
systematic rather than idiosyncratic risk disclosures by setting a minimum threshold disclosure and through enforcement institutions. Auditors could encourage firms to disclose more if they know that the firm specifies predict a firm is withholding risk information.

Notes

1 Directive 2013/34/EU was amended by Directive 2014/95/EU.
2 This is in sharp contrast to the availability of U.S. companies’ annual reports. The U.S. Security and Exchange Commission (SEC) requires firms to file annual reports with a specific form, 10-K. The SEC makes these 10-K forms available to the public through its Electronic Data Gathering, Analysis, and Retrieval system, its search platform. It is therefore comparably easy to access and download large numbers of annual reports for the U.S. context.
3 We include all 28 EU member states and two countries, namely, Iceland and Norway, of the European Free Trade Association. Lichtenstein is not included in the final sample owing to data unavailability.
4 The word list developed by Elshandidy et al. (2013) contains the following terms, where an asterisk denotes word derivatives: risk*, loss*, decline (declined), decrease (decreased), less, low*, fail (failure), threat, verse (versed); reverse; reversed, viable, against, catastrophe (catastrophic), shortage, unable, challenge (challenges), uncertain (uncertainty; uncertainties), gain (gains), chance (chances), increase (increased), peak (peaked), fluctuate*, differ*, diversify*, probable*, and significant*.
5 Consistent with Bentley et al. (2013), we use two-digit Standard Industrial Classification (SIC) codes for industry classification.
6 A score of five is given if the firm-year observation is within the fifth quintile, and a score of one is given if the firm-year observation is within the first quintile, except for capital intensity. Capital intensity is reverse scored.
7 Appendix A provides more details on all the variables, including the control variables, in our regression analysis.
8 Appendix B shows the mean values of RiskDisclosure and BusinessStrategy by country.
9 We describe how we calculate the number of risk-related sentences in the annual report in Section 3.1.
10 As an example, in its 2013 annual report, Flughafen Wien AG uses 145 systematic, 151 idiosyncratic, 30 tax, and 27 legal words in its risk-related sentences. Thus, the Herfindahl index is 0.31 and the value of Risk topic coverage is 0.645.
11 We use Francis and Schipper’s (1999) definition of high- and low-technology industries based on three-digit SIC codes.

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### Variable Definitions

| Variable name | Definition | Source |
|---------------|-----------|--------|
| **Dependent variable** | | |
| RiskDisclosure | Number of sentences in the annual report containing at least one risk keyword from the list of Elshandidy et al. (2013). Our regression analysis includes the natural logarithm of this variable. | Computer-aided textual analysis based on annual reports |
| **Independent variables** | | |
| BusinessStrategy | Composite measure based on six individual measures, computed using the average over a rolling 5-year window. The variables are ranked into quintiles, and values range between 1 and 5. All quintile ranks are added up. The individual measures are as follows: (1) Ratio of research and development expenses to sales (2) Ratio of the number of employees to sales (3) One-year percentage change in sales (4) Ratio of selling, general, and administrative expenses to sales (5) Standard deviation of the number of employees (6) Ratio of net property, plant, and equipment to total assets | Worldscape items WC01201 and WC01001 Worldscape items WC07011 and WC01001 Worldscape item WC01001 Worldscape items WC01101 and WC01001 Worldscape item WC07011 Worldscape items WC02501 and WC02999 |
| Prospector | Dummy variable taking the value of 1 if a firm’s BusinessStrategy scores between 24 and 30, and 0 otherwise. | Based on BusinessStrategy |
| Defender | Dummy variable taking the value of 1 if a firm’s BusinessStrategy scores between 6 and 12, and 0 otherwise. | Based on BusinessStrategy |
| **Control variables** | | |
| FirmSize | Natural logarithm of the total assets of the firm. | Worldscape item WC02999 |
| Leverage | Sum of short-term debt and long-term current debt, divided by firm common equity. | Worldscape items WC03051 and WC03501 |
| Profitability | Return on assets of a firm. | Worldscape item WC08326 |
| Loss | Dummy variable taking the value 1 if net income is below zero, and 0 otherwise. | Worldscape item WC01551 |
| HistoricBeta | | Datastream expression 897E |

