Management Risk Reporting Practices and their determinants

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Management Risk Reporting Practices and their Determinants
A study of Belgian listed firms

1. Introduction

In recent years, the need for effective risk management, internal control and transparent risk reporting has become an important corporate governance principle and a predominant issue in business. Already in 1987, the AICPA[1] report stated that shareholders are increasingly demanding that financial statements include more information concerning the risks and uncertainties companies are facing (Schrand and Elliott, 1998). Abraham and Cox (2007) claim that this information can help investors to determine the risk profile of a company and estimate its market value.

Risk disclosure can be beneficial for several reasons. It mitigates information asymmetry between management and external shareholders and can have positive effects on the trust and confidence stakeholders have in the firm's management. It may decrease the firm's perceived risk because an open disclosure strategy supposedly results in a better assessment of the firm's future performance. This, in turn, can lead to a decline in the firms cost of capital (Linsley and Shrives, 2006a; Abraham and Cox, 2007; ICAEW[2], 1999a) and to a reduced possibility of financial failure (Beretta and Bozzolan, 2004; Solomon *et al.*, 2000).

The Turnbull Guidance in the UK (ICAEW, 1999b) and the Jenkins Committee Report in the US (AICPA, 1994) have accelerated the debate on the quality and effectiveness of risk reporting. Boards and investors indicate that the Turnbull Guidance has led to a marked improvement in the overall standard of risk management since 1999 (FRC[3], 2005). In response to the developments in the US and UK, a number of authorities worldwide have reconsidered the set of requirements for disclosure of relevant and understandable forward-looking information about risk. As a result, narrative risk factor disclosure is nowadays increasingly required in periodic reports, both annual and quarterly.

Despite the growing interest in risk issues, only few articles have studied the characteristics of risk disclosing firms. The question which firm and governance characteristics facilitate management risk reporting has largely been ignored in the literature. Consequently, several authors encourage filling the gap in the literature with respect to empirical risk reporting research (Linsley and Shrives, 2000, 2006a, 2006b; Beretta and Bozzolan, 2004; Solomon *et al.*, 2000; ICAEW, 1999a; Schrand and Elliott, 1998).

The aim of this study is to identify the firm and governance characteristics that appear to facilitate risk disclosure by management, using a sample of large and medium-sized Belgian listed firms. The next paragraph discusses the issue of risk disclosure. Hypotheses are formulated in paragraph three and paragraph four presents the data and the empirical results. Paragraph five concludes.

2. Risk and risk disclosure literature

2.1.   Defining risk

The word 'risk' is derived from the Italian word 'riscare', which means 'to dare'. The roots of the modern risk conception go back to eight hundred years ago, when the numbering system reached the West. From then on, scientists like Fibonacci, Paccioli, Galileo and Cardano began to develop methods of dealing with the unknown in using measurement, odds and probabilities. Linsley and Shrives (2006a) note that in the pre-modern era risks were solely considered to be bad, whereas the modernist view of risk incorporates both the positive and negative outcomes of events.

Generally, risk is considered to be synonymous with uncertainty. In the early 1920's, though, Frank Knight introduces an important distinction between the two concepts. He defines 'risk' as variability that can be quantified in terms of probabilities, while immeasurable variability is best thought of as 'uncertainty'[4]. In this context, Miller (1992) states that uncertainty reduces the predictability and therefore increases risk. Crouhy, *et al.* (2006, p.25) define risk as "the volatility of returns leading to unexpected losses, with higher volatility indicating higher risk".

For the purpose of this paper, we build on the risk categorization model of Crouhy *et al.* (2006). These authors consider risk factors in a systematic way and group risk factors into eight categories: market risk, credit risk, liquidity risk, operational risk, legal and regulatory risk, business risk, strategic risk and reputation risk. Following Linsley and Shrives (2006a), we regroup the categories in order to obtain four risk types: financial risk, operational risk, legal, tax & regulatory risk and business risk. This risk categorization is presented in figure 1.

INSERT FIGURE 1 HERE

Financial Risk

Financial risk is a broad and well-known risk category. It consists of market risk, credit risk and liquidity risk.

Market Risk

This risk relates to price movements in financial markets (Servaes and Tufano, 2006). Crouhy *et al.* (2006, p.27) define market risk as "the risk that changes in financial market prices and rates will reduce the value of a security or portfolio". Market risk arises because of a number of factors, such as interest rate exposures, foreign exchange exposures, commodity price-sensitive revenues or expenses, stock option plans and pension liabilities.

Credit Risk

Credit risk is the possibility that the payment of contractual obligations may not be fulfilled by the counterparty (Cabedo and Tirado, 2004). Giesecke (2004, p.3) defines credit risk as "the distribution of financial losses due to unexpected changes in the credit quality of a counterparty in a

financial agreement". Examples of credit risk can be the downgrading by a rating agency, failure or liquidation.

Liquidity Risk

When a company is not able to meet the payment of commitments it has made, liquidity risk occurs (Cabedo and Tirado, 2004).

Operational Risk

De Ridder (2007) relates operational risk to potential losses due to inadequate or failing internal processes, people and systems or resulting from external events. Crouhy *et al.* (2006) distinguish three major types of operational risk. The first type is technology risk, principally the risk associated with computer systems. It implies the risks involved with information access, information availability and infrastructure (Linsley and Shrives, 2006a). Álvarez (2001, p.5) describes technology risk as the loss events "due to piracy, theft, failure, breakdown, or other disruption technology, data or information". The second type is fraud risk by management or employees. The third type of operational risk is human factor risk; it relates to potential losses resulting from human errors (e.g. accidentally destroying a file). Álvarez (2001) adds as a fourth type of operational risk, external loss events (e.g. following a natural disaster).

