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The effectiveness of risk management system and firm performance in the European context

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Abstract

Purpose – The purpose of this paper is to study the effectiveness of the risk management system in the European context, especially with regard to the risk management committee, the uncertainty of the environment and company performance. In summary, it evaluates European companies listed on the stock exchange in France, Germany and the United Kingdom to determine how risk management systems influence financial companies' performance.

Design/methodology/approach – To study the effectiveness of risk management systems and their influence on performance, the large companies selected in our sample are fairly representative of the European market, according to the Dutch indices of each country (SBF 120 in France, HDAX 110 in Germany and FTSE 100 in United Kingdom).The empirical evidence is based on an international quantitative analysis, using a data set involving 320 companies listed on the stock exchange over a ten-year period from 2005 to 2014.

Findings – The results indicate that the establishment of a risk management and control system by a company positively influences its management, and its performance level and value creation also improve. The results of this study demonstrate a significant strengthening of the role of the risk management committee in the three countries. The surveillance function is reinforced, and in particular, the internal control system is accentuated.

Research limitations/implications – This study has some limitations that can form leads for future research. One of these limitations is the sample size. The authors have represented the European context by three countries that certainly constitute great European powers, but have regulations different from other countries. The company size is also a possible research element. Indeed, risk management system varies between large, small and medium-sized enterprises, so it is important to study each type of company well.

Originality/value – This study identifies the risk management committee as a mechanism of control that is highly important in the company, and it proposes an international framework that comparatively and empirically evaluates how the risk management system used in large European companies can improve their financial performance.

Keywords Risk management system, Firm performance, European firms, Control mechanisms

Paper type Research paper

Introduction

Following the financial crisis of 2008, the financial system was mistreated, as governments took on the role of providing "cash bailouts." Since then, the recovery has been confirmed and governments have played this role less and less. Exceptional measures, such as regulatory laws, are no longer sufficient. Nevertheless, structural reforms to the organization of the

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governance system remain relevant in gaining the trust of stakeholders. Consequently, the capital markets have been modified in terms of their structure (Yamanaka, 2018); thus, if these capital markets remain private, the role of the state remains indispensable. For this reason, it is important to ensure the smooth running of all organizational structures (OCDE, 2010).

This crisis has led to collective awareness, while more controlled and restrictive procedures have been implemented. In 2015, the Organization for Economic Co-operation and Development (OECD) Management Group presented its main recommendations regarding the responsibility for risk management within firms. According to these recommendations, the internal and external auditors should report to the audit committee; the same approach should be taken in the risk management of financial institutions. Thus, in financial firms, a risk manager must be present who reports both directly to the board of directors and via the audit committee. This risk manager must be totally independent, and his/her mission is to be similar to that of the mediator. His/her main role is to draw the attention of the board of directors. In addition, the board of directors must fulfill its functions by ensuring the accuracy of financial and accounting documents, the independence of accounts and the effectiveness of control systems, including risk mechanisms within the firm.

In its 2011 Green Paper, the European Commission defines governance as the management and control system of firms and as "the set of relationships" between the management of the firm and its stakeholders. Thus, corporate governance ensures through its control mechanisms the responsible behavior of all agents, and in particular, the manager. Corporate governance includes a system of risk management and internal control, which must be robust, comprehensive and efficient to ensure the effective implementation of the risk management strategy.

The proper functioning of the risk management system implemented by a firm plays an important role in ensuring the firm's effective management (Mayer *et al.*, 2019). We consider that the presence of a risk management committee, a high level of debt, environmental uncertainty and the publication of a report on the social and environmental context can influence firm performance. However, our goal is to analyze the effectiveness of risk management committees and their attitude in dealing with the uncertainty of the environment. In the course of this work, we return more specifically to the effectiveness of the risk management system, particularly in the European context.

The research in the European context is based on extensive research that has been conducted in the USA. In general, this research is essentially based on the mechanisms of risk management. The related studies have focused on two main issues. First, they question whether these mechanisms protect the firm performance, and second, whether these mechanisms influence the specific decisions made within the firm's framework. This research analyzes the risk management systems in different countries.

Existing studies analyze the relationship between a mechanism or theory and a second variable. No study so far has analyzed a larger number of mechanisms in combination with firm performance, which this study will do. Also, our study realizes this approach at the level of three countries: France, the United Kingdom and Germany.

To carry out our research, we used the quantified analysis of the annual reports of firms listed on the stock exchange in the three study countries (SBF 120 for France, HADAX 110 for Germany and FTSE 100 for the United Kingdom). In addition, the period of our study extends from 2005 to 2012 for all three countries. We specifically selected this period because it is eight years (with the experience of a financial crisis) that allows for the relationship to be better evaluated.

