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Risk disclosure in listed Greek companies: the effects of the financial crisis

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Abstract

Purpose – The purpose of this study is to investigate risk disclosure in listed Greek companies. The effects of the financial crisis were also considered.

Design/methodology/approach – This study aimed to determine the risk-reporting practices of Greek's non-financial companies listed on the Athens Stock Exchange through a content analysis of their annual reports.

Findings – Risk identification and anticipation protect businesses and create shareholder value. In recent years, particularly since the economic crisis, risk has become one of the most important business issues. This study concluded that during the crisis, there was an increase in disclosure. Financial, personnel and legal risks were the most reported types of risk. This study also found liquidity to be a very important issue.

Research limitations/implications – Content analysis has limitations because subjectivity cannot be eliminated. This study measured only the quantity, not the quality, of risk disclosure. The quality of risk reporting will be examined in future research.

Originality/value – This is the first study on risk disclosure in the non-financial companies listed on the Athens Stock Exchange to conduct a content analysis of the corporate annual reports.

Keywords Risk management, Content analysis, Risk, Risk disclosures

Paper type Research paper

1. Introduction

Risk management is one of the major issues faced by a company. Growth and viability are heavily dependent on effective risk management. Risk identification and management involve protecting the business and generating value for the owners, shareholders, employees, customers, regulators and society as a whole. Recently, several large companies, such as Enron, Parmalat and WorldCom, collapsed because of irregularities and fraud. These failures had a significant effect on the global economy and negative consequences for

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those directly or indirectly related to the companies. The failures were attributed to the inability of the boards of directors (boards) to accurately assess risk and potential problems.

The recent financial crisis has given rise to the following question: Did companies warn investors about the dangers before the economic crisis, or was the crisis a surprise? Because of the various financial and accounting scandals, shareholders have come to question the quality of corporate reports. They believe that companies have failed to disclose and to manage risk appropriately. They have found corporate risk reporting to be inadequate for decision-making. Consequently, many investors have lost confidence in these reports. Companies' unwillingness to disclose risk information has led to a significant risk information gap (Linsley and Shrives, 2006). To reduce risk and uncertainty, companies are under pressure to disclose more information to the market (Courtis, 2000). One approach could be to improve the disclosure of information related to risk and the activities implemented to manage it.

There are several risk management frameworks. Each describes and applies a specific approach to risk and opportunity identification, analysis, treatment, disclosure and monitoring in the internal and external environments in which the enterprise operates. Dobler (2008) identified the influence of corporate risk management on risk reporting adoption:

- Risk management provides information for external risk reporting.
- Risk reports can facilitate risk management, thereby influencing the use of alternative reporting approaches that are based on the possible reactions of the users of financial statements.

Dobler's second point, the focus of the present study, concerns the disclosure of a greater amount of information on risk and its management in annual reports.

The seven main sections in this paper focus on risk detection, management and communication in businesses.

2. Literature review and theoretical framework

2.1 Risk management categories

Risk can be defined as the probability of the occurrence of an event and its consequences. Risk could occur in all aspects of a business and daily life. It can be characterised as basic or not basic or even important or unimportant based on size and type of risk.

Manes Rossi *et al.* (2017) examined integrated reporting and risk disclosure to determine the relationship between risk and business strategy. Companies generally report most of their financial risk. In situations in which business performance is still influenced by the financial crisis, companies have made extensive references to financial and other types of risk (e.g. operational, strategic, environmental and business) that are very important to the users and readers of annual reports and financial statements.

In addition to financial, business and operational risk management, which has been frequently analysed (Linsmeir *et al.*, 2002), strategic, technology, regulatory and political risk management is also crucial to the success of a business. Crouhy *et al.* (2006) identified eight risk categories: market, credit, liquidity, operational, legal and regulatory, business, strategic and reputation. The first three can be characterised as financial risk. Crouhy *et al.* (2006) presented three categories of operational risk: technology, fraud and the human factor. Another risk model was used by the Institute of Chartered Accountants in England and Wales ([ICAEW] 1998), Kajüter (2001), Linsley and Shrives (2006) and Amran *et al.* (2009). This model places risk into two categories: external (wider environment) and internal

(financial and non-financial). Financial risk has a direct effect on a company's assets and liabilities. All other risk is non-financial: indirect financial risk.

There are many views on and descriptions of risk management; however, there is no specific definition. What is important is the benefits that accrue to the company that manages risk appropriately. Each organisation must analyse all types of risk, i.e. risks related to goals and current or future activities. Each organisation faces risks resulting from external and/or internal factors. Thus, appropriate risk identification and management will protect organisations and their shareholders.

In the 1980s, risk management became essential; however, the regulatory framework failed to prevent the financial crisis that began in 2007 (Dionne, 2013). Even the boards did not manage risk appropriately. According to Pirson and Turnbull (2011), the corporate boards did not receive relevant information about the risk posed by management. Board members were unable to process this risk information and had no incentives or authority to influence management decision-making.

Developed and developing countries pay particular attention to risk prevention and scheduling. The goal is to acquire the capability to ensure adequate performance and high levels of protection against market uncertainty and risk, as well as to create the appropriate conditions for effective risk management.