(Continued)
Continued

| Variable name | Definition | Source |
|---------------|------------|--------|
| **HistoricVolatility** | Average volatility of stock returns over the last 5 years. | Datastream expression 400E |
| **TradingVolume** | Daily trading volume divided by the number of common shares. | Datastream items VO and NOSH |
| **CrossListed** | Dummy variable taking the value 1 if the firm has American Depositary Receipts traded on a U.S. exchange, and 0 otherwise. | Worldscope item WC11496 |
## Appendix B: Risk Disclosure and Business Strategy, by Country

| Country           | No. of firms | No. of firm–year observations | RiskDisclosure (raw) | RiskDisclosure (raw) | BusinessStrategy |
|-------------------|--------------|-------------------------------|----------------------|----------------------|------------------|
| Austria           | 36           | 179                           | 5.468                | 264.078              | 18.101           |
| Belgium           | 70           | 384                           | 5.343                | 239.385              | 16.411           |
| Bulgaria          | 4            | 7                             | 5.441                | 281.143              | 12.429           |
| Croatia           | 4            | 17                            | 5.401                | 244.353              | 18.059           |
| Cyprus            | 7            | 10                            | 4.360                | 143.000              | 12.400           |
| Czech Republic    | 4            | 14                            | 5.427                | 253.071              | 14.000           |
| Denmark           | 56           | 356                           | 5.209                | 207.149              | 17.093           |
| Estonia           | 6            | 35                            | 5.278                | 209.629              | 14.800           |
| Finland           | 84           | 476                           | 5.490                | 266.118              | 17.456           |
| France            | 197          | 1125                          | 5.614                | 348.548              | 17.404           |
| Germany           | 209          | 801                           | 5.729                | 364.532              | 17.953           |
| Greece            | 56           | 249                           | 5.037                | 177.691              | 15.365           |
| Hungary           | 10           | 45                            | 5.550                | 314.400              | 15.222           |
| Iceland           | 4            | 20                            | 5.158                | 189.100              | 20.250           |
| Ireland           | 34           | 182                           | 5.250                | 215.929              | 17.148           |
| Italy             | 133          | 704                           | 5.647                | 323.114              | 16.903           |
| Latvia            | 11           | 33                            | 4.164                | 88.6970              | 14.758           |
| Lithuania         | 4            | 7                             | 5.151                | 229.286              | 15.429           |
| Luxembourg        | 7            | 48                            | 5.592                | 288.521              | 17.333           |
| Malta             | 8            | 26                            | 5.252                | 199.654              | 16.462           |
| Netherlands       | 81           | 407                           | 5.725                | 342.644              | 17.531           |
| Norway            | 25           | 52                            | 5.713                | 364.192              | 17.231           |
| Poland            | 87           | 361                           | 5.356                | 254.618              | 16.169           |
| Portugal          | 24           | 122                           | 5.691                | 338.992              | 14.467           |
| Romania           | 5            | 10                            | 5.547                | 308.000              | 13.200           |
| Slovakia          | 3            | 18                            | 5.461                | 297.222              | 13.333           |
| Slovenia          | 6            | 28                            | 6.084                | 459.464              | 16.250           |
| Spain             | 29           | 124                           | 5.717                | 374.935              | 15.177           |
| Sweden            | 163          | 981                           | 5.392                | 242.946              | 17.854           |
| United Kingdom    | 977          | 5,244                         | 5.081                | 201.198              | 17.093           |

This table reports descriptive statistics for our dependent variable, RiskDisclosure (natural logarithmic transformation and raw count values), and our independent variable of interest, BusinessStrategy, separately for all countries in our study. See Appendix A for variable definitions.