Finally, we adopted a coding approach using the statistical software R studio that allowed us to specify the nature of our variables and master their design. Most studies that measure one of the relationships use Statistical Package for the Social Sciences (SPSS) as an analytical tool.

This approach was relevant for the analysis of our results. To achieve this, we retained the simple regression with the data of firm performance. Given the results obtained and our study's conclusions, it seems to us that this approach was adapted to this study's field and hypotheses.

For our sample, we built a database. This process was necessary because, to our knowledge, there was no existing database basis on our variables for the three countries studied. Consequently, we studied annual reports and reference documents. From these reports, we manually recorded each firm's data and this protocol was repeated for all of our variables for each year.

Theoretical framework

Several theoretical currents contribute to the understanding of risk management systems infirm. We find that the works are bound to the classical approach (financial theory and agency theory) and stakeholder theory, the theory of the dependence of resources in complement with the institutional neo-theory.

The work on corporate risk management starts from the hypotheses within the framework of agency theory. In this theory, there is a contractual relationship that places the managerial executives, who have the power and capacity to make decisions on one side and the shareholders on the other side (Jensen, 1983). This traditional approach limits the objective of explaining the firm's financial structure. This agency relationship leads to a conflict of interest and differences of the points seen, especially where there are many asymmetries of information between both parties.

According to Jensen (1986), various mechanisms are necessary to align the interests of mandates, reduce the risks associated with management and make the manager more responsible. On the one hand, there are mechanisms internal to a firm that are generally imposed by the law (e.g. the board of directors and the general shareholders' assembly), and on the other hand, there are external mechanisms that are mainly based on market power (e.g. the market recovery and the auditors' market).

The stakeholder theory exceeds and views it a classic — of a firm. It looks for the interests of the stakeholders, not shareholders, and widens the field of the manager's responsibility (Mercier, 2001). It is also the theory most frequently cited in the academic literature, it presents the firm as a group of collective interests, and it helps the manager to use their skills to make more useful, effective and strategic decisions (Freeman, 1984). Consequently, stakeholder theory provides new insights into the possible reasons for risk management.

According to Donalson and Preston (1995), this theory has three main visions: descriptive, instrumental and normative visions. According to the normative vision, this theory legitimizes the interests of actors who are not firm shareholders and allows escaping the classical theory. This vision also identifies the values and obligations where the manager can guide the firm strategically, thus providing an ethical foundation to the theory. The social firm performance is critical to this vision.

According to the instrumental vision, this theory demonstrates that the manager must manage his or her relationships with the stakeholders in a way that allows him or her to realize the firm's goals and report the responsibilities to the firm's owners (Jones and Wicks, 1999). From the descriptive vision, this model explains the firm's behavior and relationships with sound aggravation and how the manager must be responsible for the interests of the various stakeholders. Finally, it allows taking advantage of the firm's history to obtain opportunities in the future (Donalson and Preston, 1995).

We can conclude that stakeholder theory reformulates the role of the manager and firm, and it also widens the vision of agency. In this context, and from a responsible perspective, the manager must try to reduce the risks that can influence the interests of all the actors, created by the pensions for the various partners with an optimal balance of all interests, and develop his or her firm.

Finally, the new institutional economic theory offers a different perspective on risk management. This theory provides the most understanding of certain behaviors in a firm. It demonstrates that the manager tries to engage in behavior that is legally acceptable and competitive. Firms try to acquire legitimacy, because it is culturally and socially required. According to Suchman (1995), this legitimacy is a generalized perception that the actions of an entity are desirable, suitable and corresponding to a system of standards, values, faiths and definitions that are socially constructed.

At the level of managerial decisions, legitimacy is obtained by acceptable decisions. Managers try to legitimize their investment, financing or governance decisions like reducing or increasing the size of the board of directors. This attempt can be described as search legitimacy. Therefore, questioning legitimacy can have a positive influence, where it urges managers to emphasize the necessity of managing the social and environmental risks well, thereby encouraging the manager to engage in responsible reflection. A critical implication of this theory is that shareholders may be interested in attracting block ownership by reducing the risks in a firm.

Literature review

As a result of international financial crises, businesses are increasingly faced with a variety of risks, including financial, operational and regulatory risks (Krolikowski, 2016). In this context, several research projects have been conducted to highlight the necessary mechanisms to implement to manage these risks (Sperling and Webber, 2019; Rogers, 2002; Haushalter, 2000). An effective risk management system is considered one of the key mechanisms to help firms to achieve their objectives, improve their financial reporting and safeguard their reputations.