2.2 Risk identification

Among the basic risk identification techniques are the exchange of ideas and questionnaires. The risk identification approach must be designed to ensure that current or future major business activities (e.g. financial, operational and strategic) are identified and the appropriate plans are implemented. Thus, risks should be recognised promptly so that they can be effectively managed.

An organisation has a responsibility to identify current or future risk. This requires an in-depth knowledge of the organisation itself, the market and the legal, social, political and cultural environment in which it operates. Equally important is the early identification of threats and opportunities related to the achievement of organisational objectives. Knowledge is a key factor in risk recognition. It can help employees to be more productive (Najafi and Afrazeh, 2011). Increasing employee productivity by developing and enhancing knowledge is one of the most important challenges for companies.

Currently, within the crisis framework, risk recognition, categorisation and evaluation are even more urgent. Risk evaluation can be quantitative or qualitative. Risk can be categorised as high, medium or low according to the likelihood of the occurrence of events and the possible consequences for the company. Risk assessment criteria and techniques are based on the organisation and its priorities.

In recent years, the need for effective risk management, internal controls and transparent risk reporting has been a dominant business theme and an important corporate governance principle (Vandemaele *et al.*, 2009). Nerantzidis and Tsamis (2017) explored the determinants of corporate governance disclosure. They asserted that companies listed on the Athens Stock Exchange disclosed corporate governance information to be considered legitimate. The American Institute of Certified Public Accountants (AICPA) (1987) reported that shareholders were increasingly demanding that financial statements include more information about risk and uncertainty. Abraham and Cox (2007) argued that this information could help investors assess a company's risk profile and market value.

Risk disclosure is commonly accepted as being beneficial to businesses. It does not limit the information between executives and shareholders, and it can increase shareholder confidence. It can reduce the estimated risk because the discovery of a very significant risk

improves assessments of future performance. Thus, risk disclosure can reduce the probability of bankruptcy (Solomon *et al.*, 2000).

Linsley and Shrives (2006) examined risk disclosure in the annual reports of 79 non-financial (Financial Times Stock Exchange 100) companies in the UK. They considered six risk factors: financial, operational, information and technology processing, integrity, empowerment and strategic. They also identified three risk categories: advantages–disadvantages, financial–non-financial and past–future. Beretta and Bozzolan (2004) examined the annual reports of 85 companies listed on the Italian Stock Exchange. They found that the companies tended to disclose information on past and present rather than future risk.

Mocanu *et al.* (2019) focussed on operational risk disclosure. The main sources of data for this study were the fiscal year 2017 annual reports published on official company websites. Annual reports are an important tool for providing information on company's viability. Thus, regarding risk disclosure in these reports, quality is more important and valuable than quantity (Esendemirli, 2014). Abraham and Shrives (2014) developed a model for assessing risk disclosure quality. They applied it to four companies in the food processing industry. They found that the company directors preferred to make symbolic rather than substantive disclosures. Studies have traditionally focussed on disclosure quantity; however, surveys have shown that quality is more important than quantity (Beretta and Bozzolan, 2004; Beck *et al.*, 2010; Hooks and Staden, 2011).

At this point, it would be very helpful to analyse the risk reporting categories. Scott (2003) identified three categories: compulsory, proposed and voluntary disclosure. They found a relationship between the disclosure of risk and the reasons for the disclosure (Dobler, 2008). Not all the information that is required to be disclosed is in accordance with regulatory principles; however, there is no agreement on which information is voluntary and which is not.

In an efficient market, the value of a business must reflect all the available information. Businesses have disclosed and should also be able to voluntarily disclose more information to increase the confidence of stakeholders, especially investors (Vafaei *et al.*, 2011). In a study of disclosure measurement models, Beattie *et al.* (2004) distinguished between subjective and semi-objective models. Subjective evaluations were based on analysts' perceptions and not measurements of instances of factual disclosure. For semi-objective evaluations of voluntary risk disclosure, the two most commonly used methods were text analysis and disclosure indexes.

2.3 Risk disclosure

Risk disclosure is very important. It enables managers to communicate returns and the role of foreign investors (Healy and Palepu, 2001). During the recent financial crisis, shareholders demanded more risk and uncertainty information. Regulatory standards, such as the Generally Accepted Accounting Principles adopted by the US Securities and Exchange Commission (US GAAP) and the International Financial Reporting Standards (IFRS), require that detailed and quantitative risk and uncertainty information be provided. The failure to comply could cause reputational damage and threaten a company's viability and long-term health (Fuller and Jensen, 2002). The present study focussed on the effects of the financial crisis on risk disclosure.

2.3.1 Consequences of the financial crisis. Studies have revealed the shortcomings of financial information, especially regarding risk. Consequently, executives have become increasingly aware of risk and its management, especially during the past decade. Risk-taking is a key factor in the financial services sector. Risk communication, which can positively influence investors' and other stakeholders' decision-making, can be extremely valuable to businesses and contribute to their viability (Sundmacher, 2006). Cullinan *et al.* (2016) concluded that the boards of listed companies were guided by corporate governance

best practices to ensure that their decisions would protect the shareholders and all other stakeholders.

The globalisation of markets and the onset of the financial crisis resulted in an unprecedented rate of business failure, thereby contributing to the need for improved corporate governance and risk reporting. Over the past decade, most economies around the world have been re-examining their corporate governance and risk disclosure processes.