Legal, Tax and Regulatory Risk

Legal, tax and regulatory risk arises for a whole variety of reasons. An example of legal risk is the involvement in lawsuits or the infringement of legal norms. Another example is a change in tax law which may have vast implications for a firm.

Business, strategic and reputation risk

Business risk, strategic risk and reputation risk are grouped together. Following Crouhy *et al.* (2006), these three types of risk are identified as business risk.
Business risk refers to the typical risks a company faces: uncertainty about the demand for products, the price that can be charged for those products, the cost of producing, stocking and delivering the products (Crouhy *et al.*, 2006). The risk associated with actions by competitors (Servaes and Tufano, 2006) and potential losses of competitive advantage (Cabedo and Tirado, 2004) are other examples of business risk.

Strategic risk refers to the risk associated with significant investments for which high uncertainty exists about success and profitability (Crouhy *et al.*, 2006). A firm investing in research and development (R&D), for example, encounters uncertainty about the relation between its R&D investment and new product or process outputs (Miller, 1992).

Reputation risk refers to the risk that a good reputation, which can lead to value creation, turns to a bad reputation and, as a result, company value being destroyed.

2.2. Empirical studies on risk disclosure

In recent years, corporate reporting shifted from the disclosure of financial results towards informing the shareholders and other stakeholders about a wide variety of topics. One of these topics is risk. Investors know that creating value requires risk-taking and they like to know which risks the company faces and how these risks are (or will be) managed (Eccles *et al.*, 2001). As a result, there is an increasing demand for transparent risk reporting in annual reports. Beretta and Bozzolan (2004, p.269) define risk disclosure as "the communication of information concerning firms' strategies, characteristics, operations, and other external factors that have the potential to affect expected results".

Few empirical studies have been published on the subject of corporate risk disclosure, and, more specifically, on firm and governance characteristics facilitating decisions with respect to risk reporting, risk management and managerial decision making. A number of these rely on content analysis of annual or management reports. Since this is the method of analysis in the present study, we limit our review to these studies. Table 1 summarizes the methodology, sample and main results of these studies.

Table 1 Empirical studies on risk disclosures

Author(s)	Method and sample	Main results
Kajüter and Winkler (2003)	- Content analysis 247 management reports of German listed non-financial companies	- Large variation in mandatory risk disclosure - Risk disclosure mainly qualitative - Few disclosures on interrelations of risk factors - Poor risk forecasts
Beretta and Bozzolan (2004)	- Content analysis; disclosure index and regressions 85 annual reports of Italian listed non-financial companies	- Voluntary risk disclosure mainly qualitative - Focus on past en present risks, rather than future risks - Evidence consistent with size effect
Lajili and Zéghal (2005)	- Content analysis 300 annual reports of Canadian listed companies	- Large variation in voluntary risk disclosure - Risk disclosure mainly qualitative
Mohobbot (2005)	- Content analysis; disclosure index and regressions 90 annual reports of Japanese listed companies	- Large variation in voluntary risk disclosure - Risk disclosure mainly qualitative - Evidence consistent with size effect
Groenland, Daals and von Eije (2006)	- Content analysis; regressions 125 annual reports of Dutch listed companies	- Risk paragraph consists on the average of 3 percent of the annual report - Positive association between mentioning of risk management system and return
Linsley and Shrives (2006)	- Content analysis 79 annual reports of UK listed non-financial companies	- General statements of risk management outnumber the more specific statements - Evidence consistent with size effect - Correlation between volume of risk disclosures and level of environmental risk
Linsley, Shrives and Crumpton (2006)	- Content analysis 18 annual reports of Canadian and UK banks	- Evidence consistent with size effect - General statements of risk management outnumber the more specific statements
Abraham and Cox	- Content analysis and regressions 100 annual reports of UK listed non-	Positive association with number of independent directors in Board

(2007)	financial companies	▪ Positive association with dual listing in US ▪ Negative association with corporate ownership by long-term institutions ▪ Positive association with level of risk ▪ Evidence consistent with size effect
Deumes (2008)	▪ Content analysis; regressions ▪ 90 prospectuses of Dutch companies	▪ Prospectuses of Dutch companies generally provide adequate information about the material risks to an investment in a company's securities ▪ Risk disclosure in prospectuses can be seen as an area of best practives when it comes to risk communication
Hassan (2008)	▪ Content analysis; disclosure index and regressions ▪ 41 annual reports of United Arab Emirates listed companies	▪ Evidence not consistent with size effect ▪ Risk disclosure level related to industry type and degree of leverage

Source: based on Dobler (2008, p31), supplemented with other studies

3. Hypotheses

The aim of this study is to test whether any relationship exists between the level of risk disclosure, on the one hand, and company and governance characteristics, on the other hand, for a sample of Belgian listed firms. The rationale underlying the development of the hypotheses is set out below.

3.1.   Risk disclosure and company size

Size is an important factor in disclosure behaviour. Larger firms have an incentive to provide more information because these firms are more dependent on their stakeholders. Moreover, larger companies tend to be more complex than smaller companies. Since complexity increases inherent risk, managers may disclose more information about these risks (Deumes and Knechel, 2008). Additionally, Cooke (1989) argues that adequate financial communication requires a wide variety of highly skilled individuals. Since larger companies have a higher capability to attract these people, he concludes that company size is an enabler for disclosure.

Previous general disclosure studies document that company size is an important determinant of the level of disclosure (Beretta and Bozzolan, 2004). For example Beattie, *et al.* (2004) report a positive size-disclosure relation. Concerning risk disclosure, Linsley and Shrives (2006a) and Abraham and Cox (2007) find a positive size-risk disclosure relationship for samples of UK companies. Deumes and Knechel (2008) find the same relationship for a sample of Dutch companies. Mohobbot (2005) confirm the positive relationship for a sample of Japanse companies.