Triki and Dionne (2004) argued that corporate financial characteristics and internal governance mechanisms can play a role in risk management. The model suggests that increasing financial coverage does not always lead to greater debt capacity. Financial coverage is an increasing function to the financial distress costs of the business. The results obtained assert that financial distress costs, information asymmetry and the separation of the functions of the chief executive officer (CEO) and the chair of the board of directors are important determinants in the risk management process, while the composition of the board does not affect this process. The nature of a firm's risk-taking can significantly influence its performance. Hoyt and Liebenberg (2011) used Tobin's Q as an indicator of value creation and found a positive relationship between value creation and the implementation of an effective risk management system. The effectiveness of the risk management and control systems implemented by firms plays an important role in their sustainability.

Similarly, Gordon *et al.* (2009) studied the effects of risk management on firm performance and found that there is a positive relationship between the two variables. This study demonstrated the importance of five specific factors within firms: the uncertainty of the environment, the competition, the complexity and size of the firm and the supervisory board of directors.

With 711 observations from Australian financial firms over the period 2006–2008 (the period leading up to the global financial crisis), Bich and Hutchinson (2013) provided evidence of the importance of risk and compensation management committees for improving firm performance. Their study showed that the composition of risk and remuneration committees is positively related to the firm. This is due to the independence of these members concerning management; they also show great experience and professionalism. Information asymmetry is reduced when an independent director is a member of both the risk and compensation committees, which moderates the negative relationship between risk and profitability. This result suggests that coordination and communication issues are mitigated when committee members are more accountable and engaged in the performance of their duties.

Based on a sample of 39 countries, Kose *et al.* (2008) examined the relationship between investor protection and the incentive for managers to take risks. In addition, they focused on how governance mechanisms influence investment risk management choices and their implications for growth. The results highlighted that risk-taking and the growth rate of firms are positively related to the quality of investor protection. According to these authors, negligence in investor protection may magnify risk. Leaders in countries with low levels of investor protection can enter risky but rewarding projects if they can serve their own interests. The authors also suggested that stakeholders, such as banks, unions and the Government, can limit risk-taking to protect their claims.

Traditionally, audit committees ensure the proper management of risks (Korosec and Horvat, 2005). In different countries, these committees sit at the level of the board of directors. This type of committee helps to provide the information needed by firms, to strengthen their internal control systems and to develop strategies that allow them to deal with risk.

Based on data from the annual reports of 300 major publicly traded Australian firms in 2005, Subramaniam *et al.* (2009) examined how risk management committees are set up in firms. Specifically, they examined factors related to the establishment of risk management committees, such as the presence of independent directors, the combination of management functions, the size of the board of directors and the characteristics of firms.

The results indicated that risk management committees are more common in firms with large boards and independent directors. In addition, the results showed that firms are more likely to separate risk and audit committees. In this business model, firms are more likely to have large boards, lower levels of financial risk and lower levels of organizational complexity.

In addition, boards that established an independent committee that was focused solely on the risk management function demonstrated a commitment to improving the overall governance structures of their businesses (Yatim, 2010).

Aebi *et al.* (2012) used the data collected from 573 banks (available from the COMPUSTAT database, which is a comprehensive database of fundamental financial and market information on both active and inactive global companies, indices and industries, since 2006) to examine whether the risk management of corporate governance mechanisms was linked to better performance by the bank during the year. Their results showed that, in times of crisis, banks in which the director of risk management reported directly to the board of directors and not to the chief executive officer (CEO) (or other legal entities) experienced better performance in terms of equity and return on equity. On the other hand, the effect of the governance of the firm transpired to be negligible or even negatively linked to the banks' performance. To face the next financial crisis, banks should significantly improve the quality and profile of their risk management functions; for example, by integrating specialized risk committees.

In the same vein, Mongiardino and Plath (2010) have shown that despite the increase in regulatory pressure induced by the credit crisis, risk management in large banks has not been sufficiently improved. According to these authors, even if these banks organize risk management committees, these committees rarely meet. Thus, the members of these committees are neither independent members nor competent in financial management. It specifies that the implementation of at least one risk management committee is necessary at the board level in the presence of most of independent members and that the director of this committee should be part of the board of directors of the bank. A firm can also manage risks and different social requirements by making available its reports under its environmental and social approach.

