# Corporate Reputational Risk and Enterprise Risk Management: An Analysis from the Perspectives of Various Stakeholders

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### Executive Summary

In this paper we examine the effect of Enterprise Risk Management (ERM) adoption on a firm's corporate reputation. ERM may impact corporate reputation in a variety of ways. First, ERM is a management process that enables a firm to holistically manage all risks. This creates a process in which individual risks, including reputation risk, are identified, assessed, and managed in a unified manner so that the firm value is maximized. Second, ERM encourages disclosure of risks, so that stakeholders can better understand which risks a firm is accepting and which it is avoiding. This greater disclosure is generally viewed positively by outside stakeholders because it allows them to better manage their own risk profiles. Finally, ERM provides a strategic response to a reputation damaging event.

From our examination of a range of reputation proxies, we find evidence that implementation of a ERM program may enhance corporate reputation, although not in the short-term. In addition, we find evidence that ERM adoption tends to occur during a period in which various reputation measures tend to be decreasing. This suggests that firms may be implementing ERM as a response to a decline in corporate fortunes. However, our results suggest that following ERM adoption this decline in reputational measures is somewhat reduced and in some cases reversed.

### Acknowledgements

### 1 Introduction

Enterprise Risk Management (ERM) is a broad process by which managers analyze the portfolio of all risks facing the enterprise. The goal of ERM is to ensure that the risks taken by a firm are within a firm's risk appetite and that these risks are managed holistically. Proponents of ERM argue that, if implemented properly, ERM can benefit shareholders through lower stock volatility and higher stock value.

One component of a firm's portfolio of risks is reputation risk. While the definitions of reputation are broad and wide ranging, a common theme is that a firm with a good reputation is committed to principled business practices and ethical accounting. Damage to the corporate reputation can have devastating effects on shareholder value and firm performance.[1] Thus

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[1]     Merck, for example, suffered a 1/3 drop in shareholder value around the Vioxx scandal. Poor reputational risk management was partly attributed for why the company's stock price struggled to recover (see Eccles, Newquist and Schatz (2007)).

preserving a corporate reputation is of great importance to most companies, and increasingly reputation risk management has been falling under the ERM umbrella.

ERM can impact firm reputation and reputational risk in a variety of ways. First, by setting forth a process by which all of the risks facing a firm are managed holistically, a firm should be better able to identify potential reputation damaging events and thus reduce the chance that such events occur. Second, through ERM best practices, a firm may improve the disclosure of risks and financial information to investors, thus reducing the risk and uncertainty that these investors face. Third, ERM adoption in, and of, itself may result in an improved firm reputation to the extent that stakeholders associate ERM adoption with better management practices overall. Finally, ERM provides for a strategic response when a reputation damaging event occurs.

In this paper we examine the interaction between ERM and corporate reputation. We seek to understand whether the adoption of ERM is related to corporate reputation. Specifically, we are interested in whether corporate reputation is changed by the adoption of ERM. In addition, we examine if a firm's corporate reputation plays a role in its decision to implement ERM. For example, it could be the case that ERM is adopted in a response to declining corporate reputation.

While there has been a large increase in the number of ERM adoptions in recent years, our work is the first empirical research to examine the effect of ERM on firm reputation and reputational risk. This is true even though The Conference Board (2007) has found that a large number of companies are now starting to use ERM as a strategic management tool (The Conference Board, 2005). In addition, a number of consulting companies are now offering services to measure a firm's reputation and manage reputational risk during crisis (Ancia and Ananth, 2008).

We examine the effect of ERM adoption on a firm's reputation as viewed by various stakeholders. This approach is consistent with the notion that reputation affects all aspects of a firm's business. As Eccles Newquist and Schatz (2007) suggests, firms with high reputation enjoy numerous benefits such as more loyal customers, better employees, more sustained earnings, higher future growth and lower costs of capital. Given these hypothesized benefits, we hypothesize that the effects of reputation may be observed in numerous firm variables. To the extent that ERM may enhance or better manage reputation, we may observe changes in these variables around ERM adoption.

