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The effect of the enterprise risk management implementation on the firm value of European companies

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THE EFFECT OF THE ENTERPRISE RISK MANAGEMENT IMPLEMENTATION ON THE FIRM VALUE OF EUROPEAN COMPANIES

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Abstract

We aim to investigate the impact of the adoption of an Enterprise Risk Management (ERM) system on the enterprise value and to discover which are the determinants of this choice. Several economic actors have decided to face the current economic and financial complexity shifting from a Traditional silo-based Risk Management approach (TRM) to a more comprehensive one, the so called Enterprise Risk Management (ERM). Some academics have tried to investigate the effects of the ERM implementation on firm value, mainly focusing on the financial industry. The results are still controversial. Moreover, there is no empirical evidence about the adoption of ERM programs among non-financial companies. The aim of our study is double: first, we try to understand if the ERM implementation affects firm value on a sample of 200 European companies, belonging to both financial and non-financial industries; second, we test which are the determinants of the adoption of an ERM system. We do this performing a fixed effects panel regression analysis (goal 1) and a fixed effects logistic analysis (goal 2). We find a positive statistically significant relation between the ERM adoption and firm value. As for the probability that a firm engages in an ERM protocol, we find that size, the company beta and profitability (ROA) are the statistically significant determinants.

JEL Classifications: G32, L22, L25,

Key words: traditional risk management, enterprise risk management, industry, firm val

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1. Introduction

The aim of this paper is to investigate the impact of the adoption of an Enterprise Risk Management (ERM) system on the company market value and to discover which are the determinants of this choice.

The recent financial crisis, started in 2007 in the US, has once again brought the risk management issue to the forefront. Organizations, government regulators, stock exchanges, consulting firms, rating agencies, and universities have all begun to consider ERM (Enterprise Risk Management) as a way to tackle the economic complexity. As opposed to Traditional Risk Management (TRM), where individual risk categories are managed separately in risk "silos", ERM allows firms to manage a wide array of risks in an integrated, enterprise-wide fashion (Hoyt and Liebenberg, 2006).

Starting from the early 2000, much has been done to induce companies, mainly operating in the financial industry to adopt ERM. In 2004, for example, the Committee of Sponsoring Organization of the Treadway Commission (COSO) released the Enterprise Risk Management Integrated Framework, which defines ERM as a process, affected by an entity's board of directors, management and other personnel, applied in strategy-setting and across the enterprise, designed to identify potential events which may affect the organization, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives. In the same year, the New York Stock Exchange (NYSE) issued new corporate governance rules requiring audit committees of listed firms to be more involved in risk oversight. These rules led many boards to require the review and approval of risk management by their audit committee. In October 2008, the Troubled Asset Relief Program (TARP), stemmed from the Emergency Economic Stabilization Act (EESA) with the purpose of helping troubled financial institutions, stipulated that participating firms have to certify that executive compensation programs do not encourage excessive risk taking. The year after (May 2009), the Shareholder Bill of Rights stated that public companies must create stand-alone risk committees comprised entirely of independent directors who are responsible for the establishment and evaluation of risk management practices. In February 2010, the Securities and Exchange Commission (SEC) promoted new rules for an enhanced risk-related disclosure in proxy and annual statements, in particular with respect to the relationship of a company's compensation policies and practices to risk management and the board of director's leadership structure.

ERM has been targeted also by rating agencies. Since 2007, Standard and Poor's (S&P) has included a risk management rating as a key factor in its overall rating of insurance companies. This index is sophisticated and comprehensive and aims at assessing the risk management culture, systems, processes, and practices within the insurer. S&P assigns an "ERM rating" score over five categories, ranging from low levels of risk management sophistication (from one to three, indicating TRM) to high levels (indicating ERM).

Despite this increasing interest in risk management, academic research in this area is still scant. A reason is the difficulty in developing a reliable measure for the ERM construct. Some authors (Beasley, Pagach and Warr, 2008); Hoyt, Liebenberg, 2010) use the appointment of a chief risk officer (CRO) as a proxy for ERM implementation. Others (like Gordon, Loeb and Tseng, 2009) develop their own index. Moreover, the majority of the empirical studies concerns the financial industry, in particular the insurance one. The advantages of concentrating on insurance firms are at least two: first, in 2006 S&P started to produce an ERM rating only for insurers and not for non-financial firms; second, these firms are in the business of pricing risk and thus should be down the road in risk management sophistication than non-financial firms.