In examining the factors that lead to the success or failure of transparency programs in the USA, Hess (2008) explained that social reporting is a key mechanism in the governance system to ensure the transparency of firm *vis-à-vis* its stakeholders. Several studies have focused on the causal links between the publication of social or environmental reports (as one of the factors to

face the risk) and firm performance. Most of these works have revealed a positive link between these two components (Simpson and Kohers, 2002; Nelling and Webb, 2009).

Gray (2006) confirmed the importance of transparency and the relevance of social and environmental relationships as factors that contribute to the shareholder value of firms. The information disclosed through these reports helps to legitimize firms. The more that firms publish accurate and relevant information, the more that they promote a climate of trust among the various social and economic actors.

Using a sample of 629 publicly traded UK firms (the FTSE 350 Index) from 2005 to 2009, Qiu *et al.* (2016) examined the link between the environmental and social information of firms regarding their financial and market profitability. The results indicate that there is no significant relationship between environmental information and profitability. In addition, while the literature has largely focused on the importance of disclosure of environmental information, Qiu *et al.* found that social information matters most to investors. They noted that firms that disclose accurate social information have higher stock values, which leads to growth in the cash flow rates of these firms. This observation can be considered as a case that is related to the British institutional context, given the historical importance of social issues raised in the economy. These results are also consistent with the results of a recent study that shows that global investors are now concerned about firm performance (Marsat and Williams, 2014). This is consistent with the theories of corporate resources and voluntary disclosure, which reflect the critical role that information plays in the effectiveness of firms' competitive strategies.

At the European level, Carnevale *et al.* (2012) used a sample of 130 European listed banks in 2008 to study the relationship between social relations and the stock market value of the bank. The results revealed a mixed relationship; indeed, in some countries, social relations positively influence the price of equities, while in other countries, there is a negative relationship between these variables. This disagreement in the results can be explained by the fact that some investors are unable to interpret the information contained in the social reports, or do not give importance to this information, doubting its relevance.

The proper functioning of the risk management systems implemented by firms plays an important role in ensuring firms' effective management. We consider that the existence of an efficient system in a firm can have a positive relationship with firm performance. Thus, we make the hypothesis as follows:

H1. The effectiveness of the risk management system can influence firm performance.

The existence of a risk management committee within-firm may have a positive relationship with the level of performance. The mere presence of a risk management committee demonstrates a firm's commitment to improving its governance structures (Subramaniam *et al.*, 2009; Yatim, 2010). Therefore, we retain the hypothesis and each one is under a European context as follows:

H1a. The presence of a risk management committee has a positive influence on firm performance.

The level of corporate debt and the uncertainty of the environment may also be related to the firm's level of performance. Indeed, Kose *et al.* (2008) examined the link between investor protection and the leader's incentive to take risks. The results showed that the more investors are protected, the more the leader takes risks. The hypothesis is then as follows:

H1b. A high level of debt and environmental uncertainty can affect firm performance.

Several works have studied the causal link between environmental labeling (the publication of a report on the social or environmental context) and firm performance. Thus, there is a positive relationship between the two components (Marsat and Williams, 2014; Carnevale

et al., 2012; Simpson and Kohers, 2002; Nelling and Webb, 2009). We support this idea and advance the following hypothesis:

H1c. The publication of a report on the social and environmental context positively influences firm performance.

Methodology and data

Determining the setting and period of a study is always an important step in conducting empirical research. To study the effectiveness of the risk management system in the European context, we have chosen France, Germany and the United Kingdom, which represent the first three European economic powers. The World Bank, in its ranking of February 2016, identified Germany as the first European power and the third in the world. Its power is built on its production and its ability to export its industrial goods. Germany's industry accounts for 40% of its total wealth, and this industrial success is supported by a network of small and medium-sized businesses. The stock market is also a means of financing for these firms. German banks' investment in these firms is also substantial. The French economy (the second European power) relies on various sectors as follows:

(1) France is the leading agricultural power in Europe.

(2) Its industry is modernizing rapidly to face the competition.

(3) Its services sector is highly reactive worldwide (banks, insurance, etc.). In addition, Europe is a group of countries open to the world; its exports are important, and the presence of French firms is also considerable.

As for the UK, its banks are strong financial partners and its city is among the best stock exchanges in the world, just ahead of France.

Our study covers ten years: we analyze the annual reports of firms between the years 2005 and 2014. We chose this period for several reasons. First, this period has experienced several crises and financial scandals. Thus, we can mention the global financial crisis of 2007–2008 (subprime crisis) and the global economic crisis of late 2009 and early 2010 in Greece. Obviously, the pre-crisis (2005) and the post-crisis (2012) are the subject of particular attention to grasp the movements and consequences of changes in our sample of firms.