Because companies do not normally announce ERM initiations, we use the announcement of the appointment of a Chief Risk Officer (or equivalent) as a signal of the adoption of an ERM program. If ERM enables a firm to positively manage the portfolio of risks (including reputational risk) faced by various stakeholders, then we expect to observe a change in our proxies for reputation around ERM adoption. It would be logical that the changes in these proxies could be due to an improvement in a firm's reputation given that a firm has adopted ERM. In this scenario, stakeholders associate ERM with better management practices and increase their perception of quality about a firm and its managers. Alternatively, the ERM process itself may improve reputation by changing some aspect of a firm's operations. For

example, a firm's reputation with investors may be improved, if, as a result of ERM implementation, financial reporting quality is improved. Our tests and specifically our proxies for reputational risk will allow us to explore these possibilities.

As a preview of our results, we find that ERM appears to be adopted by firms that have suffered a decline in key reputation measures. Thus it appears that ERM is used as one of the potential remedies for declining reputation, rather than to purely enhance an existing reputation. Given the early developmental stage of ERM, this may not be a surprising result as it suggests that companies with the most at risk are the earliest adopters. Our results also suggest that following ERM adoption, the decline in reputational measures are reduced and in some cases reversed.

The remainder of our paper proceeds as follows: Section 2 reviews the literature on ERM and reputation measures. Section 3 discusses the data and method. Section 4 presents the results and section 5 concludes.

## 2  Literature Review

### 2.1  Enterprise Risk Management

In recent years risk management has expanded from a narrow focus on tradeable risks and insurance to a broader, all encompassing view of risk, termed Enterprise Risk Management (ERM). Prior work on the benefits and costs of ERM examine the ability of a firm to use ERM to manage risks that are manifested in the form of severe cash flow shocks. For example, Stulz (1996) and Nocco and Stulz (2006) argue that ERM is beneficial to most firms because it allows firms to manage risks in a manner that avoids costly left tail outcomes caused by large negative cash flows. In this case, ERM aims to reduce the probability of these large negative cash flows through the coordination of offsetting risks across the enterprise and to ensure that no single project risk will have an adverse effect on the overall firm. In addition, ERM shifts firms' strategic focus from specific tradable risks that may exist within a silo to all of the risks that firms face. Operational risks and reputation risks are now part of management's focus in examining the total enterprise risk. For example, the Conference Board (2007) suggests that not including reputation risk into ERM could lead to an ineffective response to risk events, and reduce a firm's ability to foster a cohesive culture of risk awareness.

The costly lower tail outcomes discussed by Stulz (1996) and Nocco and Stulz (2006) can have both direct and indirect effects on a firm's value. For example, events such as bankruptcy and financial distress involve direct outlays to creditors, lawyers and courts. Indirect costs include the inability to pursue profitable growth options, the loss of customer confidence, and the inability to realize the full value of intangible assets upon liquidation. A decline in debt ratings and the resulting increase in borrowing costs can also be costly for shareholders. Managers and employees who own stock in their company will have an undiversified equity portfolio and will bear a greater proportion of the cost of a lower tail event than a fully diversified shareholder. In an efficient labor market, these employees will demand higher compensation for bearing this idiosyncratic risk. Other stakeholders, such as suppliers, may be reluctant to enter into long term

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contracts with a firm if the potential for future payment is uncertain. All of these problems can result from the possibility of costly lower tail outcomes and represent value creating opportunities for a risk management program that can minimize such outcomes.

In addition to operating and financial risk, the loss of, or damage to reputation can result in significant cash flow shocks to a firm in the form of lost confidence by customers and investors. We discuss reputational risk specifically in the next section.

### 2.2 Stakeholders and Reputational Risk

Eccles, Newquist and Schatz (2007) state that firms that have higher reputation among stakeholders tend to be more valuable. This conjecture is supported by Wang and Smith (2008) who find that having a higher reputation on average increases firm value by about $1.3 billion. Measuring reputation and reputation risk, is however, a difficult task, in part because of the many differing definitions of reputation and reputational risk. We therefore use the Federal Reserve System's regulatory definition as our definition of reputational risk:

*Reputational risk is the potential that negative publicity regarding an institution's business practices, whether true or not, will cause a decline in the customer base, costly litigation or revenue reductions.*

It is important to recognize that reputation risk is normally the result of management processes as opposed to a specific event (see Walker (2003)). All firms face the possibility of negative events, but it falls on management to ensure that these events do not damage corporate reputation. Thus, reputation risk is a function of all the areas under mangement control such as; firm strategy, customer interaction, employee treatment, leadership and compliance and incentive systems. Ultimately, reputation-related losses reflect reduced expected revenues and cash flows and higher financing costs. At the extreme a severe loss of reputation may result in financial distress through loss of investor confidence or loss of customers.

