

**Enterprise risk management and value creation: A literature
review**
**Enterprise risk management et la création de valeur : Une revue
de la littérature**

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Abstract

Companies are under intense pressure from their shareholders to adopt a global and organized approach to manage risks, namely the enterprise risk management (ERM). However, the effect of ERM's integration on the shareholders' value creation is unclear. We have, on the one hand, the researchers who consider that this process creates shareholders' value; on the other hand, we have the modern portfolio theory, which considers that ERM can destroy the shareholders' value. Consequently, several empirical works test these hypotheses empirically. This article presents a literature review of these studies.

Keywords: Risk, Enterprise Risk Management, Modern Portfolio Theory, Value Creation, Literature Review.

Résumé

L'entreprise subit de plus en plus de pression de la part de ses actionnaires pour adopter une approche globale et structurée pour gérer les risques, l'enterprise risk management (ERM). Cependant, l'effet de l'intégration d'un ERM sur la création de valeur actionnariale n'est pas évident. On a d'un côté des chercheurs qui considèrent que ce processus crée de la valeur actionnariale ; de l'autre, on a la théorie moderne du portefeuille qui considère qu'il peut détruire la valeur actionnariale. Par conséquent, plusieurs travaux empiriques testent empiriquement ce lien. Cet article présente une revue de la littérature de ces principaux travaux empiriques.

Mots-clés : Risque, Enterprise Risk Management, Théorie moderne du portefeuille, Création de valeur, Revue de la littérature.

Introduction

Risks are an integral part of the current companies' environment (Hrifa and Bamousse, 2018). They can either be internal or external. Internal risks come from the company. These risks include: human errors, frauds, systems' failures and disruption in production's capacity. External risks come from the external environment of the company. These risks include: the emergence of new competitors on the market, the customers' preferences change, the economic conditions change, the financial markets' conditions change, political change, legal change, technological change and demographic change (Dickinson, 2001).

Shareholders become increasingly sensitized to risks. Therefore, they require more risks' monitoring from the companies in order to preserve and maximize their values (Walker et al., 2002; Kleffner et al., 2003). The company that does not manage risks can possibly lose the support of its shareholders (Véret and Mekouar, 2005). Consequently, companies start using ERM to manage their risks in a global and structured approach. This process is integrated in the overall strategy of the company and allows her to identify her risks, to evaluate them, to reduce them, to finance the residual risk, to monitor the evolution of risks and to communicate them to her stakeholders.

Academics consider that ERM's integration in the company enables shareholders' value creation. Their main argument is that ERM helps to reduce the probable costs of financial distress. ERM helps to reduce the volatility of the cash-flows and earnings, which makes financial distress unlikely (Smith and Stulz, 1985; Froot et al., 1993; Stulz, 1996; Meulbroek, 2002). In contrast, modern portfolio theory considers that risk management's activities can destroy shareholders' value. Indeed, this theory considers that the company must only use diversification to reduce its specific risks. Therefore, many empirical studies start to test the link between ERM's integration and shareholders' value creation.

This paper provides a literature review of the principal empirical works that test the link between ERM's integration and shareholders' value creation. Our main research question is: Does ERM create shareholders' value?

We present the various methods used by the researchers to identify the ERM's integration, to measure shareholders' value creation and to test their hypotheses. Then we analyze these studies' results.

This paper is structured as follows. First, we present the theoretical foundations of ERM. We present the principles of the modern portfolio theory, then we analyze its link with ERM. Second, we present the various methods used in empirical works that test the relation between

ERM's integration and shareholders' value creation. Third, we discuss the results of these studies. Finally, we draw our conclusions.

1. ERM's Theoretical Foundation and Literature Review

Harry Markowitz introduced the modern portfolio theory in 1952. A portfolio is regarded as a weighted linear combination of the assets that compose it. The portfolio risk is measured by the variance of its profitability.

