



Reprint of: The impact of enterprise risk management on the marginal cost of reducing risk: Evidence from the insurance industry[☆]



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ARTICLE INFO

Article history:

Available online 3 March 2014

JEL classification:

G22
G28
G32

Keywords:

Risk management
Enterprise risk management
Financial institution
Insurance

ABSTRACT

We test the hypothesis that practicing enterprise risk management (ERM) reduces firms' cost of reducing risk. Adoption of ERM represents a radical paradigm shift from the traditional method of managing risks individually to managing risks collectively allowing ERM-adopting firms to better recognize natural hedges, prioritize hedging activities towards the risks that contribute most to the total risk of the firm, and optimize the evaluation and selection of available hedging instruments. We hypothesize that these advantages allow ERM-adopting firms to produce greater risk reduction per dollar spent. Our hypothesis further predicts that, after implementing ERM, firms experience profit maximizing incentives to lower risk. Consistent with this hypothesis, we find that firms adopting ERM experience a reduction in stock return volatility. We also find that the reduction in return volatility for ERM-adopting firms becomes stronger over time. Further, we find that operating profits per unit of risk (ROA/return volatility) increase post ERM adoption.

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1. Introduction

Managing risk is important for corporations. The theory of corporate risk management argues that firms with smooth cash flows have lower expected tax liabilities, financial distress costs and contracting costs, suggesting that managing risk adds value (Mayers and Smith, 1982; Smith and Stulz, 1985; Froot et al., 1993). Consistent with this theory, 92% of the world's 500 largest companies in 2003 report using derivatives (Smithson and Simkins, 2005). Empirical evidence also shows that risk management enhances shareholder value (Allayannis and Weston, 2001; Carter et al., 2006; Hoyt and Liebenberg, 2011). To the extent that risk management reduces earnings and cash flow volatilities, it also facilitates investors and regulators to evaluate and monitor firm performance and solvency risk. The 2008 financial crisis highlights that risk

management is not only important to corporations but also to regulators and the global economy as a whole.

In recent years, a growing number of firms have adopted enterprise risk management (ERM) to improve risk management. Some risk management professionals argue that the 2008 financial crisis resulted from a system-wide failure to embrace ERM and that adopting ERM may prevent the history from repeating itself.¹ According to Nocco and Stulz (2006), ERM is a process that identifies, assesses and manages individual risks (e.g., currency risk, interest rate risk, reputational risk, legal risk, etc.) within a coordinated and strategic framework. Therefore, ERM represents a radical paradigm shift from the traditional method of managing risks individually to managing risk holistically. In other words, ERM emphasizes managing risks as a portfolio (risk-portfolio) as opposed to managing individual risk separately. It is this aspect of ERM that forms the premise of this paper.

We hypothesize that ERM adoption lowers the marginal cost (MC) of reducing risk, which creates incentives for profit-maximizing firms to reduce total risk while increasing firm value. By combining the firm's risks into a risk-portfolio, an ERM-adopting firm is able to better recognize the benefits of natural hedging, prioritize hedging activities towards the risks that contribute most to the

DOI of original article: <http://dx.doi.org/10.1016/j.jbankfin.2014.02.007>

[☆] A publisher's error resulted in this article appearing in the wrong issue. The article is reprinted here for the reader's convenience and for the continuity of the special issue. For citation purposes, please use the original publication details: Eckles, D.L., Hoyt, R.E., Miller, S.M., 2014. The impact of enterprise risk management on the marginal cost of reducing risk: Evidence from the insurance industry. *Journal of Banking and Finance* 43, 247–261.

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¹ *Risk management*, April, 1 2009, "The New DNA: Examining the Building Blocks of Risk."

total risk of the firm, and optimize the evaluation and selection of available hedging instruments.² By so doing, the ERM-adopting firm realizes a greater reduction of risk per dollar spent. This reduction in MC of managing risk incentivizes profit-maximizing firms to further reduce risk until the marginal cost of risk management equals the marginal benefits. Consistent with this hypothesis, we find that firms adopting ERM experience a reduction in stock return volatility. Due to the costs and complexity of ERM implementation, we also find that the reduction in return volatility for ERM-adopting firms becomes stronger over time. Further, we find that operating profits per unit of risk (ROA/return volatility) increase post ERM adoption.

This paper makes an important contribution to the literature. We are the first to examine and empirically test the impact of ERM adoption on firms' risk taking behavior. Hoyt and Liebenberg (2011) find a large valuation premium (as measured by Tobin's Q) for ERM adopters, whereas Beasley et al. (2008) find insignificant, negative announcement returns for ERM adoption. We find that, after adopting ERM, firm risk decreases and accounting performance increases for a given unit of risk. Therefore, our results complement the findings in Hoyt and Liebenberg (2011), which are based on market valuation of firm performance. Our analysis also has policy implications, as our results lend support for the recent pressure from regulators, rating agencies and institutional investors on firms to adopt ERM as part of their analysis.³

The remainder of the paper is organized as follows: Section 2 reviews related literature, Section 3 develops hypotheses, Section 4 describes the research design, Section 5 summarizes the sample selection process and describes the sample, Section 6 presents empirical findings and Section 7 concludes.