We propose to examine the impact of ERM on firm reputation and reputational risk from the perspective of three stakeholders: financial statement users (such as investors), customers and employees. Each of these stakeholders plays a major role in a firm's success and we believe that differences and changes in corporate reputation will be distinguishable for these stakeholders. In addition, a strong positive reputation among stakeholders across all areas results in a strong overall reputation (Eccles, Newquist and Schatz, 2007).

We discuss each of these stakeholders in more detail and the proxies that we will use to measure the reputational risk associated with each stakeholder.

### 2.2.1 Financial Statement Users

Financial statements are a firm's most important method of communicating performance results to stakeholders. Users of a firm's financial statements are typically investors, but also include

business partners who are evaluating a firm's financial strength before commencing or expanding a business relationship.  In addition, these stakeholders are also evaluating a firm's reputation through its financial reporting.  Specifically, companies with a high quality reputation have more incentive to ensure that their financial reports are free of misstatements and errors.

We proxy for reputation quality in two broad ways for this group of users.  First, we quantify specific financial measures such as the probability of bankruptcy or the debt rating.  These measures capture the financial health of a firm.  Second, we measure the quality of financial reporting by estimating the probability that a firm manipulates its earnings.  Both of these sets of reputation proxies will be of direct interest to both equity and debt investors.  Indirectly, the quality of a firm's reputation among these stakeholders will effect stock liquidity, cost of capital and share price.

In addition to investors, customers and suppliers also pay close attention to the financial health and overall quality of a firm's financial reports.  For example, Maksimovic and Titman (1991) argue that a firm's financial health impacts its ability to credibly deliver quality products and provide ongoing support for these products.  Thus, the financial proxies mentioned above also serve as reputational proxies for customers and suppliers.  Firms with declining financial health are likely to suffer declining reputation among customers who are concerned with future product and service support.

Specifically, the financial reputation proxies that we use include certain financial ratios, as well as a firm's debt rating, the Standard and Poors' quality rating, the probability of bankruptcy developed by Zmijewski (1984) and the probability of earnings manipulation developed by Beneish (1997).

### 2.2.2 Customers

To measure customer reputation we use the Fortune ranking of the "Most Admired Companies"[2] and also the market share of a firm.  Market share also indirectly measures customer satisfaction, although we fully recognize, it can be due to other reasons, such as aggressive pricing.  Absolute market share also fails to capture different quality versus quantity strategies across industries.  However, change in market share captures important information about how a firm's products are perceived, regardless of the actual market share of a firm.

For customers seeking a long term relationship with a firm, the financial stability of a firm is also important.  Customers care about the quality of the current products or services being produced by a firm, and the future ability of a firm to provide on-going support for these products or services.  Therefore, a customer's exposure to reputational risk can be measured in two dimensions.  First, a decline in the absolute measure of product quality represents a risk that a customer faces.  Second, the future financial health of a company is important to existing customers as declining financial health may impact a firm's ability to honor warranties and

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[2]     http://money.cnn.com/magazines/fortune/mostadmired/2008/index.html

provide ongoing after sales service.

### 2.2.3 Employees and Suppliers

For many firms, value depends upon the intellectual capital that resides with a firm's employees. A recent study by The Conference Board (2007) found that the most important factors in determining a company's reputation as a quality employer were first, how the employees were treated and compensated and second, the quality of the company's products or services. In the study, factors were distinguished by the ability to recruit and retain employees and by becoming an employer of choice.

Ballou, Godwin and Shortridge (2003) state that employee reputation will be a function of wage growth and employee growth. With these findings in mind, we examine reputational risk related to employees by investigating variables associated with employment and compensation. We hypothesize that firms that have higher employment and wage growth will have lower reputational risk among their employee stakeholders.