Based on the above arguments, the first hypothesis is formulated as follows:
H1: There is a positive relation between company size and the level of risk disclosure.

3.2. Risk disclosure and profitability

If a company is performing poorly, management may experience increased pressure for extensive risk disclosure. Moreover, the management of poorly performing firms may feel an increased sense of urgency to learn about the drivers of company performance and risk. Increased disclosure may reflect management's enhanced understanding of the value creation process of the company. Companies which are more profitable, on the other hand, may have more resources available to invest in systems in order to assess and manage their risks (Deumes and Knechel, 2008). In their study of Kenyan companies, Barako, *et al.* (2006) find a negative, although not significant, relation between the extent of voluntary disclosure and profitability. Deumes and Knechel (2008) also find a negative, but insignificant, relationship between internal control reporting and firm profitability. Because of the indeterminate relation between risk disclosure and firm profitability, the second hypothesis is presented in the null form:

H2: There is a no relation between firm profitability and the level of risk disclosure.

3.3. Risk disclosure and systematic risk

According to Linsley and Shrives (2006a), a company with a relatively high level of risk may be disclosing more risk information because management experiences an increased need to explain the risk drivers. Management may also disclose more information about how they assess and manage those risks. Following Linsley and Shrives (2006a), company risk can be measured by the beta coefficient. Linsley and Shrives (2006a) do not find a significant relationship between the extent of risk disclosure and beta. Deumes (2008) and Abraham and Cox (2007), on the contrary, report a positive significant relationship between risk disclosure and systematic risk. The fourth hypothesis is formulated as follows:

H3: There is a positive relation between beta risk and the level of risk disclosure.

3.4. Risk disclosure and audit quality

Although it is the responsibility of management to prepare annual accounts and reports, an external audit firm can have a considerable impact on the content of the annual report (Barako *et al.*, 2006). If financial statements are audited by a high quality independent auditor, investor confidence in the company may be increased. Therefore, investors may perceive that risk disclosure is less necessary in that case. On the other hand, a high quality auditor may stress the importance of risk disclosure, with more extensive risk disclosure as a result. Barako *et al.* (2006) hypothesise, but do not find, a positive relationship between audit quality and the extent of voluntary disclosure. Similarly, Deumes and Knechel (2008) do not find a significant relationship between audit quality and internal control disclosure. Because of the indeterminate relationship between risk disclosure and audit quality, the third hypothesis is presented in the null form:

H4: There is no relation between audit quality and the level of risk disclosure.

3.5. Risk disclosure and the presence of a risk committee or risk manager

Companies with a risk committee or a risk manager are likely to attach greater importance to risk disclosure than companies without a risk committee or risk manager. Therefore, the fifth hypothesis is formulated as follows:

H5: There is a positive relation between the presence of a risk committee or a risk manager within a company and the level of risk disclosure.

3.6. Risk disclosure and board composition

The annual report is approved by the board of directors. Board composition can be expected to have an impact on the disclosure policy (Abraham and Cox, 2007). One aspect of board composition is the number of non-executive directors in relation to overall board size. Non-executive directors are members of the board who are outsiders of the company (independent) or grey (not independent, but not executing a function within the company). They act as representatives of the shareholders in the board of directors. The executive directors occupy an executive position in the firm and are, therefore, corporate insiders. Because of conflicts of interest, it may be difficult for the insiders-board members to monitor managers' actions (Abraham and Cox, 2007). According to Fama and Jensen (1983), the presence of non-executive directors in the board may lead to reduced agency conflicts between managers and owners. Following Barako *et al*. (2006) this may be reflected in a high level of disclosure in the annual reports. Abraham and Cox (2007) report a significant positive relationship between the number of independent non-executive directors and the level of risk disclosure. Deumes and Knechel (2008) find a positive, but insignificant, relationship between the percentage of independent outside directors and the extent of internal control disclosure. Barako *et al*. (2006) hypothesize, but do not find, a positive relationship between the percentage of non-executive directors and voluntary corporate disclosure. Based on the above, the following hypothesis is examined:

H6: There is a positive relation between the proportion of non-executive directors in the board and the level of risk disclosure.

3.7. Risk disclosure and CEO duality

The combination of the chair of the board of directors and chief executive officer position by one person results in a unitary leadership structure. A company in which both positions are held by different persons displays a dual leadership structure. According to agency theory, a unitary leadership structure can significantly reduce the monitoring function of the board. According to Barako *et al*. (2006) a unitary leadership structure facilitates opportunistic behaviour by the CEO because of his dominance over the board. Fama and Jensen (1983, p.314) argue that this

combination of positions signals the absence of separation of decision management and decision control. We formulate the seventh hypothesis as follows:

H7: The level of risk disclosure is higher for companies with a dual leadership structure compared to firms with a unitary leadership structure.

4. Research design, methodology and findings

4.1.   Research Design

Sample and data

The sample of Belgian companies comprises non-financial firms listed on Euronext (available at www.euronext.com) at January, 1st, 2006. We opted for the A and B segments of Eurolist: 34 Large Caps[5] and 50 Mid Caps[6]. These segments are chosen because they include the largest Belgian companies and we expect these firms to report more extensively on risk issues compared to smaller companies.

Following Abraham and Cox (2007), Deumes and Knechel (2008) and Linsley and Shrives (2006a), financial companies are removed from the sample, because they are expected to make significantly different types of risk disclosure compared to industrial firms.