Results found so far are as follows: the implementation of ERM benefits firms by decreasing earnings and stock price volatility, increasing capital efficiency, and creating synergies between different risk management activities (Miccolis and Shah, 2000; Cumming and Hirtle, 2001; Lam, 2001; Meulbroek, 2002; Beasley, Pagach, and Warr, 2008). Furthermore, ERM adoption seems to promote increased risk awareness, which facilitates better operational and strategic decision-making.

The aim of this study double: first, we try to understand if the ERM implementation affects firm value of a sample of 200 European companies, belonging to both financial and non-financial industries; second, we test which are the determinants of the adoption of an ERM system.

We focus on publicly-traded companies in order to be able to access the market-based measures of value and because we are more likely to observe public disclosure of ERM implementation among this kind of firms. Our primary sources of information are firm financial annual reports. Specifically, since the company ERM engagement reporting is not mandatory, we collected by hand all the financial reports issued by the selected firms and we performed a detailed search for ERM evidence (explicit or implicit, i.e. hiring a CRO) in the company disclosure.

The paper is organized as follows. Section 2 provides the literature review concerning risk management, from TRM to ERM. Section 3 presents the research design of our study: first, we describe the data and then we declare our empirical model. Section 3 describes our results. Section 4 concludes and suggests developments for future results.

2. Literature review

Risk management has been a widely debated topic since the 1950s, when Modigliani and Miller (1958) first claimed that, under perfect market conditions, it didn't affect firm value. After Modigliani and Miller's (1958) contribution, some scholars proved that the presence of market imperfections is the reason why risk management exists and can increase firm value. Such imperfections are notoriously: tax payments; financial distress; underinvestment; asymmetric information and under-diversified stakeholders. All these imperfections allow risks to impose real costs on firms, which must be minimized. The traditional approach to risk management (TRM) suggests both to implement hedging activities (mainly financial derivatives), and to buy corporate insurance. Many studies investigate the link between TRM and firm value, with controversial results. Allayannis and Weston (2001), Graham and Rogers (2002), Nelson, Moffitt, and Afflect-Graves (2005), and Carters, Rogers, and Simkins (2006) show a positive relation between risk management (specifically hedging using derivatives) and firm value. However, Guay and Kothari (2003) and Jin and Jorion (2006) discover that derivative positions of most non-financial companies are too small to significantly affect firm value. Another stream of research shows that risk management through hedging mitigates incentive conflicts, reduces expected taxes, and improves the firm's ability to take advantage of attractive investment opportunities (Smith and Stulz, 1985; MacMinn, 1987; Campell and Kracaw, 1990; Nance, Smith, and Smithson, 1993), thus increasing their value.

As far as the demand for corporate insurance is concerned, the literature shows that if considered as part of the company's financing policy, corporate insurance may create new value through its effect on investment policy, contracting costs, and the company's tax liabilities (Mayers and Smith, 1982). The empirical evidence around these theoretical predictions is mixed: Mayers and Smith (1990), Ashby and Diacon (1998), Hoyt and Khang (2000), and Cole and McCullough (2006) support this view; instead, Regan and Hur (2007) and Zou and Adams (2008) claim exactly the opposite.

Despite the attention given to risk management in the last seventy years, the recent financial crisis has once again brought this topic to the forefront. In fact, the traditional tools used by companies to face risks (hedging and insuring) have revealed themselves to be inefficient in

tackling the increasing economic complexity. For this reason, academics and authorities are dedicating huge efforts in defining and developing a new framework, defined as Enterprise Risk Management (ERM). In the literature, ERM is synonymous with Integrated Risk Management (IRM), Holistic Risk Management, Enterprise-Wide Risk Management (EWRM), and Strategic Risk Management (SRM) (D'Arcy, 2001; Liebenberg and Hoyt, 2003; Kleffner et al., 2003; Hoyt and Liebenberg, 2006; Manab et al., 2007; and Yazid et al., 2009). For consistency, we use the acronym ERM throughout this study. ERM means to integrate or aggregate all types of risks, using integrated tools and techniques to mitigate the risks and to communicate across business lines or levels. Integrating refers to the combination of: modifying the firm's operations, adjusting its capital structure and employing targeted financial instruments (Meulbroek, 2002).