2. Literature review

The theory of corporate risk management is well established and empirical studies analyzing corporate risk management policy are vast. In contrast, the literature on ERM is still in its infancy and much of the existing evidence comes from survey and case studies. In this section, we first summarize the literature on corporate risk management and then review the research on ERM. Given the purpose of this study, we perform a much more exhaustive review of the latter, paying attention to only the more representative papers of the former that are relevant to this paper.

2.1. The literature on corporate risk management

The theory of corporate risk management is developed as an extension of corporate financing policy. Under the Modigliani–Miller (1958) paradigm, with fixed investment policy and with no contracting costs and taxes, corporate financing policy is irrelevant. Following this line of reasoning, the theory of corporate risk management uses taxes, contracting costs, and the impact of risk management on corporate investment policies to explain the firm's

² Note that this risk reduction can be done in any manner. We do not suggest a mechanism (e.g., altering product mix, reinsurance, etc.) by which firms reduce risk.

³ A.M. Best began to implement its Enterprise Risk Model for US insurers in late 2001 (A.M. Best Special Report - A.M. Best's Enterprise Risk Model, A Holistic Approach to Measuring Capital Adequacy, July, 2001). Standard and Poor's introduced ERM analysis into its global corporate credit rating process for financial and insurance companies starting in 2005 and for non-financial companies starting in 2008 (Analysis of Enterprise Risk Management in S&P Ratings of Non-Financial Corporations, Standard and Poor's Presentation to the International Developments Subcommittee of American Bar Association, 18 November 2008). Kleffner et al. (2003) report that many countries, including Canada, the United States, the United Kingdom, Australia, and New Zealand, are pressing firms to adopt more integrated and comprehensive risk management systems, propelling more firms to adopt ERM. Indeed, 37% of their surveyed Canadian firms cite compliance with Toronto Stock Exchange guidelines as their reason to adopt ERM.

risk management decision (Mayers and Smith, 1982; Smith and Stulz, 1985; Froot et al., 1993).

Empirical research on corporate risk management generally addresses two questions: why does a firm manage risk and more important for the current study, what is the impact of risk management on firm value?

Four rationales are generally given for the management of firm risk: (1) managerial self-interest, (2) the non-linearity of taxes, (3) the costs of financial distress, and (4) the existence of capital market imperfections (Allen and Santomero, 1998). For example, Tufano (1996) finds evidence consistent with the theory of managerial risk aversion proposed in Stulz (1984) and Smith and Stulz (1985). Mian (1996), however, finds evidence that is inconsistent with the argument of financial distress cost, evidence that is mixed with respect to the argument of taxes, contracting cost, imperfect capital markets, but strongly supports the argument of economies of scale (i.e., that larger firms hedge more). Graham and Rogers (2002) find that firms hedge to increase debt capacity, not in response to tax convexity. Gay and Nam (1998) find empirical evidence supporting the underinvestment explanation for corporation risk management policy. Haushalter (2000) finds support for the argument that financing costs influence firms' hedging decisions. Harper and Wingender (2000) find strong evidence for Wall's (1989) hypothesis of agency cost reduction by interest rate swaps.

In contrast to the richness of studies examining the determinants of corporate risk management policy, studies analyzing the valuation impact of risk management are relatively few. Allayannis and Weston (2001) find a positive relation between firm value and the use of foreign currency derivatives, with an average hedging premium of 4.87%. Carter et al. (2006) find that the hedging premium could be as large as 10%, and further find that the positive relation between hedging and firm value increases in capital investment, and most of the hedging premium is attributable to the interaction of hedging with investment, suggesting that the hedging benefit comes from a reduction of underinvestment costs.

2.2. The literature on ERM

The theory of enterprise risk management is based on the theory of corporate risk management and is best summarized in Nocco and Stulz (2006). Nocco and Stulz (2006) define ERM as an approach under which "all risks (are) viewed together within a coordinated and strategic framework." They argue that ERM creates value, because it strengthens the firm's ability to carry out its strategic plan, by minimizing costs like underinvestment.

Empirical work on ERM is limited and can be classified along three main lines of research – describing the ERM practice, analyzing the determinants of ERM adoption, and assessing the valuation effect of ERM. In view of the purpose of this study, we focus on the latter two lines of literature.⁴

Liebenberg and Hoyt (2003) compare firm characteristics between 26 ERM adopters and their control firms. They fail to find much difference except that the former is smaller and more levered. Using survey data from Canadian firms, Kleffner et al. (2003) find that forces driving firms to adopt ERM include the influence of risk managers, encouragement from the board of directors, and compliance with Toronto Stock Exchange guidelines, while the main deterrence to ERM adoption is organizational iner-

⁴ To read about the various development stages of ERM, see e.g., Colquitt et al. (1999), Aabo et al. (2005), Gates (2006), and Calandro et al. (2008). For a detailed account of the development of ERM and summary of academic research on this subject, see *Enterprise Risk Management: Today's Leading Research and Best Practices for Tomorrow's Executives*, 2010, Wiley Publishing, Editors: John Fraser and Betty J. Simkins. See Hunter and Smith (2002) for a review of developments in risk management at both the firm level and the macro-economy.

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