Second, there is an empirical and theoretical consensus on the choice to use the years before and after crises as temporal bounds (Soltani, 2014; Gulsun and Royer, 2009). Our sample for the three countries includes 320 listed firms, 120 French firms, 110 German firms and 100 British firms. The number of firms varied each year according to the inflows and outflows.

Finally, we reviewed 2,887 annual reports for the entire period of the study. For each country, we studied 1,075 (France), 871 (Germany) and 941 (United Kingdom) annual reports.

The websites of firms that made up our sample were crucial in order to collect the data. As a result, we have promoted the use of annual reports and reference documents. From these reports, we manually recorded each firm's data, and for each year, this protocol was repeated for all our variables: COMRISK firm has a risk management committee or not and RAPSO the existence or no report on the social or environmental context.

The annual report is a document addressed to all the partners of the firm, and in particular, the shareholders, to inform them of the firm's situation. Financial information, the balance sheet, the income statement must be submitted within 4 months after the end of the financial year and no later than 15 days before the general meeting of shareholders.

The reference document of a firm is drawn up by any firm whose securities are admitted to trading on a regulated market. This document contains information on the organization, its activity, its financial situation and its results, and the legal, economic, financial and

accounting environment for the entire exercise. It is also a means of communication to transmit a signal to the partners of a firm that may sometimes be a specific document. To complete our data collection concerning our variables, we used referential databases, such as Thomson One Banker, Datastream and Amadeus.

The variables

Firm performance

Several ratios based on financial and accounting data make it possible to calculate firm performance, the return on assets (ROA) ratio, the return on equity (ROE) ratio and return on investment (ROI). These indicators, which measure performance, have their limits and none of them makes it possible to directly apprehend the calculation of firm performance. These indicators remain limited. Therefore, other indicators, and in particular the indicators of the stock market performance, must be retained.

The indicators of the stock market firm performance depend mainly on the results of the firm on the stock market. The measurement of the stock market performance is, therefore, a remarkably interesting projection measure. Among these stock market measures, we find the ratio Q proposed by Tobin in 1969 which corresponds to the market value equal to the shareholders' equity added to the financial debts of the firm divided by the replacement cost of the assets. We retain the following three variables: return on assets (ROA), return on equity (ROE) and QTOBIN (Tobin's Q).

We define and name the variables related to the risk management system as follows:

COMRISK: a binary variable that equals 1 if the firm has a risk management committee and 0 otherwise;

DETENT: measured by Total Debt Ratio = Total Debt/Total Assets;

INCERENV: measured by the standard deviation of the sales growth rate over a specific period and

RAPSO: the existence (or not) of a report on the social or environmental context.

Control variables

In our research, we use control variables that can have an impact on firm performance, such as the size, complexity and business sector of the firm. We define the variables TAILENT, COMPLENT and SECTAC as follows:

TAILENT: the logarithm of the total assets of the firm;

COMPLETE: the number of subsidiaries of the firm and

SECTAC: takes the value 1 if the firm belongs to the financial sector, 0 otherwise.

Based on our different assumptions, as well as the different variables of the research, we can develop the model as follows:

Model: ($Yi = a0 + a1\,X1 + c$), $X1$, represents the variables related to the enterprise risk management system

$$Yi = \alpha 0 + \alpha 1\,\mathrm{COMRISK} + \alpha 2\,\mathrm{DETEENT} + \alpha 3\,\mathrm{INCEENV} + \alpha 4\,\mathrm{RAPSO} + \alpha 5\,\mathrm{TAILENT} + \alpha 6\,\mathrm{COMPLENT} + \alpha 7\mathrm{SECTAC} + c$$

With:

Yi (ROA: return on assets, ROE: return on equity, Q TOBIN = market value of the firm/value accounting for economic assets): COMRISK: a binary variable that equals 1 if the firm has a risk management committee and 0 otherwise: DETECT: total debt ratio = Total debt/

Total assets: INCEENV: measured by the standard deviation of the sales growth rate over a specific period: RAPSO: equal to 1 if the firm has published a report on the social or environmental context, 0 otherwise: TAILENT: the logarithm of total assets: COMPLENT: number of subsidiaries of the firm (local and foreign) and SECTAC: equal to 1 if firm belongs to the financial sector, 0 otherwise.

Results

Our results (see Table 1) show that the effectiveness of the risk management and control system implemented by a firm plays an important role because they ensure the effective management of the firm. Indeed, the presence of a risk management committee positively influences the level of firm performance. Our descriptive results confirm the important presence of risk management committees in France. In 2014, their presence was evaluated at 23%, whereas in 2005, their presence was only 5%; an average of 11% over the entire study period. This strong increase in the presence of risk management committees seems logical because the regulation insists on this presence. As this type of committee is specialized, it can effectively respond to the issues of risks and uncertainties in the environment.