Profit maximizing firms should consider implementing and ERM program only if it increases expected shareholder wealth. The studies about risk management show that managing each risk class in separate silo creates inefficiencies due to lack of coordination between the various risk management departments. Supporters of ERM argue that by integrating decision making across all risk classes, companies are able to avoid duplication of risk management expenditure by exploiting natural hedges. ERM should allow firms to better understand the aggregate risk inherit in different business activities, thus providing them with a more objective basis for resource allocation which implies improved capital efficiency and return on equity. Moreover, ERM provides a structure that combines all risk management activities into one integrated framework that facilitates the identification of potential interdependencies between risks across activities, which might go unnoticed in the TRM model. So, while individual risk management activities can reduce earnings volatility from a specific source (hazard risk, interest rate risk, etc.), an ERM strategy aims to reduce volatility by preventing aggregation of risk across different sources. Another great advantage of adopting ERM programs arises due to improved information about the firm's risk profile. (Meulbroek, 2002).

Liebenberg and Hoyt (2003) are the first to study ERM using secondary data. Their research focuses mainly on the determinants of the ERM adoption and shows the importance to appoint a CRO in order to reduce information asymmetry, implement and manage the ERM program. Their results also indicate that firms with greater financial leverage are more likely to appoint a CRO and company size is significant in explaining the ERM adoption.

In another study, Hoyt and Liebenberg (2006) discover that size, institutional ownership and international diversification are significant in determining the ERM adoption among US

insurance companies. Pagach and Warr (2007) focus on banks and public utilities and find that a 10% increase in leverage increases by 7.8% the probability for companies to hire a CRO. In addition, the study shows that a 10% size increase increases by 27% the above probability, and a 10% increase of earnings results in 4.7% likelihood to hire CRO.

Hoyt and Liebenberg (2008), extending their 2006 study, find that larger firms are more likely to engage in ERM than smaller firms. This is supported by pressure from institutional owners (institutional ownership). Other determinants, like leverage and reinsurance are negatively and significantly related to ERM.

Given this broad review of the literature, we can move to present our research design.

3. Research Design

3.1. Dataset description

In order to test if the ERM implementation increases firm value, we focused our attention on a sample of 200 European listed companies, operating in 17 different industries (financial and non-financial). Our companies belong to the STOXX® Europe Large 200 Index, which represents large capitalization companies, headquartered in Europe.

The industries represented in our sample are the following: *Industrial Goods and Services*; *Personal & Household Goods*; *Insurance*; *Retail*; *Chemicals*; *Basic Resources*; *Technology*; *Construction and Materials*; *Food and Beverages*; *Healthcare*; *Banking*; *Oil and Gas*; *Telecommunications*; *Utilities*; *Financial Services*; *Media*; *Travel & Leasure*.

We observed the adoption of an ERM system by our sampled companies from 2002 to 2011, getting a strongly balanced panel of 2'000 observations (200 x 10 years).

The information used in this research was extracted from the annual financial reports produced by companies. Specifically, since the reporting of the adoption of ERM is not mandatory, we collected by hand all the financial reports and we performed a detailed search for ERM evidence (explicit or implicit, like e.g. the hiring of a Chief Risk Officer) in the company disclosure.

From the financial statements, we also collected other accounting and non-accounting data, in order to have specific information about each company. Table 1 and 2 describe the main characteristics of our dataset. As we can see, 61% of our firms have been starting to adopt and ERM system during the time horizon of observation. Moreover, we observe a significant increase in the ERM adoption from 2002 to 2011: only 7 (4%) firms in 2002, 78 (39%) firms in 2011.

Insert Table 1

Insert Table 2

3.2. Empirical model

In order to test our hypothesis and detect if the adoption of an ERM approach affects firm value across industries, we used the Tobin's Q as our dependent variable and a set of independent variables, composed by our risk management variable plus other control variables drawn by the main literature about corporate risk management.

In particular, the Tobin's Q is defined as the ratio between the sum of the market value of equity plus the book value of liabilities over the book value of assets (Smithson, Simkins, 2005; Cummins, Lewis, Wei, 2006). According to Lang and Stulz (1994), the Tobin's Q dominates other performance measures (like, e.g., the accounting measures or the company stock returns) because it doesn't require any risk adjustment or normalization. Moreover, the Tobin's Q reflects the market expectations and is free from possible managerial manipulation of the accounting information. This is important for our analysis as we expect that the ERM adoption doesn't have an immediate effect on the accounting information of the company but requires a certain period of time to exhibit its benefits for the company itself (Lindenberg, Ross, 1981).