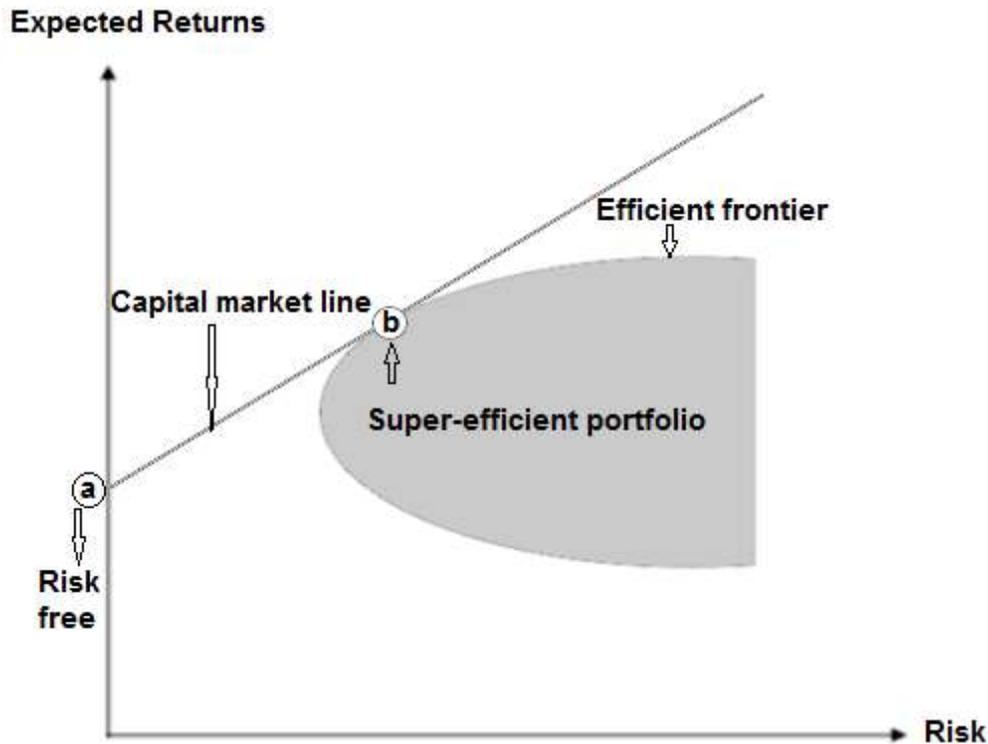
The modern portfolio theory is founded on the basis of the following hypotheses:

- Investors base their choices on mean (which represents return) and variance (which represents volatility). The portfolio's return is the weighted mean of its constituent asset's returns. Assets are weighted according to their proportions in the portfolio. The variance corresponds to the portfolio's risk. It measures the standard deviation of the return and depends on the correlations between the assets that constitute the portfolio;
- financial assets are correlated, i.e. they do not vary in an independent way;
- markets are perfect: there are no taxes, no barrier to entry, no transaction costs, the information is available and free for all and there is a perfect competition
- investors are risk-averse. They can refuse risky assets;
- investors are rational. They seek to maximize their returns for a given level of risk;
- and all the investors have the same decision-making horizon.

Markowitz (1952) considers that the investor will try to maximize the portfolio's return and to minimize its risk. This portfolio is what he calls: "the efficient portfolio." It is the portfolio that enables to maximize the return for a given risk or to minimize the risk for a given return. All the efficient portfolios constitute what he calls: "the efficient frontier" (Vernimmen, 2012). These efficient portfolios are the types of portfolios that interest the rational investors. The modern portfolio theory considers that the portfolio's risk management is possible through diversification. Diversification is the fact of having a portfolio composed of assets that are not (or weakly) correlated.

Figure 1 represents the efficient frontier of Markowitz. Only the portfolios that are on the upper part of the hyperbole are efficient. The higher the risk, the greater the portfolio return.