The aim of this study is to examine the disclosure of risk factors in the annual reports of the sample firms and to identify the firm and governance characteristics facilitating disclosure decisions. Annual reports are not the only means of corporate reporting, but Lang and Lundholm (1993) state that information in annual reports is positively correlated with the amount of disclosure provided via other media. Annual reports are generally considered by management and outsiders to be the most important and influential source of corporate information (Beretta and Bozzolan, 2004; Botosan, 1997). CEOs consider annual reports as major communication devices to both internal and external stakeholders concerning their and their companies' performances (Bowman, 1984). In the current paper, corporate annual reports of 2006 are used. For reasons of consistency in the coding procedure (see below), only the firms with annual reports in English on their corporate websites are considered. The final sample consists of 46 Belgian firms. Appendix 1 contains a list of companies included in this final sample.

Content analysis

There are several different approaches to the analysis of narratives in annual reports. Beattie *et al*. (2004) distinguish two categories: subjective (analyst ratings) and semi-objective (disclosure index studies, content analysis, readability studies and linguistic analysis). Content analysis has

been selected for this study because it has been widely used in the accounting research, particularly in corporate disclosure studies (Beretta and Bozzolan, 2004; Lajili and Zéghal, 2005; Deumes, 2005, Linsley and Shrives, 2006a, 2006b; Abraham and Cox, 2007).

Content analysis is a method of codifying text into various categories depending upon selected criteria (Milne and Adler, 1999). Krippendorff (1980, p.21) defines content analysis as "a research technique for making replicable and valid inferences from data to their context". It is important that the classification procedure is reliable in order to draw valid inferences (Beattie *et al.*, 2004).

Reliability of the coding process can be improved by constructing decision rules that the coder can refer to (Linsley and Shrives, 2006a). Milne and Adler (1999, p.241) state that content analysis involves two activities: (a) the construction of a classification scheme and (b) devising a set of rules about 'what' en 'how' to code, measure and record the data to be classified. Linsley and Shrives (2006a) stress the need for a reliable coding method because content analysis is inevitably subjective.

Bowman (1984) suggests that more than one person reads and codes the document in order to increase confidence that the interpretation of the document corresponds to the objective reality. Since, for the purposes of the current paper, there is only one coder, it has to be taken into account that the results will be more subjective and therefore less valid than if there had been multiple coders. Because of this, it is very important to develop a framework with a sound classification scheme and clear decision rules.

Classification scheme, dependent variable definition and decision rules

Milne and Adler (1999) stress the importance of mentioning which unit of analysis forms the basis for coding decisions because "reliability is concerned with coding errors, not measurement errors" (p.234).

There are several possibilities in choosing a coding and counting unit: words, page proportions or sentences (Linsley and Shrives, 2006a). Following Abraham and Cox (2007), Linsley and Shrives (2006a, 2006b) and Beretta and Bozzolan (2004), sentences are chosen as the basis for coding in the current study because these are far more reliable than any other unit of analysis (Milne and Adler, 1999). Without a sentence, individual words have no meaning to provide a basis for coding disclosures (Milne and Adler, 1999). It is therefore necessary to look at words in their proper context in order to achieve reliable results. Abraham and Cox (2007, p. 236) argue that "one drawback of using sentences to code is that it is possible for the writing style of

the company to influence the disclosure measurement outcome". Since this drawback is difficult to overcome, it is a limitation of the study.

In order to code risk-related sentences of the corporate annual reports, a risk classification scheme based on prior risk disclosure research and on the classical risk classification is developed. The classification for this study is based on the model of Linsley and Shrives (2006a), which has also been used by Kajüter (2001). It is completed with other risk factors from the model of Miller (1992), Deumes (2005), Lajili and Zéghal (2005) and Crouhy *et al*. (2006). The final scheme identifies four different types of risk disclosures: financial, operational, legal, tax and regulatory and business risk (see Figure 1). For each type, a number of subcategories are specified in appendix 2.

Content analysis is performed taking into account these four types of risk information. This procedure yields four measures of risk reporting per sample firm, all measured in number of sentences. The first estimate consists of the number of financial risk-related sentences included in the annual report for each sample firm and is called RDFIN (where RD stands for risk disclosure). The other measures are constructed similarly and they are referred to as RDOP (operational risk disclosure), RDLEG (legal, tax and regulatory risk disclosure) and RDBUS (business risk disclosure). Finally, an aggregate risk disclosure estimate is created for each sample firm: RDSCORE is the sum of the four estimates above.

In coding the annual reports, several decision rules are employed. These are based on the work of Linsley and Shrives (2006a) and on a pretest. Linsley and Shrives (2006a) state that the subjectivity in coding is unavoidable "as the definition of risk is open to interpretation" (p.393). Therefore the decision rules aim to improve the consistency in coding. The most important decision rules are mentioned in appendix 3. Table 2 presents some typical examples of risk disclosures and the category to which they are assigned.

Table 2 Risk disclosure examples

Company	Risk disclosure example	Risk category
Barco	'Barco incurs foreign currency risk on recognized assets and liabilities when they are denominated in a currency other than the company's local currency.' Barco, 2006, p. 94	Financial risk
Delhaize	'Delhaize Group's interest rate risk management objective is to achieve an optimal balance between borrowing cost and management of the effect of interest rate changes on earnings and cash flows.' Delhaize, 2006, p. 42	Financial risk
Recticel	'The Group uses potentially dangerous substances and chemicals in the product development and manufacturing processes. There are risks of accidental pollution.' Recticel, 2006, p. 71	Operational risk
Elia	'Defects in the IT system and processes used to manage the electrical system may harm the latter's performance.' Elia, 2006, p. 84	Operational risk

Hamon	'The Group believes that it has covered all of its potential litigation risks.' Hamon, 2006, p. 77	Legal, tax and regulatory risk
Distrigas	'The evolution in the Belgian and European gas market regulatory framework could have significant impact on the activities of Distrigas and its subsidiaries.' Distrigas, 2006, p. 16	Legal, tax and regulatory risk
VPK	'In addition, there are risks and uncertainties specific to the market, of which the most important is fluctuation in margins resulting from greater or lesser competition.' VPK, 2006, p. 13	Business risk
Real Software	'Companies are increasingly competing on a global basis. Increased competition from global or pan-European players could lead to increased margin pressure and lower profitability'. Real Software, 2006, p. 23	Business risk

Source: Based on the corporate annual reports of the sample companies.