We perform a fixed effect panel regression analysis to control for the unobservable heterogeneity across units (our firms) deriving form variables at company-level not included in the model. Formally, the first model (1) we test is:

$$Q_{it} = \alpha + \beta_1 ERM + \beta_2 SIZE + \beta_3 LEVERAGE + \beta_4 SALESGROWTH + \beta_5 ROA + \beta_6 DIVIDENDS + \beta_7 BETA + \varepsilon_{it} \quad (1)$$

where *i* represents the company and *t* the time (years 2002-2011).

Focusing on the set of the independent variables, our risk management variable (*ERM*) is a dummy variable, based on the ERM first adoption. We identify the first adoption of an ERM system on the company annual financial statements. ERM is set equal to 1 in correspondence of the first evidence of ERM adoption and for the years ahead during the period 2002-2011, and equal to 0 in correspondence of observations prior to this moment.

We also consider other control variables that, consistently with the main literature, affect firm

value. Specifically, we include the company size, *SIZE*, measured as the natural logarithm of the firm total assets. There is evidence that big firms are more likely to implement ERM systems (Colquitt, Hoyt, Lee, 1999; Liebenberg, Hoyt, 2003; Beasley, Clune, Hermanson, 2005). However, Lang and Stulz (1994) and Allayannis Weston (2001) find a significantly negative relation between size and firm value.

To control for the relation between firm capital structure and company market value we include a financial leverage variable (*LEVERAGE*) that is equal to the ratio between the book value of total liabilities and the book value of equity. The predicted sign of the relation between leverage and Tobin's Q is ambiguous. On the one hand, financial leverage enhances firm value to the extent that it reduces free cash flows, which might otherwise be invested by self-interested managers in sub-optimal projects (Jensen, 1986); on the other hand, too much debt increases the probability of default of the company.

Then, according to the literature (Allayannis and Weston 2001), as more profitable firms trade at premium, we include the company Return on Assets (*ROA*), measured by the ratio of net income on total assets, to control for firm profitability. Our expectation is a positive relation between *ROA* and firm value. In line with Allayannis and Weston (2001), we control for the effect of growth opportunities, expecting a positive relation with the company Tobin's Q. Thus, we include in our models the *SALESGROWTH* variable, measured as the historical (one-year) sales growth and used as a proxy for future growth opportunities.

Finally, we include the control variables *DIVIDENDS* and *BETA*. The first one is a dummy variable that takes value 1 if the company paid dividends during the corresponding year of analysis and value 0 otherwise. The second one is the standard measure of volatility of the company stock with respect to the market. The expected sign of the relation between these two variables and the Tobin's Q is as follows: ambiguous in the case of dividends (the dividends payment can signal either a lack of new projects with positive NPV or the good status of the company, which can distribute the earnings produced); positive in the case of beta (more volatility increases the value of any investment project).

The second purpose of our analysis is to identify the determinants of the adoption of an ERM system. For this reason we test a second model (2), formalized as follows:

$$\begin{aligned} P(ERM_{it}) = \alpha + \beta_1 SIZE + \beta_2 LEVERAGE + \beta_3 OPACITY + \\ \beta_4 FINANCIALSLACK + \beta_5 \Delta(EBIT) + \beta_6 VALUECHANGE + \varepsilon_{it} \end{aligned} \quad (2)$$

where *i* represents the company and *t* the time (years 2002-2011).

We run a logit panel regression analysis where *ERM* is our dependent variable. *SIZE* and *LEVERAGE* are defined as explained above. As for the *SIZE* variable, recent research shows that bigger companies have a greater probability of involving in an *ERM* adoption because they are more complex, face a wider number of risks and have the possibility to sustain the administrative cost of an ERM program (Colquitt, Hoyt, Lee, 1999; Hoyt, Merkley, Thiessen, 2001; Beasley, Clune, Hermanson, 2005; Standard and Poor's, 2005). As for the LEVERAGE variable, Pagach and Warr (2010) show that the relation between ERM and leverage is ambiguous. On one side, companies adopting an ERM program have the possibility to reduce leverage through a better allocation of the resources within the firm and, consequently, their probability of default. However, they can also decide to increase debt in the financial structure because the ERM helps the firm in monitoring all risks simultaneously, thus controlling its overall risk exposure. Instead, Liebenberg and Hoyt (2003) claim that companies with a higher leverage are more likely to hire a Chief Risk Officer and move towards and integrated risk management.