### 2.3 Corporate Reputation Research

While our research focuses on ERM and the Federal Reserve's definition of reputational risk, it is also consistent with previous research on corporate reputation. Prior research has primarily focused on defining corporate reputational constructs and examining how these constructs affect measurement of corporate reputation, as in Wartick (2002). While numerous terms such as prestige, identity and goodwill have been used to describe reputation, Brown (1997) argues that there are three main aspects to corporate reputation. The first aspect is that corporate reputation is a judgment by stakeholders. The second aspect is that corporate reputation is the result of the aggregate perceptions of all stakeholders, not just some. Finally, a common aspect to definitions of corporate reputation is that they allow for a comparison against some standard. This final aspect has led prior research on corporate reputation to be primarily focused on examining datasets such Fortune's Most Admired Companies as in Fombrun and Shanley (1990) who define corporate reputation as "the outcome of a competitive process in which firms signal their key characteristics to constituents to maximize their social status." In addition to examining the interaction between ERM and reputation, our research contributes to corporate reputation research overall by providing additional means of proxying for corporate reputation.

## 3 Data and Method

### 3.1 Identifying ERM adopters

Our study focuses on firms that have adopted Enterprise Risk Management programs as proxied by the hiring of a Chief Risk Officer or equivalent. Because corporations disclose only minimal details of their risk management programs (Tufano, 1996), we focus on hiring announcements of senior risk officers as a signal of a firm adopting an enterprise risk management process. There is good reason to believe that CRO hiring coincides with the decision to follow an ERM

program.  For example, The Economist (2005) reports that many organizations appoint a member of the senior executive team, often referred to as the chief risk officer or CRO, to oversee the enterprise's risk management process.  Walker (2003) notes that because of its scope and impact, ERM requires strong support from senior management.

Our study starts with 158 announcements of senior risk officer appointments made from 1990-2005 for which we are able to obtain all the necessary data for our tests.  Announcements are obtained by searching the business library of LEXIS-NEXIS for announcements containing the words "announced", "named", or "appointed", in conjunction with position descriptions of "chief risk officer" or "risk management".[3]  Only announcements for publicly traded companies are retained and in the case of multiple announcements for the same company, we select only the first announcement on the assumption that this represents the initiation of the risk management program.  By starting our search in 1990, we hope to capture the first appointment of a Chief Risk Officer; however, it is possible that some appointments, although being the first announcements, are not actually the first appointments.  These announcements will add noise to our sample and reduce the power of our tests.  We collect data for all firms listed in Compustat from 1990 to 2007.

Table 1 presents the distribution of CRO appointments through time and across the two broad regulated industries that make up much of our sample.  Most CRO hires tend to be in the later part of the sample period, clustered from 1999 through 2002.  A substantial portion of the appointments are located in the financial and utility industries.  These are defined in our sample as having SIC codes in the 6000s for financial firms and in the 4900s for utilities.

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[3]	In our initial sample search we included the following "title" terms in order to capture firms engaging in ERM: Chief, Director, Vice President, President, Head, Managing Director, Manager, and General Manager.

Table 1 Distribution of CRO Appointments by Year and Industry

CRO appointments are presented for all years, and by utility and financial firms defined as SICC 6000-6999 for financial firms, and SICC 4900-4999 for utilities.

| Year | All Firms | Financial Firms | Utilities |
|------|-----------|-----------------|-----------|
| 1992 | 8 | 5 | 0 |
| 1993 | 10 | 3 | 0 |
| 1994 | 9 | 2 | 2 |
| 1995 | 11 | 3 | 1 |
| 1996 | 13 | 8 | 3 |
| 1997 | 7 | 3 | 2 |
| 1998 | 7 | 4 | 0 |
| 1999 | 11 | 7 | 1 |
| 2000 | 14 | 7 | 2 |
| 2001 | 22 | 13 | 5 |
| 2002 | 16 | 8 | 4 |
| 2003 | 15 | 9 | 3 |
| 2004 | 11 | 8 | 1 |
| 2005 | 4 | 3 | 0 |
| Total | 158 | 83 | 24 |

### 3.2  Reputation measures

We group the reputation proxies into three categories, financial measures, customer measures and employee measures.  We recognize, however, that the interest in some of these measures will span over all three groups.  For example, customers concerned about the longevity of a firm will be interested in financial measures.