Independent variable definitions

The data for the independent variables are obtained from the sample companies' annual reports, Euronext[7] and KBC Securities[8].

Firm size is measured by turnover (SALES). Firm profitability (PROFIT) is measured as return on assets, which is defined as the ratio of net profit to book value of total assets. The variable BETA is measured using the market model based on the capital asset pricing model. The beta is calculated using sixty monthly estimates from the period 2002 to 2006. Audit quality (AUDIT) is measured through a dummy variable which equals one if the company is audited by a big-4 auditor[9] and zero otherwise. The existence of a risk committee or a risk manager (COMMIT) is measured through a dummy variable which equals one if the company has a risk committee and/or a risk manager and zero otherwise. The proportion of non-executive directors (NONEXEC) is measured by the ratio of the number of non-executive directors to the board size. The leadership structure of a company (LEADER) is examined through a dummy variable, which equals one if the company has a dual leadership structure, and zero otherwise.

4.2. Descriptive statistics

Before going to the descriptive statistics, we check the internal consistency of the measures of risk disclosure score using Cronbach's alpha. It uses repeated measurements (in this case the various categories of the disclosure score) to assess the degree to which correlation among the measurements is attenuated due to random error. Cronbach's alpha is equal to one (its maximum value) when the correlation between each pair of variables is one. Computed with logged values of the dependent variables RDFIN, RDOP, RDLEG and RDBUS, Cronbach's coefficient alpha equals 0.746. As a general rule, an alpha of 0.8 indicates that the correlation is

attenuated very little by random measurement error (Botosan, 1997). Thus, a coefficient of 0.746 suggests that internal consistency is relatively high.

On the basis of table 3, which presents descriptive statistics of the four risk disclosure measures, we can make the following observations. A total number of 4037 risk disclosure sentences were identified within the sample of annual reports. The overall mean disclosure rate per annual report is 88 sentences. The variation in the number of risk disclosures is very large, with a minimum of 17 sentences and a maximum of 445 sentences and a standard deviation of 76,95. For each category of risk disclosure, the minimum value of zero indicates that there is at least one company not disclosing any information about the category. However, the minimum number of total risk disclosures equals 17, which indicates that all sample firms publish some risk information. The financial and operational risk categories have the highest total risk related sentences, with sums of 1907 and 1051 sentences, respectively. Disclosures concerning business risk and legal, tax and regulatory risk are the least present in the annual reports of the sample firms. Figure 2 shows the relative importance of each category. Table 4 shows that only few companies do not disclose anything about financial, operational or business risk, the percentages being 2,17%, 4,35% and 6,52%. A somewhat larger proportion of firms does not disclose any information about legal, tax and regulatory risks (10,87%).

Table 3 Descriptive statistics of dependent variables

	N	Minimum	Maximum	Sum	Mean	Std. Deviation	Median
RDFIN	46	0	139	1907	41,46	32,05	32,50
RDOP	46	0	189	1051	22,85	32,52	11,00
RDLEG	46	0	75	461	10,02	14,38	4,00
RDBUS	46	0	94	618	13,43	18,79	6,00
RDSCORE	46	17	445	4037	87,76	76,95	65,50

Note: RDFIN is the risk disclosure score which measures the total number of sentences dedicated to financial risk. RDOP is the risk disclosure score which measures the total number of sentences dedicated to operational risk. RDBUS is the risk disclosure score which measures the total number of sentences dedicated to business risk. RDSCORE is the risk disclosure score which measures the total number of sentences dedicated to varying risk issues.

***INSERT FIGURE 2 HERE ***

Table 4 Companies not disclosing any information about a risk category

Category	Percentage of total sample (N=46)
Financial risk	2,17%
Operational risk	4,35%
Legal, tax and regulatory risk	10,87%
Business risk	6,52%

Table 5 presents the descriptive statistics of the independent variables in the analysis. From the table it appears that the mean (median) sales level of the sample firms is 3071,42 million EUR (675,78 million EUR). The mean (median) profitability ratio, defined as the return on assets, equals 7,46% (5,50%). The beta coefficient equals 0,732, on average; its median equals 0,608. The variable AUDIT indicates that 39 out of the 46 sample firms (85%) do have a Big Four auditor. In only 5 companies (11%) a risk committee or risk manager is present (COMMIT). The percentage of non-executive directors in the board (NONEXEC) is 33% minimum and 100% maximum. On average, 68% of the board members can be considered as independent. 40 of the sample firms (87%) have a dual leadership structure (LEADER); in six companies the functions of CEO and chairman are exercised by the same person. The number of board members (BOARD) in the sample firms varies between 5 and 21.