Then we control for the company opacity (*OPACITY*), defined as the annual ratio between the intangible assets and the total book value of assets of the company (Pagach, Warr, 2010). Liebenberg and Hoyt (2003) argue that firms relatively more opaque should have greater benefit from implementing and disclosing ERM programs. Opaque firms are quite difficult to be evaluated by outsiders (Pottier, Sommer, 2006), thus a structured ERM program should improve the transparency and, as a consequence, have a positive effect on the Tobin's Q.

We also consider as control variables the financial slack (*FINANCIALSLACK*), the annual variation of the EBIT *(*Δ*EBIT*) and the annual change of company value (*VALUECHANGE*). As for the financial slack, defined as the ratio between company liquidity plus short term investments over the book value of assets, the evidence is not unanimous (Pagach and Warr 2010): some firms involved in an ERM protocol have a higher level of financial slack in order to reduce their probability of default; others, instead, have a lower financial slack thanks to the enhanced management of risks.

Also the relation between the ERM implementation and the annual variations of the EBIT is ambiguous: in theory, we would expect that a better risk management reduce the earnings volatility but this is not true for all companies (Pagach, Warr, 2010, 2011; Liebenberg, Hoyt, 2003). Finally, we expect that firms adopting an ERM program reduce their market value

changes, as it is a good signal for the stockholders (Pagach, Warr, 2011).

4. Results

4.1. Descriptive Results

This section reports summary statistics on the main variables of the models we tested.

Insert Table 3

Companies of our dataset are characterized by a mean size of 10.23. The profitability of them is set around 5.8% in terms of ROA. With respect to the financial leverage, the average value is equal to 4.93.

The company mean value (in terms of *Q*) is 1.67 with standard deviation of 1.13.

Table 4 reports the correlation matrix of *Q* variable with the other selected variables. All the correlations among the independent variables are not significantly high, with the exception of *SALEGROWTH1* and *DIVIDENDS* with *ERM* variable. For this reason some of the reported results (see Table 3, column 1) could suffer from this multicollinearity issue. However, when we control for this, the results do not change (see Table 4, column 2).

Insert Table 4

4.2. Empirical Results

In order to test our hypothesis we run a fixed effect panel regression on different versions of model (1) and (2). The main results are reported in Table 4 and 5.

In Table 4, columns 1 and 2 show that the ERM adoption has a strong significant positive impact on company value. Among the control variables, leverage (*LEVERAGE*), size (*SIZE*), *ROA* and the company beta (*BETA*) have a significant impact on the company value. In particular, both the variables *ROA* and *BETA* have a positive effect, meaning that the most profitable and volatile companies have the highest value. Whereas, *LEVERAGE* and *SIZE* have a negative impact on firm value. The other control variables, such as *SALEGROWTH* and *DIVINDENDS* do not affect *TOBIN's Q*. Column 3 reports the selected model, including only significant variables.

Insert Table 4

Overall, these results show that ERM increases the firm value, regardless the specific industry user. This result means that the market perceives the involvement of the company in an ERM system as a good signal.

Table 5 shows the main results of model (2), which focuses on the determinants of the probability of a company to adopt an ERM system. We performed a fixed effects logistic regression, using as independent variables the most cited in the main literature about ERM.

Insert Table 5

Column 2 evidences that the ERM adoption depends on the company opacity (*OPACITY*), on the company size (*SIZE*) and on the financial slack (*FINANCIALSLACK*). Therefore, the presence of intangible assets, the company dimension, and the presence of free liquidity, push firms to better manage risks within the organization.