2.3.2 Accounting standards. In accordance with the internationally recognised accounting standards (IAS, Germany's accounting standards [GAS], US GAAP), companies are required to report all risk and the possible consequences.

The IAS recommends that a financial management overview, in addition to financial statements, be provided to explain the key features of a company's financial performance and position and to disclose uncertainty. IAS 1.8 and GAS 5 both require the disclosure of risk and risk mitigation and management policies. The US GAAP has equally important risk disclosure requirements [1].

IFRS 7 comprises two sections. The first section covers quantitative disclosure related to balance sheets and income statements. The second deals with risk disclosure. The risk disclosure arising from financial instruments is presented "through the eyes of management". It should reflect these executives' perceptions, assessments and management of risk. IFRS 7 addresses the need for management to disclose the reporting entity's policies and risk acceptance, measurement, monitoring and control processes. It requires management to disclose the effects on profits and losses.

3. Research approach, objectives and hypotheses

The purpose of this study was to investigate risk disclosure by companies listed on the Athens Stock Exchange by conducting a content analysis of their annual reports. The focus was the businesses' risk identification, assessment, disclosure and management practices. The hypotheses are presented below.

3.1 Disclosure of financial and non-financial risk

To improve the quality of their reporting, companies should quantify their risk exposure, i.e. communicate the financial value where possible (Linsley and Shrives, 2006; Beretta and Bozzolan, 2004), to enable the reader to evaluate the potential effect on the company. Kadous *et al.* (2005) asserted that risk information should clearly state the value at risk.

H1. There would be a relationship between the volume of financial risk disclosure and the volume of non-financial risk disclosure.

3.2 Risk disclosure through the years

The year for which the annual report is issued seems to be a very important factor in risk disclosure. In recent years, especially since the financial crisis, studies have found that risk reporting has assumed greater importance.

H2. There would be a relationship between the risk disclosure volume of recent years and that of the earlier years.

3.3 Risk disclosure and company size

Company size is a very important factor in risk disclosure. Larger companies are motivated to provide more information because of their higher dependence on shareholders. In a study

of UK companies, Beattie *et al.* (2004) concluded that there was a positive relationship between company size and reported risk. In a study of 72 UK companies, Elzahar and Hussainey (2012) concluded that large companies were likely to disclose more risk information. A similar relationship was found by Elshandidy *et al.* (2013).

H3. Risk disclosure volume would be influenced by company size.

3.4 Risk level and disclosure

Companies with high levels of risk should disclose a greater amount of information to explain the causes. In addition, detailed risk management plans must be provided. Therefore, there should be a positive relationship between risk level and risk disclosure. The difficulty with this argument is that companies with higher levels of risk tend not to focus on risk and might therefore be reluctant to disclose the pertinent voluntary information. Most studies have not found a significant relationship between risk level and risk disclosure volume (Ahmed and Courtis, 1999). Hossain *et al.* (1995) did not find any correlation; however, Malone *et al.* (1993) found a positive relationship.

H4. Risk volume would be influenced by risk level.

3.5 Risk disclosure and liquidity

There is a strong relationship between the 2007 crisis and liquidity issues. According to Cabedo and Tirado (2004), a liquidity risk is created when a company is unable to pay its liabilities. Elshandidy *et al.* (2013) found that companies with high liquidity levels provided more risk information as a positive signal to investors. In contrast, Mangena and Pike (2005) found no statistically significant correlation between disclosure and liquidity.

H5. There would be a relationship between liquidity and risk disclosure.

4. Methods

Annual reports are generally considered to be the most important source of corporate information. Managers consider them crucial for communicating company performance (Bowman, 1984). There are many approaches to analysing annual report data. Beattie *et al.* (2004) identified two major approaches: subjective (analyst ratings) and semi-objective (publication index analysis, content analysis, readability studies and linguistic analysis).

One of the main approaches is content analysis (Beretta and Bozzolan, 2004; Linsley and Shrives, 2006; Abraham and Cox, 2007), which is a method of coding text into categories on the basis of specific criteria (Milne and Adler, 1999). Krippendorff (2004) defined content analysis as technical research to produce valid conclusions. The classification process thus needs to be reliable so that valid conclusions can be drawn (Beattie *et al.*, 2004). In a content analysis of the 2012–2015 annual reports of 45 firms, Kakanda *et al.* (2017) found significant amounts of disclosure about risk management practices: risk-management committee structures, responsibilities and policies; and audit committee availability.

Ibrahim *et al.* (2019) conducted manual content analysis to determine the influence of corporate governance on risk disclosure levels in Saudi Arabia. They examined 408 listed Saudi non-financial firms' 2012–2015 annual reports. The results indicated that the chief executive officer (CEO), audit committee effectiveness, state ownership and firm size, complexity and profitability positively

affected risk disclosure. However, there were no significant correlations for board independence, institutional ownership, auditor type, leverage and firm age.

The empirical model involved the estimation of Pearson correlation coefficients and the following linear equation:

$$\text{Risk Disclosure} = b0 + b1 * \text{Leverage} + b2 * \text{Size} + b3 * \text{Efficiency} + b4 * \text{Profitability} + b5 * \text{Liquidity} + b6 * \text{Corporate Governance} + e \quad (1)$$

Where leverage was estimated by the debt-to-equity ratio. To measure company size revenue was selected. Efficiency was estimated by return on equity. As a measure of profitability, the gross profit margin (sales minus cost of goods sold to sales) was applied. To measure liquidity, the general liquidity ratio (current assets to current liabilities) was applied. Board composition (corporate governance) was captured by the percentage of non-executive members to the total number of members.