Table 5 Descriptive statistics of independent variables

	N	Minimum	Maximum	Sum	Mean	Std. Deviation	Median
SALES	46	46,48	44289,20	141285,28	3071,42	7227,16	675,78
PROFIT	46	-23,77	32,25	343,15	7,46	9,46	5,50
BETA	46	0,026	1,675	33,670	0,732	0,426	0,608
AUDIT	46	0	1	39	,85	,36	1,00
COMMIT	46	0	1	5	,11	,32	0,00
NONEXEC	46	33,33	100,00	3107,01	67,54	17,57	66,67
LEADER	46	0	1	40	,87	,34	1,00
BOARD	46	5	21	480	10,43	3,56	9,50

Note: Firm size is measured by turnover (SALES). Firm profitability (PROFIT) is measured as return on assets, which is defined as the ratio of net profit to book value of total assets. The variable BETA is measured using the market model based on the capital asset pricing model. The beta is calculated using sixty monthly estimates from the period 2002 to 2006. Audit quality (AUDIT) is measured through a dummy variable which equals one if the company is audited by a big-4 auditor and zero otherwise. The existence of a risk committee or a risk manager (COMMIT) is measured through a dummy variable which equals one if the company has a risk committee and/or a risk manager and zero otherwise. The proportion of non-executive directors (NONEXEC) is measured by the ratio of the number of non-executive directors to the board size. The leadership structure of a company (LEADER) is examined through a dummy variable, which equals one if the company has a dual leadership structure, and zero otherwise. BOARD represents the number of board members.

In table 6 the Pearson correlation coefficients between dependent and independent variables and their significance levels are given. Since there are no missing values in the data, the sample size is always 46. From the table it appears that the log of the total risk disclosure index is significantly positively correlated with the log of sales (1% level), significantly negatively correlated with firm profitability (5% level) and significantly positively correlated (5% level) with the variable COMMIT which measures the presence (or not) of a risk committee or a risk manager. Table 6 also shows that large firms are more likely to use a big-4 auditor, are more

likely to install a risk committee and have a higher percentage of non-executive directors in the board.

Table 6 Pearson Correlations

	LNSALES	PROFIT	BETA	AUDIT	COMMIT	NONEXEC	LEADER
LNRDSCORE	,391(**)	-,358(*)	,240	,093	,344(*)	,236	,063
	,007	,015	,108	,539	,019	,114	,679
LNSALES		-,089	-,164	,323(*)	,417(**)	,296(*)	-,079
		,558	,276	,029	,004	,046	,602
PROFIT			,001	,300(*)	-,041	-,205	-,045
			,995	,042	,786	,171	,767
BETA				,086	-,194	,118	-,026
				,571	,197	,433	,862
AUDIT					,148	-,042	,016
					,326	,781	,918
COMMIT						,169	,135
						,261	,370
NONEXEC							-,059
							,698

Notes:
a) In the cells, correlation coefficients are given in the first row; p-values in the second row. * indicates significance at the 0.05 level (2-tailed); **indicates significance at the 0.01 level (2-tailed).
b) LNRDSCORE is the natural logarithm of the risk disclosure score which measures the total number of sentences dedicated to varying risk issues. LNSALES is the natural logarithm of the sales level. Firm profitability of a company (PROFIT) is measured as return on assets, which is defined as the ratio of net profit to book value of total assets. The variable BETA is measured using the market model based on the capital asset pricing model. The beta is calculated using sixty monthly estimates from the period 2002 to 2006. Audit quality (AUDIT) is measured through a dummy variable which equals one if the company is audited by a big-4 auditor and zero otherwise. The existence of a risk committee or a risk manager (COMMIT) is measured through a dummy variable which equals one if the company has a risk committee and/or a risk manager and zero otherwise. The proportion of non-executive directors (NONEXEC) is measured by the ratio of the number of non-executive directors to the board size. The leadership structure of a company (LEADER) is examined through a dummy variable, which equals one if the company has a dual leadership structure, and zero otherwise.

Table 7 presents the t-tests associated with the differences in means of the disclosure index for two sub-samples of firms. The sub-samples are defined on the basis of the median values of the different explanatory variables. One sub-sample contains the firms with a value of the explanatory variable below its median (Group0), the other sub-sample contains the firms with a value of the explanatory variable above its median (Group1). In the case of a dummy variable, firms with a score of zero are assigned to one sub-sample (Group0), firms with a score of one are assigned to the other sub-sample (Group1). Levene's test indicates that the tests for differences of means can be performed under the assumption of equality of variances.

Table 7 T-tests

	Mean Group0	Mean Group1	t-statistic	p-value (2-tailed)
LNRDSCORE *grouping variable LNSALES*	3,901	4,490	2,904	,006***
LNRDSCORE *grouping variable PROFIT*	4,407	3,984	-1,999	,052*
LNRDSCORE *grouping variable BETA*	4,037	4.354	1,470	,149
LNRDSCORE *grouping variable AUDIT*	4,034	4,224	-,619	,539
LNRDSCORE *grouping variable COMMIT*	4,107	4,920	-2,434	,019**
LNRDSCORE *grouping variable NONEXEC*	3,994	4,380	1,804	,078*
LNRDSCORE *grouping variable LEADER*	4,077	4,213	-,416	,679

Notes:
a) LNRDSCORE is the natural logarithm of the risk disclosure score which measures the total number of sentences dedicated to varying risk issues. LNSALES is the natural logarithm of the sales level. Firm profitability of a company (PROFIT) is measured as return on assets, which is defined as the ratio of net profit to book value of total assets. The variable BETA is measured using the market model based on the capital asset pricing model. The beta is calculated using sixty monthly estimates from the period 2002 to 2006. Audit quality (AUDIT) is measured through a dummy variable which equals one if the company is audited by a big-4 auditor and zero otherwise. The existence of a risk committee or a risk manager (COMMIT) is measured through a dummy variable which equals one if the company has a risk committee and/or a risk manager and zero otherwise. The proportion of non-executive directors (NONEXEC) is measured by the ratio of the number of non-executive directors to the board size. The leadership structure of a company (LEADER) is examined through a dummy variable, which equals one if the company has a dual leadership structure, and zero otherwise.
b) *** indicates significance at the 0.01 level; ** indicates significance at the 0.05 level, * indicates significance at the 0.10 level.