### 3.2.1 Financial Measures

We compute the following financial measures as proxies for the financial reputation of a firm. In each case we report the Compustat data item [d#] used.

**Profitability**

$$Profitability = \frac{Net\ Income[d172]}{Sales[d12]} \tag{1}$$

**Return on assets**

$$ROA = \frac{Net\ Income[d172]}{Total\ Assets[d6]} \tag{2}$$

**Probability of Bankruptcy**

Firms with greater probability of bankruptcy are likely to see their reputation decline, not only with investors and creditors, but also with suppliers and customers. We compute the probability of bankruptcy using the method of Zmijewski (1984). This method is an updated approach to the classic method of Altman (1968). The probability of bankruptcy generated by the model is negatively related to a firm's liquidity and return on assets and positively related to a firm's financial leverage. The probability of bankruptcy is given as:

$$PB = -4.803 - 3.599 \times ROA + 5.406 \times FINL - 0.1 \times LIQ \tag{3}$$

Where ROA is Return on Assets computed above, FINL measures leverage:

$$FINL = \frac{(Curr\ Liab[d5] + LTD[d9] + Other\ Liab[d75] + Def\ Tax[d35] + Min\ Int[d38])}{Total\ Assets[d6]} \tag{4}$$

and LIQ measures liquidity:

$$LIQ = \frac{Current\ Assets[d4]}{Current\ Liabilities[d5]} \tag{5}$$

Zmijewski's measure of financial leverage significantly understates the true financial leverage of financial firms, and therefore, we compute this variable as follows:

$$FINL = \frac{Total\ Assets[d6] - Book\ Equity[d60]}{Total\ Assets[d6]} \tag{6}$$

## Restatements of Financials

If investors view restatements negatively, firms that engage in restatements may see their corporate reputation suffer as investors will have less confidence in future disclosures. We capture the existence of restatements by comparing Compustat data item d118 (income before extraordinary items (restated)) with item d18 (income before extraordinary items). If, in a given year, they are different, we assume that some type of restatement has taken place. We thus create a variable that equals 1 for years in which there are restates and zero otherwise.

## Probability of earnings manipulation

Earnings manipulation is generally viewed unfavorably by investors. Firms that engage in earnings manipulation are likely to have lower corporate reputation. We test for the presence of earnings manipulation using the method of Beneish (1997). Beneish's method examines changes in key financial variables. In each case the measure is computed and divided by the prior year's value thus creating an index value that should have a value of 1 for no change. For simplicity we just present the formula for the measure rather than the index.

DSRI - Days sales in receivable index

$$DSR = \frac{Receivables[d2]}{Sales[d12]} \tag{7}$$

GMI - Gross margin index

$$GM = Sales[d12] - Cost\ of\ Goods[d41] \tag{8}$$

AQI - Asset quality index

$$AQ = \frac{Tot\ Assets[d6] - Curr.\ Assets[d4] - Net\ PPE[d8] - Invstmt[d31 + d32]}{Total\ Assets[d6]} \tag{9}$$

SGI - Sales growth index

$$SG = \frac{Sales[d12]_t}{Sales[d12]_{t-1}} \tag{10}$$

DEPI - Depreciation index

$$DEP = \frac{Depreciation\ and\ Amortization[d14]}{Net\ PPE[d8]} \tag{11}$$

SGAI - Sales and general and administrative expenses index

$$SGA = \frac{SGA\ Expense[d189]}{Sales[d12]} \tag{12}$$

LVGI - Leverage index

$$LVG = \frac{Total\ Liabilities[d181]}{Total\ Assets[d6]} \tag{13}$$

TATA - Total accruals to total assets

$$TATA = Income\ Before\ Extraordinary\ Items[d18] - Net\ CF\ from\ Ops[d308] \tag{14}$$

The probability of earnings manipulation is computed as follows:

$$Pr(Manip) = \Phi[-4.840 + 0.920 \times DSRI + 0.528 \times GMI + 0.404 \times AQI$$

$$+ 0.892 \times SGI + 0.115 \times DEPI - 0.172 \times SAI - 0.327 \times LVGI$$

$$+ 4.670 \times TATA] \tag{15}$$

Where $\Phi$ is the normal density function.