Milne and Adler (1999) asserted that reliability relates to coding errors rather than measurement errors. There are many coding and measurement unit options, such as words or sentences (Linsley and Shrives, 2006).

De Luca and Phan (2019) investigated the risk disclosure practices of large listed Italian firms. They found inter-relationships among industry, risk type, risk management and risk disclosure levels. The present study identified the following types of risk disclosure: environmental, socio-political, economic, business, legal, tax, regulatory, strategic, personnel, technology, financial, operational and business. For each, there were several subcategories that were analysed and presented aggregately (Table 1). The content analysis addressed these types of risk disclosure. For each company and sector, risk reporting measures were generated on the basis of the published risk.

The purpose of decision-making rules is to improve coding consistency. The most important rules underlying the coding decisions are listed below:

- A broad definition of risk needs to be established to identify risk disclosure in the sample of annual business reports; thus, the word “risk” need not be included in the sentence. Proposals should be coded as risk disclosure in the event that they provide information on opportunities, prospects, risks, harm, threats or exposure. The management of these types of risk should also be classified as risk disclosure.
- The risk disclosure instance should be an explicit statement of the risk.
- A sentence can be counted more than once if more than one classification is possible.
- Repeated instances of risk disclosure in an annual business report will not be recorded each time the report is discussed or reported. Thus, the same instance of risk disclosure will be coded only once and not upon each reference.

4.1 Sample selection

The study sample was non-financial corporations (total of 226) listed on the Athens Stock Exchange from 2005 to 2011. This period is significant because it includes the first years of the financial and debt crisis in Greece. The companies were chosen on the basis of business

Environmental risks	**Political and social-economic risks**
•Environmental risks •Environmental incidents •Environmental destruction/war •Natural disaster •Environmental laws and regulations •Extreme weather – climatic conditions	•Political environment •State, hegemonic and political risks •Financial risks •Changes in the political environment •Socio-economic trends •Political developments •Changes to regulation/regulatory requirements
Business environment and market risks	**Legal, tax and regulatory risks**
•Market trends and risks •Market attractiveness and competition •Size and value of competition •Competitive advantages and competitor actions •Supply risks, important – key suppliers •Developing good relationships with suppliers •Loss of important customers •New alliances and joint ventures •Industrial and commercial risks	•Legal obligations •Changes in regulations, taxation •Legal risks •Tax risks •Tax audit risks •Legal environment •Change in legislation •Actions, revenge •Change in tax law •Regulatory risks
Strategic business risks	**Staff and Integrity Risks**
•Key strategic risk statements and assumptions •Outcome of business strategy •Corporate strategy consistency •Activity sector, business sector •Corporate strategy consistency •Strategic goals •Business structure •Critical success factors •Business performance •Investing in other businesses •Capital expenses •Business status •Information Management •Business portfolio •Competitors •Pricing •Valuation •Design •Shelf life of the products •Performance measurement •Investor relations	•Human resources issues •Recruitment of employees •Staff development •Variation of staff •Key persons •Loss of important employees and executives •Failure of people •Employee management •Risk of human error •Risk of fraud •Illegal actions •Employee ethics •Staff productivity •Workplace safety of employees •Workplace accidents •Integrity •Ethics
Risks of IT, technology and information processing	**Business risks**
•Data security •Availability (risk of damage/loss of data) •Natural disaster •Accidents, fire •Failure of systems, information infrastructure and technology risks •IT availability •Integrity •Access	•Demand risks •Selling price risks •Production cost •Competition •Inventory •Restructuring •Investments •Risk of losing market share •Unforeseen financial cycle

Table 1.
Categories and subcategories of risk

(*continued*)

•Infrastructure	•Risk of product replacement, production
•Rapid technological change	•Reputation risk
Operational risks	**Financial risks**
•Business technical risks	•Liquidity risk
•Project risks	•Currency risk
•Product liability	•Interest rates
•Safety and health risks	•Financial stability
•Risks associated with social actions	•Business portfolio risk
•Customer satisfaction	•Percentage of shareholding
•Product development	•Portfolio security and risks
•Liability for defective products	•Securities/prices
•Effectiveness and efficiency	•Derivatives
•Source, origin	•Potential losses on the capital markets
•Depreciation and inventory shrinkage	•Credit risk
•Failure of products and services	•Credit risk assessment
•Trademark corrosion	•Risk of default
•Damage to plants and equipment (exogenously affected)	•Customer insolvency
•Health and safety risks	•Risk of bankruptcy
•Accidents	•Investment and financial risks
•Human error	•Risk of goods prices
•Insufficient resources and stocks	•Danger of goods
•Low-quality reserves	•Risk of pension plan
•High-quality natural resources	

Table 1.

sector and Athens Stock Exchange classifications. Financial corporations were not included because they have to be studied independently given the regulatory framework under which they operate. Table 2 provides information about the companies by sector (14 sectors). For the 226 companies, 1,543 annual reports provided the data for reaching a robust conclusion. In total, 39 annual reports (2.5% of the total sample) were not available.