Figure1: The efficient frontier of Markowitz

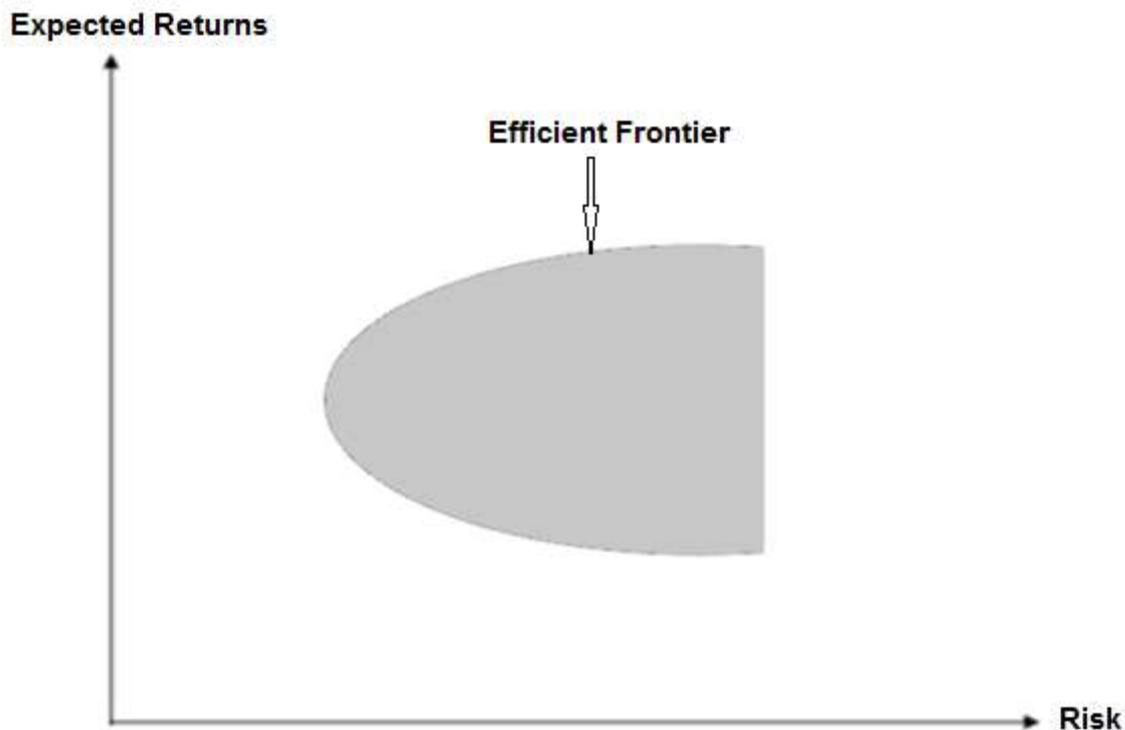


Source : Vernimmen (2012)

However, it is difficult to reach the efficient frontier only through risked assets in the portfolio. This is why Tobin (1958) introduced the concept of a risk-free asset to modern portfolio theory. A risk-free asset is an asset whose variance equals zero, but whose return is certain. It is an asset which is not correlated with the other assets. It is generally a government security such as a treasury bill.

Figure 2 represents the efficient frontier when a risk-free asset is introduced into the portfolio. With the introduction of a risk-free asset, the efficient frontier becomes a line called: “Capital Market Line.” This line starts from the risk-free asset (represented by the letter a in the figure) and is tangential to the efficient frontier of Markowitz (represented by the letter b in the figure). It reflects all the possible combinations between the risk-free asset and the risky asset. The point of tangency between the Capital Market Line and the efficient frontier of Markowitz is called: “Market portfolio.” It is the only efficient portfolio that offers the highest return given the incurred risks (Vernimmen, 2012).

Figure2: The efficient frontier in the presence of a risk-free asset



Source: Vernimmen (2012)

Tobin (1958) considers that the portfolio choice is made in two steps. First, it is necessary to determine the market portfolio. Then, it is necessary to combine this portfolio with a risk-free asset in order for the investor to reach the desired levels of risks and returns. The proportion of the risk-free asset depends on the investor's risk aversion. The more the investor is risk-averse, the less his portfolio is risky. An investor who has a high risk-aversion will choose a portfolio that contains several risk-free assets and few risky assets. On the other hand, an investor who has a low risk-aversion will choose a portfolio that contains few risk-free assets and several risky assets.