From table 7, it appears that the total disclosure index is significantly higher for larger firms, for low-profitability firms, for firms with a risk committee or risk manager and for firms with a higher percentage of independent directors. The positive relation between the disclosure index and the proportion of independent directors is, however, only significant at the 10% level.

4.3. Multivariate analysis

A multivariate test of the different hypotheses outlined consists of running the following regression model:

$$LNRDSCORE = \beta_0 + \beta_1*LNSALES + \beta_2*PROFIT + \beta_3* BETA + \beta_4* AUDIT + \beta_5*COMMIT + \beta_6*NONEXEC + \beta_7*LEADER + \varepsilon$$

The dependent variable is the natural logarithm of the risk disclosure score. Table 8 presents the results of the OLS regression where industry has been controlled for [10]. The results show that of the seven variables included in the model, sales, profitability and beta are significantly associated with the risk disclosure index. The relation between the disclosure level and firm size is positive, indicating that firms with a high sales volume are more likely to disclose information about risk items. This finding confirms hypothesis 1 and confirms earlier work of, for instance, Abraham and Cox (2007), Beretta and Bozzolan (2004), Deumes and Knechel (2008) and Linsley and Shrives (2006a). The relation between the disclosure level and profitability is negative. To our knowledge, this is the first paper to find this relation to be significant. The negative relation suggests that the management of low profitability firms experiences increased pressure to disclose information on the risk factors the firm faces. Alternatively, increased risk disclosure may reflect enhanced understanding of the factors (negatively) affecting performance. This finding is in line with the negative relation between profitability and risk disclosure documented by Barako *et al.* (2006) and Deumes and Knechel (2008). In the latter studies, however, the relation was insignificant. The relation between the disclosure level and the beta factor is positive, indicating that the management of firms with a relatively high level of systematic risk is aware of the high risk level and feels the need to disclose information about the risk driving factors. This finding confirms hypothesis 3 and confirms earlier work of, for instance, Deumes (2008) and Abraham *et al.* (2007). The other variables turn out to be insignificant. In particular, the variable COMMIT, which was significantly positively associated with the risk disclosure index in the univariate analysis (5% level) becomes insignificant when considered in the multivariate analysis. This suggests that, taking into account the high positive correlation between the presence of a risk committee and size, the significant result in the univariate analysis is a mere size effect.

Table 8 OLS regression that relates disclosure level to company characteristics

N=46	Unstandardized Coefficients		t-statistic	p-value	Collinearity Statistics	
	β	Std. Error			Tolerance	VIF
(Constant)	2,664	,649	4,104	,000***		
LNSALES	,144	,069	2,102	,042**	,627	1,596
PROFIT	-,026	,011	-2,477	,018**	,842	1,188
BETA	,469	,259	1,808	,079*	,698	1,432
AUDIT	,078	,295	,265	,792	,741	1,349
COMMIT	,539	,341	1,584	,122	,741	1,349
NONEXEC	,002	,006	0.295	,770	,758	1,320
LEADER	,142	0,281	0,505	,617	,930	1,075
	Sum of Squares	df	F	Sig.	R	R^2 adj
Regression	10,640	8	3,470	,004***	,655	,305
Residual	14,182	37				

| Total | 24,822 | 45 |

Notes:
a) LNRDSCORE is the natural logarithm of the risk disclosure score which measures the total number of sentences dedicated to varying risk issues. LNSALES is the natural logarithm of the sales level. Firm profitability of a company (PROFIT) is measured as return on assets, which is defined as the ratio of net profit to book value of total assets. The variable BETA is measured using the market model based on the capital asset pricing model. The beta is calculated using sixty monthly estimates from the period 2002 to 2006. Audit quality (AUDIT) is measured through a dummy variable which equals one if the company is audited by a big-4 auditor and zero otherwise. The existence of a risk committee or a risk manager (COMMIT) is measured through a dummy variable which equals one if the company has a risk committee and/or a risk manager and zero otherwise. The proportion of non-executive directors (NONEXEC) is measured by the ratio of the number of non-executive directors to the board size. The leadership structure of a company (LEADER) is examined through a dummy variable, which equals one if the company has a dual leadership structure, and zero otherwise.
b) A dummy variable (IND) is created, which equals one if the company operates in a high-risk industry (telecommunication, information technology or biotechnology), and zero if it does not.
c) *** indicates significance at the 0.01 level; ** indicates significance at the 0.05 level, * indicates significance at the 0.10 level.

The high R squared adjusted indicates that nearly 31% of the variance in total risk disclosure can be explained by the regression model. Moreover, the high overall significance level indicated by the F-statistic confirms that the explained variance cannot be attributed to sheer chance.

5. Conclusions, limitations and recommendations for further research

This study examines the extent of risk disclosure in annual reports of Belgian listed firms and studies the firm and corporate governance characteristics that facilitate risk disclosure by management. The data used are obtained from a sample of 46 annual reports of Belgian listed companies. To obtain a risk disclosure score for each company in the sample, a content analysis of the annual reports of 2006 is performed. This risk disclosure score is used to examine the company and corporate governance characteristics that drive disclosure decisions.

The coefficient on company size is positive and significant, confirming the hypothesis that larger companies disclose more risk information. This confirms earlier findings of Beretta and Bozzolan (2004), Mohobbot (2005), Linsley and Shrives (2006a) and Abraham and Cox (2007) for Italian, Japanese and British companies' risk disclosure practices. The hypothesized negative association between profitability and risk disclosure score is also confirmed. To our knowledge, this is the first time that this relation is significantly demonstrated. It suggests that management of firms with relatively low profitability may experience increased pressure to examine and disclose risk factors affecting firm performance. The beta factor has a positive significant relationship with the extent of risk disclosure. This result confirms earlier work of Abraham and Cox (2007), but is evidence contrary to the results of Linsley and Shrives (2006a) and Deumes (2008) which show no significant relationship. It suggests that management feels the need to disclose more about the risk driving factors when systematic risk is high.