5. Conclusions

The increasingly turbulent and complex economic scenario brought research about risk management again to the forefront. Historically, companies have managed risks in silos, following a Traditional Risk Management (TRM) approach, and using hedging derivatives and corporate insurance as the mail tools for this activity. In recent years, some firms have started to adopt an integrated approach, called Enterprise Risk Management (ERM) in order to deal with the market complexity. The empirical research regarding the ERM adoption is trying to investigate the relation between this choice and firm value. The majority of the studies are concentrated on financial companies, specifically on insurance companies. Nevertheless, results are still ambiguous. A possible reason consists of the lack of an effective proxy for the degree of ERM capability and implementation. In 2006 S&P produced an ERM rating, but only for insurance companies, thus making the study of ERM adoption easier for companies belonging to this industry. In our study we treat ERM as a dummy variable, setting a value equal to one to companies that explicitly declare in their financial reports the adoption of an integrated approach to risks and also to those that have hired a CRO. The main contribution of our research lies in the attempt to investigate the effect of ERM adoption also on the firm value of non-financial firms. Moreover, we try to discover the determinants of an ERM adoption. Our results show that: overall, ERM increases firm value, regardless the specific industry user. Among the control variables we used in our model, we find that

financial leverage, profitability, size and beta seem to affect the firm value, whereas the dividend policy and sales growth of the firm are weakly significant.

In terms of economic implications, our results seem to show that the market perceives the ERM adoption as a value driver, and not as a cost for the company. This pushes the research about this new paradigm in risk management to go ahead and better understand the organizational implication, the necessary steps, the difficulties and the real benefits of this holistic approach.

The results presented in this paper are still preliminary and not conclusive. The research needs further empirical analysis. Specifically, to check for the robustness of our results, we will collect and introduce new control variables in the models. Secondly, in order to control for market inefficiencies that could affect the Tobin's Q, we will use other proxies for the dependent variable, such as, for instance, company performance measurements. Finally, to generalize the results, we will enlarge our dataset to other companies; in particular we will extend our data both at industry and country level.

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Tables

Table 1. The ERM disclosure

PANEL A

	ERM adoption during 2002-2011	%
ERM = 1	122	61%
ERM = 0	78	39%

PANEL B

	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	TOT.	%
ERM = 1	78	71	63	52	43	33	26	17	9	7	399	19.95%
ERM = 0	122	129	137	148	157	167	174	183	191	193	1601	80.05%
TOT.	200	200	200	200	200	200	200	200	200	200	2000	100%

Table 2. The model variables

PANEL A

Variable	Obs	Mean	Std. Dev.	Min	Max
ERM	2000	.1995	.3997245	0	1
Q	1962	1.669507	1.12899	.366	13.249
SIZE	1984	10.23979	1.738849	5.1091	14.8828
LEVERAGE	1959	4.933071	12.7285	.0014	211.7268
SALESGROWTH1	1070	.0468816	.0879195	0	.8288
ROA	1976	.0576152	.0744397	-.5367	.5185
DIVIDENDS	1991	.9398209	.2415678	0	2.0032
BETA	1934	.9758372	.2881149	.1707	2.2836
OPACITY	1934	.1869926	.3604896	0	7.141824
FINANCIALS~K	1981	.0842748	.1117766	-.0868628	2.738977
DELTAEBIT	1980	-.0333774	4.30267	-116.1564	54.56514
VALUECHANGE	1762	.1780868	.7187305	-.838	19.235

PANEL B

Summary statistics: mean, sd, min, max, N
by categories of: ERM (ERM (si=1/no=0))

ERM	Q	SIZE	LEVERAGE	SALESG~1	ROA	DIVIDE~S	BETA	OPACITY	FINANC~K	DELTAE~T	VALUEC~E
0	1.722711	9.98797	2.979453	.0456015	.0599746	.9381887	.9524999	.1836833	.0843047	.0419653	.1999555
	1.146972	1.618712	7.136026	.0922051	.0739364	.2457481	.2743023	.2340003	.0934261	3.800238	.7650477
	.366	5.1091	.0018	0	-.5367	0	.1707	0	-.0119248	-116.1564	-.838
	13.249	14.5457	95.7146	.8288	.5121	2.0032	2.1247	2.22008	.892293	54.56514	19.235
	1563	1585	1560	886	1577	1592	1543	1538	1582	1581	1370
1	1.46109	11.24013	12.57128	.0530457	.0482902	.9463333	1.067933	.1998455	.0841561	-.3319158	.1016582
	1.030794	1.838705	22.89386	.063189	.075774	.2242878	.3213724	.6501337	.1657818	5.882984	.5193641
	.716	6.2878	.0014	.0001	-.3572	0	.4604	.0003244	-.0868628	-85	-.783
	10.648	14.8828	211.7268	.2256	.5185	1	2.2836	7.141824	2.738977	37.65432	5.014
	399	399	399	184	399	399	391	396	399	399	392
Total	1.669507	10.23979	4.933071	.0468816	.0576152	.9398209	.9758372	.1869926	.0842748	-.0333774	.1780868
	1.12899	1.738849	12.7285	.0879195	.0744397	.2415678	.2881149	.3604896	.1117766	4.30267	.7187305
	.366	5.1091	.0014	0	-.5367	0	.1707	0	-.0868628	-116.1564	-.838
	13.249	14.8828	211.7268	.8288	.5185	2.0032	2.2836	7.141824	2.738977	54.56514	19.235
	1962	1984	1959	1070	1976	1991	1934	1934	1981	1980	1762