Based on the work of Markowitz (1952), some scholars developed a model called: "Capital Asset Pricing Model" (Treyner, 1961, 1962; Sharpe, 1964; Lintner, 1965; Mossin, 1966). This model considers that the total risk of a portfolio combine two types of risks. First, a specific risk that only concerns certain assets. Second, a systematic risk which depends on the movements of the market.

In this model, the investor's compensations depend only on the systematic risks and not on the specific risks. Specific risks can be diversified and thus be reduced. Systematic risks are represented in the Capital Asset Pricing Model by the Beta. Beta represents the volatility of

the portfolio's return compared to the market's volatility (Sharpe, 1964). The higher the Beta is, the higher the portfolio's volatility is compared to the market. Therefore, in the Capital Asset Pricing Model the portfolio's return corresponds to the return of a risk-free asset added to a risk premium. This risk premium will be multiplied by the Beta. It compensates the investor for taking a higher risk (Belkahia and Oudad, 2013).

The literature associate the emergence of the ERM to the modern portfolio theory (Beasley et al., 2008; Alvinuissen and Jankensgard, 2009; Acharyya and Mutenga, 2013; Ballantyne, 2013; Eckles et al., 2014). ERM uses certain principles that are similar to this theory. First, the company's risks are considered as a portfolio, which is managed in a global and structured way (Cumming and Hirtle, 2001; Meulbroek, 2002; Kleffner et al., 2003; Liebenberg and Hoyt, 2003; Gordon et al., 2009; Daud et al., 2011; McShane et al., 2011; Golshan et al., 2012). Second, the risk manager assesses the company's risks and analyzes their possible correlations (Alvinuissen and Jankensgard, 2009). Third, the risks' aggregation allow their diversification. The total risk becomes lower than the sum of the individual risks (Nocco and Stulz, 2006).

The rise of ERM raises the question of its effect on shareholders' value creation. The value can be viewed as the excess of the company's market value compared to her book value.

The modern portfolio theory considers that the ERM can destroy shareholders' value. In this context, any expenditure concerning risk management is regarded as a waste of the company's resources since the specific risks can be eliminated through diversification (Beasley et al., 2008).

As for ERM proponents, ERM improves the shareholders' value and markets' imperfections do exist (Smith and Stulz, 1985; Froot et al., 1993; Stulz, 1996; Meulbroek, 2002). ERM creates shareholders' value through the reduction of the costs of financial distress. These costs can be direct like the legal and administrative costs that include the lawyers' fees. They can also be indirect, like the incapacity to pursue profitable growth's opportunities, the deterioration of the reputation, the loss of a relation with a stakeholder and the non-realization of the real value of the intangible asset in times of financial distress (Smith and Stulz, 1985; Stulz, 1996). For Nocco and Stulz (2006), ERM creates value through "macro-benefits" and "micro-benefits." For the "macro-benefits" ERM enables value creation through a better risk's quantification and a better tradeoff between risk and return. As for the "micro-benefits" ERM builds a genuine risk culture in the company. Each employee becomes a "risk owner" which allows an efficient risks' reduction.

2. The Methods Used in the Empirical Studies

Several empirical studies test the effect of ERM's integration on value creation (Beasley et al., 2008; Hoyt and Liebenberg, 2008, 2011; McShane et al., 2011; Tahir and Razali, 2011; Lin et al., 2012; Quon et al., 2012; Ballantyne, 2013; Baxter et al., 2013; Waweru and Kisaka, 2013; Farrell and Gallagher, 2015; Eastman and Xu, 2015; Ramlee and Normah, 2015; Vo, 2016).

Various methods are used to identify the companies that have an ERM, to measure the value and to test the effect of ERM on the value creation. In the following, we present a literature review of these methods.

2.1. The Methods Used to Identify the Companies With an ERM

It is difficult to evaluate the presence of an ERM in companies because they often do not communicate this information (Liebenberg and Hoyt, 2003). There is no universal method to determine the presence of an ERM. Each researcher chooses the method that is appropriate to him given to the means available.