5. Statistical analysis

Table 3 presents the instances of risk reporting by category in the sample companies' annual reports. A total of 25,885 instances of risk were identified. The three most frequently occurring risk categories for 2005 to 2011 were:

(1) financial (11,111);

(2) personnel and integrity (3,648); and

(3) legal, tax and regulatory (3,145).

This represented 69% of the total instances of reported risk. There were a few references to technology and environmental risk; however, the focus was financial risk.

Table 3 also presents the frequencies for the types of risk by year. The table demonstrates that there was a significant increase from 2005 to 2009; however, the number of instances was consistent in the past two years (2010–2011). It is noteworthy that the largest percentage increases in the instances of risk reporting between 2005 and 2011 were in the following categories:

- IT, technology and information processing (818%);
- socio-political and economic (736%); and
- personnel and integrity (455%).

Table 2.
Number of companies by sector

A/A	Sector	No. of companies	(%)
1	Oil and gas	3	1.3
2	Chemically	9	4.0
3	Raw materials	17	7.5
4	Construction and construction materials	28	12.4
5	Industrial products and services	28	12.4
6	Food and beverage	28	12.4
7	Personal and household goods	40	17.7
8	Health	9	4.0
9	Trade	11	4.9
10	Media	12	5.3
11	Travel and leisure	15	6.6
12	Telecommunications	2	0.9
13	Public utilities	4	1.8
14	Technology	20	8.8
	Total	226	–

Table 3.
Number of risks per category and year of publication

Categories of risk	2005	2006	2007	2008	2009	2010	2011	Total no. of risks	(%)
Environmental risks	49	72	91	121	129	148	152	762	2.9
Political and social-economic risks	42	51	72	282	318	343	351	1.459	5.6
Business environment and market risks	107	120	128	122	137	153	142	909	3.5
Legal, tax and regulatory risks	406	441	459	454	463	471	451	3.145	12.1
Strategic business risks	119	134	150	147	171	202	201	1.124	4.3
Staff and integrity risks	108	535	603	588	603	612	599	3.648	14.1
Risks of IT, technology and information processing	17	17	22	14	21	130	156	377	1.5
Financial risks	1.144	1.391	1.645	1.755	1.760	1.723	1.693	11.111	42.9
Operational risks	88	120	132	173	205	216	227	1.161	4.5
Business risks	208	243	291	338	356	378	375	2.189	8.5
Total	2.288	3.124	3.593	3.994	4.163	4.376	4.347	25.885	
(%)	8.8	12.1	13.9	15.4	16.1	16.9	16.8	100	

In contrast, the smallest percentage increases in risk reporting between 2005 and 2011 were consistent across the following categories:

- legal, tax and regulatory (11%);
- business environment and market (33%); and
- financial (48%).

Table 3 and Figure 1 indicate that the biggest increase in instances of risk reporting between 2005 and 2011 was in the following categories:

- financial (+549);
- personnel and integrity (+491); and
- socio-political and economic (+309).

Smaller increases were observed in the following risk categories:

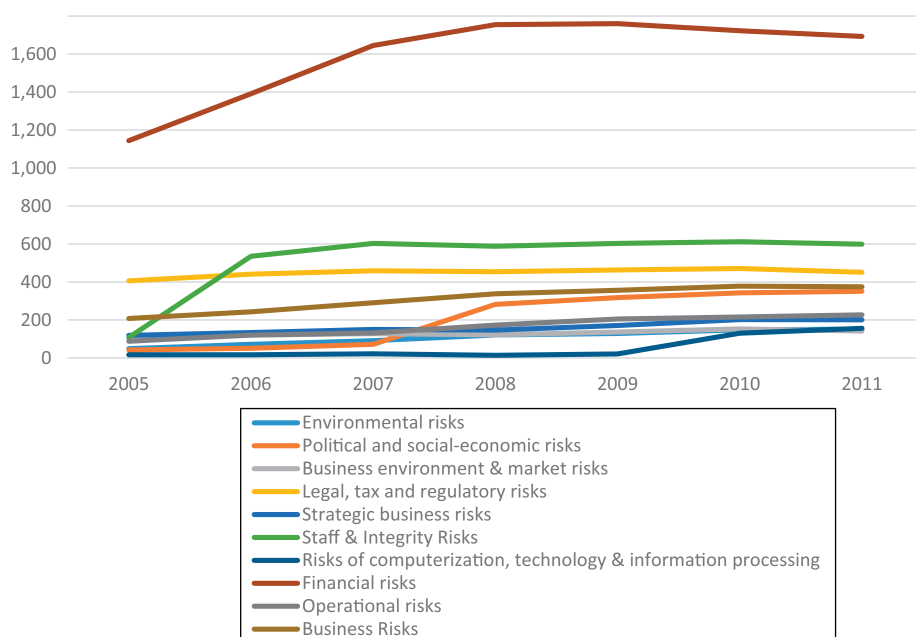

Figure 1. Number of risks per category and year of publication

- business environment and market (+35);
- legal, tax and regulatory (+45); and
- strategic (+82).