Notes: this tables summarize the main descriptive statistics of the variables used in model (1) and (2). Panel A reports stats for the general dataset, Panel B divides stats by *ERM* value (0 v*ersu*s 1). The variables are defined in the following way: *Q* is is the ratio between the sum of the market value of equity plus the book value of liabilities over the book value of assets, *ERM* is set equal to 1 in correspondence to the first evidence of *ERM* usage and for the subsequent years ahead during the period 2002-2011, and equal to 0 in correspondence to observations prior to the first observed ERM usage. *SIZE* is the natural log of the firm total assets, *LEVERAGE* is is equal to the ratio of the book value of total liabilities to the book value of equity, *ROA* is measured as the ratio of net income on total assets, *SALESGROWTH* is measured as the historical (one-year) sales growth and used as a proxy for future growth opportunities, *DIVIDENDS* is a dummy variable that takes value 1 if the company paid dividends during the corresponding year of analysis and value 0 otherwise, *BETA* is the standard measure of volatility of the company stock with respect to the market, *OPACITY* is defined as the annual ratio between the intangible assets and the total book value of assets of the company, *FINANCIALSLACK* is the ratio between company liquidity plus short term investments over the book value of assets, Δ*EBIT* is the annual variation of the EBIT and *VALUECHANGE* is the annual change of company value.

Tabel 3. The Pearson's correlations among model variables

	ERM	Q	SIZE	LEVERAGE	SALESG~1	ROA	DIVIDE~S
ERM	1.0000						
Q	-0.0933*	1.0000					
SIZE	0.2887*	-0.4902*	1.0000				
LEVERAGE	0.3036*	-0.2159*	0.5497*	1.0000			
SALESGROWTH1	0.0320	0.1453*	-0.1449*	-0.0596	1.0000		
ROA	-0.0630*	0.5965*	-0.4175*	-0.2589*	0.0451	1.0000	
DIVIDENDS	0.0135	0.0326	0.0220	-0.1856*	-0.0629*	0.1475*	1.0000
BETA	0.1610*	-0.1665*	0.3218*	0.3268*	0.0985*	-0.2131*	-0.2154*
OPACITY	0.0181	0.4414*	-0.2947*	-0.1584*	-0.0090	0.3091*	0.0699*
FINANCIALS~K	-0.0005	0.3877*	-0.3737*	-0.1523*	0.2360*	0.3632*	-0.0845*
DELTAEBIT	-0.0349	0.0318	-0.0059	-0.0219	-0.0028	0.0932*	0.0261
VALUECHANGE	-0.0569*	0.1071*	-0.1254*	-0.1191*	0.0017	0.0136	-0.1439*

	BETA	OPACITY	FINANC~K	DELTAE~T	VALUEC~E
BETA	1.0000				
OPACITY	-0.1759*	1.0000			
FINANCIALS~K	0.0499*	0.3198*	1.0000		
DELTAEBIT	-0.0555*	0.0081	-0.0071	1.0000	
VALUECHANGE	0.0157	-0.0467	0.0512*	0.0275	1.0000

Notes: This table reports the correlations among variables. The variables are defined as follow:
Q is is the ratio between the sum of the market value of equity plus the book value of liabilities over the book value of assets, *ERM* is set equal to 1 in correspondence to the first evidence of *ERM* usage and for the subsequent years ahead during the period 2002-2011, and equal to 0 in correspondence to observations prior to the first observed ERM usage. *SIZE* is the natural log of the firm total assets, *LEVERAGE* is is equal to the ratio of the book value of total liabilities to the book value of equity, *ROA* is measured as the ratio of net income on total assets, *SALESGROWTH* is measured as the historical (one-year) sales growth and used as a proxy for future growth opportunities, *DIVIDENDS* is a dummy variable that takes value 1 if the company paid dividends during the corresponding year of analysis and value 0 otherwise, *BETA* is the standard measure of volatility of the company stock with respect to the market, *OPACITY* is defined as the annual ratio between the intangible assets and the total book value of assets of the company, *FINANCIALSLACK* is the ratio between company liquidity plus short term investments over the book value of assets, Δ*EBIT* is the annual variation of the EBIT and *VALUECHANGE* is the annual change of company value.