Beasley et al. (2008) use companies' public information (financial statements, briefing notes, annual reports, newspapers, etc.) to search for the presence of the keyword Chief Risk Officer (CRO). The CRO is a person who works with other managers to establish an effective ERM (COSO, 2004). Given the complexity of the assessment and the treatment of risks, this process is generally managed by a CRO (Beasley et al., 2008). Therefore, the presence of a CRO may be synonymous with the presence of an ERM in the company.

Other researchers do not only search for the presence of the CRO's keyword in companies' public information, but also other keywords that may indicate the presence of an ERM (Hoyt and Liebenberg, 2008, 2011; Lin et al., 2012; Eastman and Xu, 2015; Vo, 2016). The keywords used include: ERM, senior risk management, risk management director, vice-president risk management and vice-president ERM, risk committee, strategic risk management, consolidated risk management, holistic risk management and integrated risk management.

Certain researchers use special databases to identify the presence of an ERM. Tahir and Razali (2011) use the Osiris database which contains information on listed companies. This database contains summarized information, detailed financial information, ratings, scanned reports and various companies' information. Farrell and Gallagher (2015) use the ERM maturity model of the Risk and Insurance Management Society (RIMS). This model is based on the survey performed by the RIMS between 2006 and 2011 to evaluate companies' ERM.

This model is based on seven components: the level of support of the executive managers to ERM, the ERM's integration in the companies' activities, the risk appetite, the understanding of the origin of risks, the capacity to identify risks, the management of the performance and finally the resilience and durability.

Other researchers use the ERM's rating of Standard & Poor's (S&P) to identify the presence of an ERM in companies (McShane et al., 2011; Quon et al., 2012; Baxter et al., 2013). This rating enables to evaluate several aspects of an ERM like the risk management culture, the systems, the processes and the practices (McShane et al., 2011). The S&P ERM's Rating classifies companies in five categories (from a weak ERM to an excellent ERM).

Ramlee and Normah (2015) create their own index. This index is based on the four categories of objectives that appear in the COSO (2004) framework: strategic, operations, reporting and compliance.

Finally, the remaining researchers use their own surveys to identify the presence of an ERM in companies. Ballantyne (2013) conduct an online survey using a sample of 134 listed American companies in 2012. He uses in his survey the eighth ERM's components of the COSO (2004) framework: the internal environment, objective setting, event identification, risk assessment, risk response, control activities, information and communication. Waweru and Kisaka (2013) conduct a survey on 22 companies listed on the Nairobi stock exchange in 2009. In their questionnaire, they ask the companies to evaluate the level of ERM's integration. The responses allow them to classify companies in six levels, from level 1 (where there is no ERM and the companies do not intend to integrate it) to level 6 (where the ERM is well formulated and completely integrated).

2.2. The Variables of Value Creation Used

The majority of the empirical studies on the relation between ERM's integration and the shareholders' value creation use James Tobin's Q ratio as a measure of the shareholders' value creation (Hoyt and Liebenberg, 2008, 2011; McShane et al., 2011; Tahir and Razali, 2011; Lin et al., 2012; Quon et al., 2012; Ballantyne, 2013; Baxter et al., 2013; Waweru and Kisaka, 2013; Farrell and Gallagher, 2015; Ramlee and Normah, 2015; Vo, 2016). Tobin's Q is the market value of equity plus the book value of liabilities divided by the book value of assets (Hoyt and Liebenberg, 2008). The company creates value if the return on investment is higher than its cost. Therefore, if the value of Tobin's Q is higher than one the company creates value and vice versa (Tahir and Razali, 2011).

Only Beasley et al. (2008) and Eastman and Xu (2015) use different indicators for the shareholders' value. Beasley et al. (2008) use the cumulative abnormal returns of stocks for the two days following the nomination of a CRO in the company. Eastman and Xu (2015) use also the cumulative abnormal returns of stocks, but for different periods around ERM's integration and after the ratings announcements from two rating agencies (S&P and A.M. Best). They explain their choice by the fact that the increase in the shareholders' value will cause positive stocks' reactions for the companies that have an ERM.