**Cash flow volatility**

We measure cash flow earnings volatility SDCF as the standard deviation of the error term from a regression of a firm's quarterly cash flow on the prior quarter's cash flow. We use Compustat quarterly item d21, Operating Income Before Depreciation, as a measure of quarterly cash flows. This regression is run for eight quarters. Greater cash flow volatility may be associated with a lower reputation among investors who tend to prefer smooth earnings.

**Tobin's Q**

Tobin's Q or the market-to-book ratio measures both growth options of a firm as well as the overall valuation.[4] Firms with higher growth options tend to have higher Q ratios because a greater proportion of firm value is derived from future cash flows and not assets in place. However, short run changes in Q are more likely to be due to changes in firm valuation.

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[4]    Allayannis and Weston (2001) find that the market to book ratio is significantly correlated with the theoretically constructed Tobin's Q score and provides consistent results and conclusions.

$$Q = \frac{Market\ Value\ Equity[d199 \times d25] + Book\ Debt[d6 - d60]}{Book\ Assets[d6]} \qquad (16)$$

**Credit ratings**

Credit ratings represent a measure of a firm's ability to pay future obligations. They are of interest to investors and customers alike. We obtain Standard and Poors' credit ratings from Compustat (d280). We recode the credit ratings so that "23" signifies AAA, "22" AA+, "21" AA and so on. The lowest credit rating is D which is represented as "1". Thus a higher number indicates a better credit rating.

**Stock rating**

In addition to specific variables, we also use the Standard and Poors' stock ranking as a broad measure of firm quality. The quality rank (d282) is described as: "an appraisal of past performance of a stock's earnings and dividends and the stock's relative standing as of a company's current fiscal year-end. Growth and stability of earnings and dividends are key elements in establishing S&P's earnings and dividends rankings for common stocks."[5] We recode this variable so that "9" =A+, "8" =A and so on, thus a higher score is better.

### 3.2.2 Customer Measures

**Fortune's Most Admired Companies**

Fortune magazine annually surveys executives, directors and financial analysts to rate companies in their industry on eight criteria from social responsibility to investment value. When determining the "Most Admired Score," the voters rate companies in their own industry based on the following factors:

- the ability of the company to attract and retain talented people,
- the quality of the company's management,
- the quality of the company's products or services,
- the company's innovativeness,
- the company's long-term investment value and financial soundness,
- the company's wise use of corporate assets and social responsibility to the community and environment.

Over the time period 1991 to 2008 the "Most Admired Score" ranged from a low of 1.06 (Enron in 2003) to a high of 9.36 (Kinder Morgan Energy Partners in 2005).

This variable is only available for a subset of our firms, as being in the Fortune 1000 is a requirement for inclusion in the survey. Other researchers have used the Fortune list to evaluate

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[5]  Source: Compustat data manual.

corporate policy including Wang and Smith (2008), Anderson and Smith (2006), Damodaran (2003) and Antunovich and Laster (1999). We collect this data from the Fortune website and match it with our Compustat data.

**Market Share**

Firms with larger market share may have better reputations with their customers, although the causality here is clearly weak. A more appropriate use for a market share variable is to proxy for changes in reputation through changes in market share. Rapid declines in market share may be particularly indicative of declines in reputation. We estimate the market share of a firm by computing a firm's percentage of the total sales for its 4-digit SICC in a given year. This variable will tend to overstate market share for firms that operate in industries with significant numbers of privately held firms. However, we are primarily interested in the change in this variable, so this bias should not negatively impact our conclusions.

### 3.2.3 Employee Measures

Ballou, Godwin and Shortridge (2003) find a correlation between firm value and employee attitudes. In their study they use Fortune's "100 Best Places to Work" list as a proxy for employee attitudes. For our purposes, this list is too limited in coverage and does not overlap sufficiently with our sample. We therefore construct other proxies for employee attitudes, and indirectly, a firm's reputation among its employees and potential employees.