This study also considers the impact of some corporate governance variables, some of which have not been studied before. On the basis of the multivariate regression, it appears that none of the corporate governance characteristics facilitates risk disclosure decisions. The multivariate results suggest that the positive relationship between the existence of a risk committee and the extent of risk disclosure in the univariate analysis is a mere size effect.

The research method of this study has some limitations due to the employment of content analysis. First, subjectivity can not completely be eliminated from content analysis, especially not with only one coder. Second, the sentence-based approach has limitations since it just measures the quantity, not the quality, of the risk disclosures. To minimize the subjectivity effect, detailed decision rules and procedures for coding were followed. As the various risk categories did sometimes overlap, the use of the separate risk disclosure scores (financial, operational, legal and business) is reduced to a minimum. The hypotheses were nearly all tested using the total risk disclosure score. Another limitation of this study is that it only focuses on what type of risk disclosures the annual reports contain, not why they are disclosed.

There is considerable scope for further research into risk disclosure. International studies may be informative about cross-country differences in risk disclosure practices. The impact of cross-listing on risk disclosure decisions can be an interesting research topic as well. Additional research on the determinants of risk disclosure may consider the composition and the financial knowledge of the Audit Committee. Examining the evolution of risk disclosure in Belgium in the last years and analysing the impact of corporate governance reforms on risk disclosure practices can lead to valuable insights on the overall process of risk reporting. Due to the present lack of understanding, further research is needed to examine possible links between risk disclosure and the cost of capital.

Appendix 1: annual reports available on corporate websites, final sample

Ackermans VH	www.avh.be	Immobel	www.immobel.be
Agfa Gevaert	www.agfa.com	Inbev	www.inbev.com
Artwork	www.artwork.com	Innogenetics	www.innogenetics.com
Atenor Group	www.atenor.com	Lotus Bakeries	www.lotusbakeries.com
Barco	www.barco.com	Melexis	www.melexis.com
Bekaert	www.bekaert.com	Mobistar	www.mobistar.be
Belgacom	www.belgacom.be	Omega Pharma	www.omega-pharma.be
CFE	www. cfe.be	Option	www.option.com
CMB	www.cmb.be	Punch International	www.punchinternational.com
Colruyt	www.colruyt.be		
Cumerio	www.cumerio.com	Real Software	www.realsoftware.be
Deceuninck	www.deceuninck.com	Recticel	www.recticel.com
Delhaize	www.delhaizegroup.com	Roularta	www.roularta.be
Dieteren	www.dieteren.be	RTL Group	www.rtlgroup.com
Distrigaz	www.distrigas.be	Sioen	www.sioen.be
Duvel Moortgat	www.duvel.be	Sipef	www.sipef.be
Econocom	www.econocom.com	Solvay	www.solvay.com
Elia	www.elia.be	Suez	www.suez.com
Euronav	www.euronav.be	Telenet	www.telenet.be
EVS Broadcast	www.evs-global.com	Tessenderlo	www.tessenderlo.com
Exmar	www.exmar.be	UCB	www.ucb-group.com
Hamon	www.hamon.com	Umicore	www.umicore.com
Icos Vision	www.icos.be	Van De Velde	www.mariejo.com
		VPK Packaging	www.vpk.be

Appendix 2: Risk disclosure categories

Risk category	Subcategory
Financial Risk	interest rate risk equity price risk foreign exchange risk commodity price risk credit risk and credit rating risk pension plan risk liquidity risk
Operational Risk	failing of internal processes faling of people; human error risk failing of systems; information infrastructure and technology risk information access and availability risk fraud risk environmental risk internal control weaknesses product liablility safety and health risks related to social actions human resources issues
Legal, Tax and Regulatory Risk	lawsuits, litigation change in tax law change in legislation changes in political environment
Business Risk	demand selling price producing cost competition inventory restructuring strategic risk investments risk of losing market share unpredictable economic cycles product life cycles substitution risk reputation risk

Appendix 3: Decision rules for coding

- *A broad definition of risk has to be adopted in order to identify risk disclosures.* This indicates that the word 'risk' does not have to be included in the sentence. Sentences are to be coded as risk disclosures if they inform the reader about any opportunity, prospect, danger, harm, hazard, exposure or threat. The management of any such risk has to be coded as a risk disclosure as well.

- *Disclosures must be specifically stated.* Risk disclosures have to be mentioned explicitly; they can not be implied.

- *A sentence can be only accounted for more than once,* if this sentence has more than one possible classification.

- *Quantitative risk-related items in the financial statements will not be examined.* This is done from a practical point of view, because of the limited time available for the study. The notes to the financial statements on the other hand, will be accounted for.

- *A repeated risk disclosure shall be recorded as a risk disclosure each time it is discussed.* This implies that the same risk disclosure can be coded more than once, because each time it is mentioned it draws the attention of the reader.

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[1] American Institute of Certified Public Accountants

[2] Institute of Chartered Accountants in England and Wales

[3] Financial Reporting Council

[4] For a profound discussion about Knight's theory and the history of risk, see *Against the Gods, the remarkable story of risk* (1996) of P.L. Bernstein.

[5] Large Caps are companies with a market capitalisation of at least €1 billion

[6] Mid Caps are companies with a market capitalisation between €150 million and €1 billion

[7] www.euronext.com

[8] KBC Securities stock recommendations, 09/01/2008, available on www.kbcsecurities.com

[9] Big Four auditors are Deloitte, Ernst&Young, KPMG and PriceWaterhouseCoopers

[10] A dummy variable (IND) is created, which equals one if the company operates in a high-risk industry (telecommunication, information technology or biotechnology), and zero if it does not.