2.3. The Statistical Tests of Hypotheses Used

In order to statistically test the relation between the integration of an ERM and the shareholders' value, the majority of the researchers use a linear regression (Beasley et al., 2008; McShane et al., 2011; Tahir and Razali, 2011; Ballantyne, 2013; Baxter et al., 2013; Waweru and Kisaka, 2013; Ramlee and Normah, 2015). The linear regression allows modeling the relations between a dependent variable (the shareholders' value creation) and one or more explanatory variables (ERM's integration) as a linear function (Gavard-Perret et al., 2012).

Quon et al. (2012) use the Student's t-test to evaluate the changes in shareholders' value of 156 nonfinancial companies between 2007 and 2008 and between 2008 and 2009. The Student's t-test is a parametric test that compares the means of two populations that follow a normal distribution (Thiéart, 2014).

In other studies, it is the maximum likelihood estimation that is used to analyze the effect of ERM's integration on the shareholders' value creation (Hoyt and Liebenberg, 2008, 2011). These researchers explain the choice of this method by the fact that certain variables correlated with the determinants of ERM's integration can also be correlated with the observed differences in the shareholders' value.

Certain researchers use the Heckman two-step estimation to correct the selection bias and to reduce the endogeneity of ERM's integration (Lin et al., 2012; Farrell and Gallagher, 2015; Vo, 2016). In addition to this method, Vo (2016) uses Hausman-Taylor estimation. He explains this choice by the fact that certain explanatory variables are correlated with the individual level random effects.

Finally, Eastman and Xu (2015) perform an event study to measure the impact of ERM's integration on shareholders' value creation.

3. The results of the empirical studies

Empirical works that test the relation between ERM's integration and the shareholders' value creation have various conclusions.

First there are studies that find that ERM's integration improves the shareholders' value. The results of Hoyt and Liebenberg (2008) and of Hoyt and Liebenberg (2011) show that ERM's integration improves the shareholders' value by 17% and 20% respectively. Baxter et al. (2013) find that the shareholders' value is higher for the companies that have advanced ERM. Waweru and Kisaka (2013) find that ERM's integration has a positive influence on shareholders' value. They find that the companies that integrated an ERM have a shareholders' value higher by 15.7% compared to other companies' shareholder's value. The results of Farrell and Gallagher (2015) show that the companies that have more advanced ERM have a shareholders' value higher by approximately 25%. Finally, Vo (2016) finds that ERM's integration in listed European insurers improves their shareholders' values.

Other researchers find mixed results. McShane et al. (2011) find that the shareholders' value increases in the traditional risk management approach, but it does not increase with sophisticated ERM. Eastman and Xu (2015) find that the markets' reactions are negative for the companies that integrated an ERM before 2005, whereas they are positive for the companies that integrated an ERM after 2005. They consider that these results can have two reasons. First, S&P started to consider ERM in her rating since 2005. Second, ERM's understanding in companies improves with time. The results of Eastman and Xu (2015) also show that the market's reactions after ratings announcements from S&P and A.M.Best are positive for the companies that have an ERM, whereas there are no markets' reactions for the companies without an ERM.

Then, there are researchers who find that ERM's integration does not have a statistically significant influence on the shareholders' value. The results of Beasley et al. (2008) show that the market's reactions after the nomination of a CRO is nonsignificant. Nevertheless, they find that it is associated with some characteristics of the nonfinancial companies. On the one hand, they are positively correlated with size and earnings' volatility. On the other hand, they are negatively correlated with the financial leverage and the cash ratio. Tahir and Razali (2011) find a positive relation between ERM's integration and the shareholders' value, but it is not statistically significant. Quon et al. (2012) find that the risks' increase has an immediate effect on the shareholders' value, but it is not statistically significant. The results of Ballantyne (2013) show that ERM's integration and its maturity do not have significant

effects on the shareholders' value. Ramlee and Normah (2015) find that the presence of a risk management committee does not have a significant influence on the shareholders' value.