The level of firm debts negatively influences firm performance. These results are logical, given the nature of this variable. However, the level of uncertainty in the firm environment has a positive influence on its performance. It should again be noted that the level of uncertainty is measured by the standard deviation of the growth rate of sales over the study period. Gordon *et al.* (2009) proposed that the uncertainty factor (among other factors) had an effect on firm performance.

In addition, we found a negative relationship between organizational display by publishing reports on social or environmental contexts and firm performance. This result is similar to that of Carnevale *et al.* (2012), who found that the influence of the publication of organizational reports is sometimes positive and sometimes negative. The interpretation of these documents is complicated and the information itself is sometimes irrelevant for future decisions.

In Table 2, the results show that the risk management and control system is effective for the management of firms and their performance, and in particular, if there is a risk management committee. The justification is the same as in the French case, where the expertise of this committee is effective for firms.

	Y1 (ROA)		Y2 (ROE)		Y3 (QTOBIN)	
	Coef.	*t*-stat	Coef.	*t*-stat	Coef.	*t*-stat
COMRISK	0.07	0.1	5.96	1.986**	2 e–4	2.3***
DETEENT	−1.42	−0.97**	1.5	0.242	−1 e−3	−8.9***
INCEENV	2.83	3.9***	1.9	0.621**	4 e−4	4.8***
RAPSO	−0.38	−0.7**	−2.98	−1.287**	−8 e−5	−1.3**
TAILENT	−1.14	−3.9***	−0.29	−0.234	−3 e−4	−8.5***
COMPLENT	−0.0003	−0.1	0.03	2.761***	−5 e−7	−1.7**
SECTAC	−0.56	−0.6**	2.15	0.604**	4 e−6	0.04
R^2	0.52		0.46		0.72	
DF	740		740		740	
F-stat	4.2		1.62		22.79	
p-value	1.6 e−7		0.08		<2.2 e−16	
M.E.	8.2 e−17		1.5 e−15		8 e−20	
S.D.E	5.8		25.4		0.0007	

Note(s): M.E.: average model error, S.D.E.: standard deviation error and DF: degrees of freedom. *** significant $p < 0.01$; ** significant $0.01 < p < 0.05$; * significant $0.05 < p < 0.10$
Source(s): Own elaboration

Table 1. The effectiveness of risk management systems: the case of France

	Y1 (ROA)		Y2 (ROE)		Y3 (QTOBIN)	
	Coef.	*t*-stat	Coef.	*t*-stat	Coef.	*t*-stat
COMRISK	−0.016	−0.44	0.009	0.23	0.063	1.59**
DETEENT	−0.11	−2.91***	−0.13	−3.19***	−0.024	0.38
INCEENV	0.24	6.23***	0.13	3.2***	0.06	1.612**
RAPSO	−0.16	−3.83***	−0.06	−1.568**	−0.09	−2.068***
TAILENT	−0.08	−1.955**	−0.11	−2.593***	−0.15	−3.37***
COMPLENT	0.0046	0.121	0.04	1.099**	0.05	1.24**
SECTAC	0.005	0.149	0.007	0.168	−0.15	−0.39
R^2	0.75		0.33		0.45	
DF	635		635		635	
F-stat	8.972		2.899		3.8	
p-value	5.04 e−16		0.0006		8.5 e−6	
M.E.	1.5 e−17		−2.32e−17		−2.37 e−17	
S.D.E	0.924		0.97		0.965	

Note(s): M.E.: average model error, S.D.E.: standard deviation error, DF: degrees of freedom
***significant $p < 0.01$; **significant $0.01 < p < 0.05$
Source(s): Own elaboration

Table 2.
The effectiveness of risk management systems: the case of Germany

The level of firm debts negatively influences its performance. However, the level of uncertainty in the firm environment has a positive influence on its performance and value creation. Soyka and Bateman (2012) indicated that investors and businesses are more interested in sustainability issues and strategies to cope with uncertainty, potentially affecting performance.

As in the French case, our results show a negative relationship between organizational display by the publication of reports on the social or environmental contexts and firm performance.

Our results (Table 3) demonstrate that the establishment of an effective system of risk management and control by a firm has a positive influence on its management and performance. This confirms Roger's (2002) finding that the risk management system chosen by the firm is a key element in its economic and social success.