Table 4 shows that the number of instances of other types of reported non-financial risk was higher than the total number of instances of financial risk. The only year in which financial risk represented 50% of the total instances of reported risk was 2005. Therefore, *H1* (Section 3) was supported. The same table presents the instances of risk reporting for each year. The data in Table 4 also support *H2* (Section 3). The risk disclosure volume in recent years would be higher than that in previous years. The number of instances in the past two years was stable. The instances of reported risk in 2008 were 8.8% (2,288) of the total number of instances. The reported instances in the past two years were 16.9% (4,376 instances) and 16.8% (4,347 instances) of the total number.

Financial and non-financial risks	2005	2006	2007	2008	2009	2010	2011	Total
Financial risk	1.144	1.391	1.645	1.755	1.760	1.723	1.693	11.111
All other categories of risk	1,144	1,733	1948	2,239	2,403	2,653	2,654	14,774
Other risk categories % in total	50	55	54	56	58	61	61	57
Total number of notified risks	2.288	3.124	3.593	3.994	4.163	4.376	4.347	25.885
% of the total	8.8	12.1	13.9	15.4	16.1	16.9	16.8	100

Table 4. Number of financial and non-financial risks per year of publication

Figure 2 illustrates the relationship between the instances of reported risk and the number of annual reports. The maximum value for this relationship (disclosed risk and annual reports) was determined: 14 instances and 123 annual reports.

Table 5 presents the annual reports that did not include risk information. The instances of disclosure in the risk categories were as follows: environmental, 66.8%; socio-political and economic, 42.1%; business and market, 58.7%; legal, tax and regulatory, 0.8%; strategic, 50.7%; personnel and integrity, 11.1%; IT, technology and information processing, 83.2%; financial, 0.3%; operational, 54.4%; and business, 21.8%. There were no annual reports that did not disclose at least one of the above ten business risk categories.

6. Results

The calculated values and the subsequent analysis of the empirical results were based on the sum of the instances of risk disclosure by year and category. For each annual report, "1" indicated that at least one instance of risk was disclosed in a specific category and year; "0" indicated that no risk was reported.

Table 6 presents the tabulated statistics for the dependent variables for the ten risk disclosure categories in this annual report sample. The results are listed below:

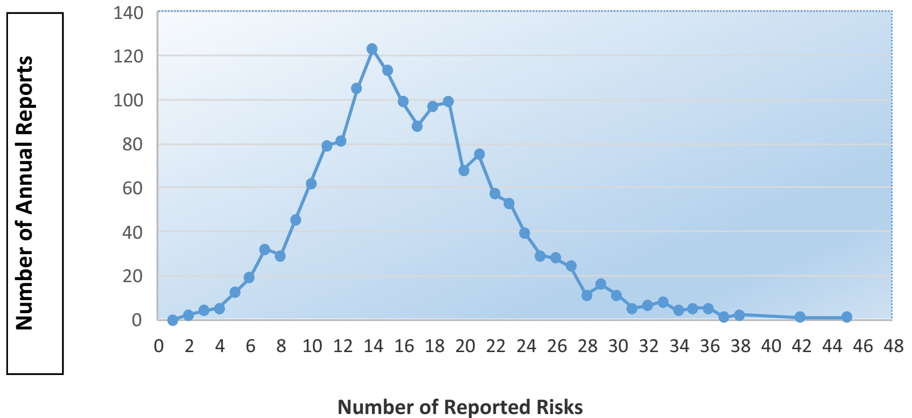

Figure 2. Number of risks reported

Table 5. Annual reports with non-reported risk

Categories	% of total sample (No. 1,543)
Environmental risks	66,8
Political and social-economic risks	42,1
Business environment and market risks	58,7
Legal, tax and regulatory risks	0,8
Strategic business risks	50,7
Staff and integrity risks	11,1
Risks of IT, technology and information processing	83,2
Financial risks	0,3
Operational risks	54,4
Business risks	21,8

Dependent variables	No	Minimum	Maximum	Mean (%)	SD (%)	Median
RENV	1,543	0	1	33.18	47.10	0
RPOL	1,543	0	1	57.94	49.38	1
RMAR	1,543	0	1	41.28	49.25	0
RLEG	1,543	0	1	99.22	8.79	1
RSTR	1,543	0	1	49.25	50.01	0
RSTA	1,543	0	1	88.85	31.48	1
RCOM	1,543	0	1	16.79	37.39	0
RFIN	1,543	0	1	99.68	5.69	1
ROPE	1,543	0	1	45.63	49.82	0
RBUS	1,543	0	1	78.16	41.33	1

Notes: RENV: number of environmental risks; RPOL: number of political and social-economic risks; RMAR: number of business environment and market risks; RLEG: number of legal, tax and regulatory risks; RSTR: number of strategic business risks; RSTA: number of staff and integrity risks; RCOM: number of IT, technology and information processing risks; RFIN: number of financial risks; ROPE: number of operational risks; and RBUS: number of business risks

Table 6.
Descriptive statistics: dependent variables

- The total number of instances of disclosed risk by category was 9,412.
- The variation in the number of instances of reported risk was relatively small. The minimum number of instances was "0", and the maximum was "1". The reason was that every reported risk was marked "1"regardless of the number of times it occurred in a specific category or year. A value of 0 indicated the absence of risk disclosure. For each risk category, the minimum value, 0, indicated that at least one company did not disclose any information related to these categories. In contrast, the maximum value, 1, was an indication of the disclosure of at least one type of risk.
- The highest standard deviations in terms of risk were for the strategic (50.01%), operating (49.82%), socio-political (49.38%), business and market (49.25%) and environmental (47.10%) categories.
- The four risk categories with the highest instances of disclosure were financial (1,538), legal (1,531), tax and regulatory (1,371) and personnel and business (1,206). There were fewer instances of IT, environmental, business and market and operational risk disclosure in the annual reports.