Finally, only Lin et al. (2012) find that the ERM's integration reduces the shareholders' value by 5%.

Table1: Synthesis of the empirical studies on the effect of ERM's integration on value

Authors	Sample	ERM's indicator	Methodology	Value indicator	Results
Beasley et al. (2008)	120 American companies	Search for CRO	Linear regression	Cumulative abnormal returns of stocks	No significant influence
Hoyt and Liebenberg (2008)	125 listed American insurers	Search for several keywords	Maximum likelihood estimation	Tobin's Q	Positive influence
Hoyt and Liebenberg (2011)	117 listed American insurers	Search for several keywords	Maximum likelihood estimation	Tobin's Q	Positive influence
McShane et al. (2011)	82 listed insurers	S&P's ERM rating	Linear regression	Tobin's Q	Mixed results
Tahir and Razali (2011)	528 listed Malaysian public companies.	Osiris database	Linear regression	Tobin's Q	No significant influence
Lin et al. (2012)	85 Listed American insurers	Search for several keywords	Heckman two-step estimation	Tobin's Q	Negative influence
Quon et al. (2012)	156 nonfinancial companies listed in Toronto	S&P's ERM rating	Student's t-test	Tobin's Q	No significant influence
Ballantyne (2013)	134 listed American insurers	Survey	Linear regression	Tobin's Q	No significant influence

Authors	Sample	ERM's indicator	Methodology	Value indicator	Results
Baxter et al. (2013)	165 observations (banks and insurances)	S&P's ERM rating	Linear regression	Tobin's Q	Positive influence
Waweru and Kisaka (2013)	22 companies listed in Nairobi	Survey	Linear regression	Tobin's Q	Positive influence
Eastman and Xu (2015)	43 American insurers	Search for several keywords	Event study	Cumulative abnormal returns of stocks	Mixed results
Farrell and Gallagher (2015)	225 listed companies from several countries	RIMS's ERM maturity model	Heckman two-step estimation	Tobin's Q	Positive influence
Ramlee and Normah (2015)	148 nonfinancial companies Listed in Malaysia	Creation of an ERM index	Linear regression	Tobin's Q	No significant influence
Vo (2016)	101 listed European insurers	Search for several key words	Heckman two-step estimation and Hausman-Taylor estimation	Tobin's Q	Positive influence

Source: Prepared by the author

Conclusion

We present in this paper a literature review of 14 empirical studies that test the relation between ERM's integration and the shareholders' value creation. We analyze in our literature review the methods used to determine the presence of an ERM, the indicators of the shareholder's value used, the statistical tests used and the results of these studies.

We note that the researchers use different methods to identify the companies that have an ERM. These methods include: the search for the CRO keyword, the search for other keywords that indicate the presence of an ERM, the use of specific databases, the use of S&P's ERM

rating, the creation of an ERM's index and the use of surveys. To measure the shareholder's value, the majority of the studies use Tobin's Q ratio. This ratio is a good indicator of the value since it considers markets' anticipation. The most used method by the researchers to statistically test the relation between ERM's integration and the shareholder's value is the linear regression. Regarding the results of the empirical work analyzed, we note that there is no real consensus between the researchers on the influence of ERM's integration on shareholders' value. Indeed, six studies find that ERM improves the shareholders' value, two studies find mixed results and cannot confirm their hypotheses, five studies find that ERM does not have a significant influence on shareholders' value and only one study finds that ERM reduces the shareholders' value.

Additional empirical studies on the effect of ERM's integration on shareholders' value creation are necessary. We suggest that these studies use surveys to evaluate ERM's maturity, and to test its effect on shareholders' value creation instead of only using ERM's presence. The fact that the company indicates the presence of this process does not automatically mean that it constitutes an integral part of the company's strategy and that she attaches a real importance to this process. In contrast, the fact of classifying the companies according to ERM's maturity enables to test if the companies with more advanced ERM create more values than the companies that have less advanced ERM.

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