The level of debt, uncertainty and the publication of annual reports follow the same trend in the three countries in our sample. For the UK, the analysis of the publications of the reports reveals the absence of a significant relationship with firm performance, especially with regard to environmental information (Qiu *et al.*, 2016). Yet the theory of resources and voluntary disclosure of information argues that relevant information is a factor in order for firms to achieve a competitive advantage.

Regarding the risk management system, the movement is general in all three countries (Table 4). The function of surveillance is reinforced. In particular, the internal control system is accentuated. The period of our study highlights a significant strengthening in the role of the risk management committees. The prospect of establishing a risk management control team is also shared by all three countries in the sample.

In general terms, a firm's level of debt has a negative effect on its performance, while the level of uncertainty in the firm's environment has a positive influence on this performance within the three countries in question. Managerial innovation is the result of a firm's economic and social environment. Business leaders generally conceptualize innovation as a strategic element with which firms can counter uncertainty. This uncertainty can be internal or external. From our sample of countries, it appears that the analysis of information must be relevant and effective to best respond to the uncertainty of the economic and social environment of the firm. Moreover, the realistic and successful analysis of the environment is

	Y1 (ROA)		Y2 (ROE)		Y3 (QTOBIN)	
	Coef.	*t*-stat	Coef.	*t*-stat	Coef.	*t*-stat
COMRISK	0.019	0.51*	−0.01	−0.331	0.1	2.93***
DETEENT	−0.03	−0.85**	−0.16	−4.182***	−0.04	−1.09**
INCEENV	0.06	1.78**	−0.003	−0.07	0.01	0.27
RAPSO	−0.04	−1.07**	−0.03	−0.6**	−0.025	−0.63**
TAILENT	−0.35	−9.52***	−0.007	−1.754***	−0.08	−2.13***
COMPLENT	−0.0004	−0.012	0.001	0.034	0.033	0.63**
SECTAC	0.009	0.25	−0.03	−0.904**	−0.025	−0.68**
R^2	0.82		0.32		0.42	
DF	699		699		699	
F-stat	9.447		2.075		2.63	
p-value	<2.2 e−16		0.02		0.0019	
M.E.	2.76 e−17		−5.16 e−18		−1.9 e−17	
S.D.E	0.927		0.982		0.987	

Note(s): M.E.: average model error, S.D.E.: standard deviation error, DF: degrees of freedom
***significant $p < 0.01$; **significant $0.01 < p < 0.05$; *significant $0.05 < p < 0.10$
Source(s): Own elaboration

Table 3.
The effectiveness of risk management systems: the case of the United Kingdom

		France			Germany			United Kingdom		
	Expected signs	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
COMRISK	(+)	NS	+**	+***	NS	NS	+**	+*	NS	+***
DETEENT	(?)	−**	NS	−***	−***	−***	NS	−**	−***	−**
INCEENV	(?)	+***	+**	+***	+***	+***	+**	+**	NS	NS
RAPSO	(+)	−**	−**	−**	−***	−**	−***	−**	−**	−**
TAILENT	(−)	−***	NS	−***	−***	−***	−***	−***	−***	−***
COMPLENT	(−)	NS	+***	+**	NS	+**	+**	NS	NS	+**
SECTAC	(−)	−**	+**	NS	NS	NS	NS	NS	−**	−**

Note(s): (+) positive relationship and (−) negative relationship and (NS) not significant. Y1: (ROA), Y2: (ROE) and Y3: (TOBIN Q)
***significant $p < 0.01$; **significant $0.01 < p < 0.05$; *significant $0.05 < p < 0.10$
Source(s): Own elaboration

Table 4.
Results summary

strategic for the firm as a prerequisite for its decisions (Bruce *et al.*, 2007; Priem and Cycyota, 2001).

Regarding the control variables of our research, our results demonstrate that the size and complexity of a firm are important determinants of the effectiveness of its risk management systems. However, we did not find a precise or significant relationship between the fact that firms belong to the financial sector and their performance. In this context, the results remain ambiguous.

Limitations and future research

This study has some limitations that can form leads for future research. One of these limitations is the sample size. We have represented the European context by three countries that certainly constitute great European powers but have regulations different from other countries. Therefore, further research can extend the sample by analyzing other European countries, which would provide a broader view of the European context. It could also be possible to compare two countries in two different continents, like France and the USA, while maintaining the same variables.

Firm size is also a possible research element. Indeed, the risk management system varies between large, small and medium-sized enterprises, so it is important to study each type of firm well.

Another research topic can be to analyze the effectiveness of the risk management system in the European context, but on variables besides firm performance. In particular, the variables related to the social environment and the firm's general strategy can be explored.