Table 7 presents the statistics for the independent variables in the 1,543 annual reports. The following significant conclusions were drawn:

- For leverage, the minimum value was −34.79, the maximum was 78.64, and the mean (average) was 2.16. The standard deviation, 5.40, implied that high deviations were observed.
- For sales, the minimum value was €0, the maximum was €10,130,983, and the mean (average) was €324,904.
- Efficiency (return on investment) had a minimum value of −43.41%, a maximum of 11.33% and an average of −0.09%. The standard deviation, 1.49%, was an indication of substantial volatility.
- For the gross profit margin (profitability), the minimum rate was −238%, the maximum was 93%, and the mean was 22%.

- For general liquidity, the minimum value was 0.00, the maximum was 173.73, and the mean (average) was 2.04. The standard deviation, 8.26, was an indication of significant variations in liquidity.
- The minimum percentage of non-executive board members was 27.27%, the maximum was 92.31%, and the average was 54.18%. The standard deviation was 15.51%.

Table 8 presents the Pearson correlation coefficients, i.e. the correlations between the dependent and independent variables, as well as their significance levels. Positive and negative relationships were observed. Table 8 shows that the highest positive correlation was between environmental risk and sales (revenue) level (0.139). The highest negative correlations were between efficiency and IT, technology and information processing risk (−0.073). Positive correlations were found in 35 cases, and negative correlations were found in 29. Only two cases had no relationship.

Table 9 presents the ordinary least squares regression estimates regarding the relationship between risk disclosure and firm characteristics. These estimates provided evidence that the coefficients of crisis, sales, efficiency and liquidity were statistically significant. Furthermore, the coefficients of crisis, sales and liquidity variables were positive, and the coefficient of efficiency was negative.

A consequence of the 2007–2009 financial crisis and the subsequent Eurozone debt crisis was that many Greek companies, through their boards, aimed to disclose risk to the

Independent variables	No	Minimum	Maximum	Mean	SD	Median
Leverage	1,543	−34.79	78.64	2.16	5.40	1.44
Size	1,543	0	10,130,983	324,904	1,009,856	60,600
Efficiency %	1,543	−43.41%	11.33%	−0.09.%	1.49%	0.02%
Profitability %	1,543	−238%	93%	22%	21%	21%
Liquidity	1,543	0	173.73	2.04	8.26	1.35
Corporate governance %	1,543	27.27%	92.31%	54.18%	15.51%	50.00%

Notes: Leverage ratio: debt to equity; size: revenue; efficiency: ROE (return on equity); profitability: gross profit margin; liquidity: current assets to short-term liabilities; and corporate governance: percentage of non-executive to total members of board

Table 7.
Descriptive statistics: independent variables

Categories of risk	Size	Efficiency	Profitability	Leverage	Liquidity	Corporate governance
Environmental risks	0.139	0.021	−0.021	0.014	−0.037	0.057
Political and social-economic risks	0.056	−0.052	−0.039	0.037	0.040	0.066
Business environment and market risks	0.044	−0.034	−0.002	0.007	−0.041	−0.046
Legal, tax and regulatory risks	0.021	0.000	0.008	0.000	0.007	−0.012
Strategic business risks	0.059	−0.022	−0.001	0.029	−0.023	−0.031
Staff and integrity risks	0.036	−0.018	−0.022	−0.032	0.013	0.064
Risks of IT, technology and information processing	−0.014	−0.073	0.019	0.037	0.032	0.068
Financial risks	0.014	−0.008	−0.004	0.003	0.003	0.006
Operational risks	0.040	−0.048	0.009	0.029	−0.030	0.021
Business risks	0.055	−0.007	−0.021	−0.003	0.026	−0.036
Total risks	0.099	−0.053	−0.018	0.030	−0.008	0.031

Table 8.
Correlation (Pearson) matrix

shareholders. In addition, shareholders have demanded more risk information. Thus, it could be argued that the financial crisis had a positive effect on risk disclosure. Furthermore, the positive relationship between risk disclosure and liquidity and sales volume indicates that firms with high sales volumes and substantial liquidity were more likely to disclose additional information. In contrast, companies with low efficiency were reluctant to disclose risk, and this created significant problems.

Table 9 also presents the estimated relationship between company size (revenues) and risk disclosure in annual reports. Company size seemed to have a very important influence (*H3*). Large companies that depend on shareholders are motivated to provide additional information. Deumes and Knechel's (2008) sample of Dutch companies found that the managers of large companies disclosed more risk information. Firth (1979) and Beattie *et al.* (2004) reported a positive relationship between company size and risk disclosure. Elzahar and Hussainey (2012), Linsley and Shrives (2006) and Abraham and Cox (2007) found that UK companies disclosed more risk information. Beretta and Bozzolan (2004) concluded that there was a significant relationship between risk and company size in Italy. A similar relationship was revealed by Hossain *et al.* (1995) and Elshandidy *et al.* (2013).