Table 4. The ERM adoption effect on firm value

VARIABLES	(1) Q	(2) Q	(3) Q
ERM	0.122*	0.106**	0.106**
	(0.0630)	(0.0335)	(0.0331)
SIZE	-0.417***	-0.358***	-0.359***
	(0)	(0)	(0)
LEVERAGE	-0.0143*	-5.43e-05	
	(0.0556)	(0.974)	
SALESGROWTH1	0.728		
	(0.126)		
ROA	2.757***	2.541***	2.542***
	(0)	(0)	(0)
DIVIDENDS	0.0503		
	(0.587)		
BETA	0.518***	0.327***	0.326***
	(5.92e-09)	(9.41e-07)	(8.31e-07)
Constant	5.129***	4.862***	4.864***
	(0)	(0)	(0)
Observations	1,047	1,905	1,905
R-squared	0.167	0.122	0.122
Number of ID	119	204	204

pval in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

Notes: this table shows the results for model (1). The variables are defined in the following way: *Q* is is the ratio between the sum of the market value of equity plus the book value of liabilities over the book value of assets, *ERM* is set equal to 1 in correspondence to the first evidence of *ERM* usage and for the subsequent years ahead during the period 2002-2011, and equal to 0 in correspondence to observations prior to the first observed ERM usage. *SIZE* is the natural log of the firm total assets, *LEVERAGE* is is equal to the ratio of the book value of total liabilities to the book value of equity, *ROA* is measured as the ratio of net income on total assets,

SALESGROWTH is measured as the historical (one-year) sales growth and used as a proxy for future growth opportunities, *DIVIDENDS* is a dummy variable that takes value 1 if the company paid dividends during the corresponding year of analysis and value 0 otherwise, *BETA* is the standard measure of volatility of the company stock with respect to the market, *OPACITY* is defined as the annual ratio between the intangible assets and the total book value of assets of the company, *FINANCIALSLACK* is the ratio between company liquidity plus short term investments over the book value of assets, Δ*EBIT* is the annual variation of the EBIT and *VALUECHANGE* is the annual change of company value.

Table 5. The determinants of the ERM adoption

EQUATION	VARIABLES	(1) ERM	(2) ERM
ERM	SIZE	7.299***	7.108***
		(0)	(0)
	LEVERAGE	0.00713	
		(0.689)	
	OPACITY	11.28***	15.09***
		(2.15e-05)	(0)
	FINANCIALSLACK	5.191	5.029**
		(0.101)	(0.0465)
	DELTAEBIT	-0.0197	
		(0.369)	
	VALUECHANGE	-0.434	
		(0.161)	
	Observations	606	706
	Number of ID	68	71

pval in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

Notes: this table shows the results for model (2). The variables are defined in the following way: *Q* is is the ratio between the sum of the market value of equity plus the book value of liabilities over the book value of assets, *ERM* is set equal to 1 in correspondence to the first evidence of *ERM* usage and for the subsequent years ahead during the period 2003-2010, and equal to 0 in correspondence to observations prior to the first observed ERM usage. *SIZE* is the natural log of the firm total assets, *LEVERAGE* is is equal to the ratio of the book value of total liabilities to the book value of equity, *ROA* is measured as the ratio of net income on total assets,

SALESGROWTH is measured as the historical (one-year) sales growth and used as a proxy for future growth opportunities, *DIVIDENDS* is a dummy variable that takes value 1 if the company paid dividends during the corresponding year of analysis and value 0 otherwise, *BETA* is the standard measure of volatility of the company stock with respect to the market, *OPACITY* is defined as the annual ratio between the intangible assets and the total book value of assets of the company, *FINANCIALSLACK* is the ratio between company liquidity plus short term investments over the book value of assets, $\Delta EBIT$ is the annual variation of the EBIT and *VALUECHANGE* is the annual change of company value.