From a methodological point of view, the collection of information through annual reports could be a limitation, because it relies on the seriousness of the boards at a specific time. Thus, the seriousness of this follow-up is not assured since it is related, in our case, seriously to the members of the board of directors.

Conclusion

The objective of this research was to analyze risk management systems, particularly in the European context. We selected France, Germany and the United Kingdom for this purpose, as they represent the first three European economic powers. We studied these countries simultaneously, following the approach of empirical studies that have analyzed several countries in a combined way. As a result, the large firms selected in our sample, according to the Dutch indices of each country (SBF 120 in France, HDAX 110 in Germany and FTSE 100 in the UK), were fairly representative of the European market. Our sample for the 3 countries included 320 listed firms. The number of firms varied each year according to the inflows and outflows. Finally, we reviewed 2,887 annual reports for the entire period of the study (2005–2014).

The results suggest that the establishment of an effective system of risk management and control by a firm has a positive influence on its management and performance. In general terms, a firm's level of debt has a negative effect on its performance, while the level of uncertainty in the firm's environment has a positive influence on this performance in the three selected countries. Our results are interesting because they allow us to shed light on the subject of our study. They provide details about certain relationships and identify which ones are negative and which are positive. Ultimately, our results are indispensable for multiple actors, both internal and external to firms. Beyond the theoretical contributions, managerial contributions are indispensable in the short term. In particular, the data obtained will enable firms to establish more efficient organizational frameworks. We emphasize the importance of risk management committees because they positively influence performance.

Based on the recommendations already proposed by several European and international regulatory bodies, as mentioned in our regulatory frameworks, such as the Organization for Economic Co-operation and Development (OECD) and the European, we propose that the risk management system must be efficient: risks in firms must be analyzed by taking into account their origins and their consequences, the risks must be subject to anticipation and prevention by risk management committees and finally, the risks must be prioritized in order to minimize their effect.

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Further reading

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Appendix 1

Table A1. Descriptive statistics related to variables measuring the firm risk management by country

Country	Variables	Descriptive statistics				
		Average	Median	Standard deviation	Minimum	Maximum
France	COMRISK	0.11	0	0.31	0	1
	DETEENT	21.39	0.23	0.15	0.0001	0.73
	INCEENV	0.105	0.06	0.31	−0.52	5.63
	RAPSO	0.72	1	0.44	0	1
Germany	COMRISK	0.07	0	0.26	0	1
	DETEENT	0.21	0.18	0.16	0.00001	0.71
	INCEENV	0.102	0.08	0.21	−0.74	2.18
	RAPSO	0.63	1	0.48	0	1
United Kingdom	COMRISK	0.36	0	0.48	0	1
	DETEENT	0.23	0.23	0.14	0	0.69
	INCEENV	0.08	0.07	0.34	−5,102	1.67
	RAPSO	0.74	1	0.43	0	1

Source(s): Own elaboration

Appendix 2

Year		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
France	COMRISK	0.053	0.05	0.095	0.106	0.106	0.12	0.14	0.22	0.22	0.23
	DETEENT	0.25	0.24	0.24	0.27	0.26	0.24	0.24	0.24	0.25	0.24
	INCEENV	0.21	0.16	0.14	0.085	−0.05	0.12	0.06	0.08	0.07	0.08
	RAPSO	0.7	0.69	0.72	0.71	0.75	0.73	0.75	0.72	0.73	0.74
Germany	COMRISK	0.06	0.09	0.074	0.074	0.086	0.061	0.07	0.086	0.08	0.082
	DETEENT	0.18	0.19	0.2	0.23	0.22	0.21	0.21	0.21	0.22	0.22
	INCEENV	0.107	0.14	0.14	0.105	−0.03	0.16	0.12	0.057	0.058	0.06
	RAPSO	0.58	0.67	0.64	0.62	0.65	0.64	0.62	0.62	0.63	0.64
United Kingdom	COMRISK	0.35	0.33	0.37	0.35	0.33	0.39	0.39	0.375	0.4	0.43
	DETEENT	0.23	0.23	0.24	0.25	0.25	0.22	0.21	0.22	0.23	0.23
	INCEENV	0.22	0.14	0.025	0.029	−0.13	0.13	0.11	0.15	0.15	0.17
	RAPSO	0.74	0.7	0.76	0.74	0.74	0.73	0.75	0.75	0.78	0.77

Source(s): Own elaboration

Table A2. Descriptive statistics related to variables measuring the firm risk management for the period (2005–2014)

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