The relationship between risk disclosure and liquidity (general liquidity) was estimated (*H5*). Cabedo and Tirado (2004) found that liquidity risk resulted from a company's inability to meet its obligations. The ICAEW (2005) argued that liquidity risk was one of the most important types of financial risk faced by a firm. In some cases, it could lead to closure. Elshandidy *et al.* (2013) reported that companies with high liquidity disclosed more risk information to satisfy shareholders.

Contrary to Elshandidy *et al.* (2013), the present study found no relationship between risk disclosure and company risk (leverage ratio). Companies with high risk levels should disclose as much information as possible. They should require the CEO and other top managers to provide shareholders with in-depth information about the reasons for the risks and the steps being taken to mitigate the negative effects. Thus, there should be a positive relationship between disclosure and risk level. However, this positive relationship was not observed because of high-risk companies' reluctance to disclose information about the significant levels of risk they face. In surveys of companies, Hossain *et al.* (1995) and Ahmed and Courtis (1999) found no correlation between risk level and disclosure; however, Malone *et al.* (1993) found a positive correlation.

7. Conclusions

Among the most significant problems faced by firms are risk identification, mapping, analysis and management. A company's development and viability depend on its quick

No. of companies 226 total sample 1,543	Unstandardized β Coef β	Coefficients Std. error	*t*-statistic z	*p*-value p > z
Crisis	1.822	0.066	27.52	0.000
Size	1.70e	7.99e	2.13	0.033
Efficiency	−0.097	−0.052	−1.87	0.061
Profitability	−0.022	0.234	−0.09	0.927
Leverage	−0.003	0.006	−0.40	0.692
Liquidity	0.002	0.007	2.26	0.091
Corporate governance	0.229	0.394	0.58	0.560
_cons	4.886	0.235	20.75	0.000

Notes: R-sq = 0.390; Wald chi^2 (7) = 844.32; sigma_u 1.216; and sigma_e 1.242

Table 9. Risk-related disclosures (RRD)-OLS model

implementation of effective risk management strategies. In principle, firms have developed and adopted risk management techniques and procedures to achieve their goals.

In recent years, especially since the economic crisis, risk management has become a very important issue. Company executives have an obligation to clearly and thoroughly disclose risk information to shareholders so that the quality of the reports is unquestionable. There are cases in which investors have lost confidence because of concerns about inadequate risk disclosure and management. The understanding, monitoring, disclosure and management of risk should be the responsibility of the top executives of the company in the context of internal audit and analysis department strategies. These activities should be also be informed by detailed reports and meetings with the relevant experts and analysts. The significant findings of the present study could help companies to improve risk identification, assessment, reporting and management.

This study sought to examine the extent to which stakeholders are provided sufficient risk information to understand a firm's true financial status. The study focussed on two key periods: before (2005–2008) and after (2009–2011) the international financial crisis. From 2005 to 2008 and in 2009, there was a significant increase in the instances of risk reporting by the companies in the sample. In 2010 and 2011, there was a steady increase.

The categories with the highest numbers of reported instances were financial, personnel and integrity and legal, tax and regulatory. These three categories (of a total of 14) accounted for 69% of the total instances of disclosed risk. The highest increases in risk disclosure in 2005 to 2011 were in the financial and personal and integrity categories.

The findings of the study have led to the following conclusions:

- The amount of non-financial risk disclosure was greater than the amount of financial risk disclosure (*H1*).
- The instances of risk disclosure were higher in the later years than in the earlier years (*H2*).
- Risk disclosure was influenced by company size; thus, bigger companies (revenue) disclosed more instances of risk (*H3*).
- No relationship was found between the instances of reported risk and the level of risk (leverage ratio; *H4*).
- There was a relationship between liquidity and risk disclosure (*H5*).

A significant problem faced by the companies in this study was liquidity. Companies with high sales volumes and no liquidity problems were much more likely to survive the crisis. Thus, companies were trying to increase liquidity and sales volumes to attract more shareholders. According to the results of this study, companies with high sales volumes and substantial liquidity disclosed more risk information.

The relationship between liquidity and risk disclosure was found to be statistically significant. Companies with high liquidity provided more risk information. The same phenomenon was observed for company size. Large companies provided a much greater amount of risk information than smaller companies.

Content analysis, the research method used in this study, has limitations. Subjectivity could not be eliminated; however, detailed rules and procedures were followed to minimise its effects. In addition, content analysis measures only the quantity, not the quality, of risk disclosure. More disclosure does not necessarily mean better information. Thus, future studies should examine the quality and quantity of risk disclosure.

This study of risk disclosure in annual reports has limitations. Annual reports are not the only means of publishing risk and general business information. Although they are

considered to be the most important source of corporate information, there are other means of communicating with shareholders and other stakeholders. Other theories and methods might be useful in future research. Another limitation of the present study is the focus on the disclosure of risk information but not the underlying reasons. This could be the subject of future analyses.

The findings of this study could contribute to improvements in risk management and the development of a standard that incorporates an integrated approach that considers all risk factors. Further research is needed to analyse the determinants of risk reporting and the effects of risk-management systems. This could lead to improvements in the disclosure of risk to stakeholders. These recommendations, in combination with the right risk reporting approach, can enhance the design and effectiveness of corporate risk management systems.

Note

1. This study does not refer to the Greek Accounting Standards (4308/2014) because they were implemented in 2014.

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