**Wage Growth**

Average wages is computed as the total payroll (d42) divided by the number of employees (d29). We measure wage growth as the year over year change in this variable. Because wages tend to grow over time, we adjust the wage growth number by the average wages of a firm's 2-digit SICC.

## 4  Results and Analysis

### 4.1  Summary Statistics

In Table 2 we present summary statistics for the firms in the sample. Panel A shows statistics for all firms, while Panel B shows just statistics for the financial firms in the sample. Consistent with the large number of financials in the sample, the average firm is quite highly levered. The average firm has a market value of nearly $10 billion, but the distribution of firm size is quite skewed. Firms generally have investment grade debt, although the average rating is around A. The Fortune reputation score averages around 6 (recall the score historically ranges from about 1 to 10).

Table 2 Summary Statistics

Summary Statistics are presented for firms in the sample for the year of the CRO appointment. Market value is the market value of equity. Market to book is computed as Tobin's Q, i.e. market value of equity plus book debt divided by book equity plus book debt. Return on assets is net income divided by assets. Leverage is debt divided by assets. Fortune score is Fortune magazine's ranking of the most admired companies (higher is better). Debt rating is obtained from Compustat.

| Variable | Mean | Median | Standard Deviation |
|---|---|---|---|
| *Panel A. Full Sample* | | | |
| Market Value (Millions) | 9,500 | 2,930 | 20,122 |
| Q (market to book) | 1.27 | 1.13 | 0.50 |
| Return on Assets | 0.74% | 1.27% | 7.96% |
| Leverage | 0.76 | 0.81 | 0.22 |
| Liquidity | 0.69 | 0.40 | 0.86 |
| Debt Rating | (BBB+) | (A-) | NA |
| Fortune Score | 6.14 | 6.12 | 1.05 |
| *Panel B. Financial Firms* | | | |
| Market Value (Millions) | 11,643 | 2,719 | 23,655 |
| Q (market to book) | 1.16 | 1.08 | 0.38 |
| Return on Assets | 0.59% | 0.01% | 6.05% |
| Leverage | 0.85 | 0.92 | 0.18 |
| Liquidity | 0.14 | 0.00 | 0.52 |
| Debt Rating | (A-) | (A) | NA |
| Fortune Score | 6.37 | 6.18 | 1.07 |

### *4.2 Tests of Changes in the Reputation Proxies*

In table 3 we turn our attention to comparisons of the key reputation proxies before and after ERM adoption.  We measure changes in our key variables by computing the average of the variable in the 2 years before the ERM adoption year and in the 2 years after the ERM adoption year.  We then conduct a t-test of the difference in the two averages.  Out of the measures that we examine, only five have statistically significant changes around ERM adoption.  First, we find that after ERM adoption, the Standard Deviation of Cash Flows increases quite significantly.  This finding is consistent with either a firm taking on more risk after adopting ERM or entering a more risky period in its history.  The cause of the change is not overly important in that the fact that firm risk increased is more likely to be viewed negatively by customers and suppliers.  From the investor's point of view, the level of risk depends on the investor's ability to hold the stock in a diversified portfolio, as capital market theory states that investors are unconcerned with idiosyncratic risk.

Table 3. Tests for Changes in Reputation Proxies - Full Sample

The tests in this table compare the mean of the variable for the 2 years before the CRO appointment with the mean for the 2 years after the CRO appointment.

| Variable | Mean Before | Mean After | Difference | T-Statistic |
|---|---|---|---|---|
| Profit | 7.363 | 6.708 | -0.655 | -0.454 |
| ROA | 2.559 | 1.722 | -0.837 | -1.141 |
| Pr(Bankruptcy) | 0.122 | 0.140 | 0.018 | 0.773 |
| Restatements | 0.128 | 0.159 | 0.031 | 1.055 |
| Pr(Manip) | 0.926 | 0.938 | 0.011 | 0.756 |
| SD(Cash Flow) | 98.922 | 143.290 | 44.369 | 2.026** |
| Market to Book | 1.846 | 2.600 | 0.753 | 1.169 |
| Debt Rating | 16.354 | 15.473 | 0.882 | -4.730*** |
| SP Rank | 6.108 | 5.817 | 0.291 | -2.673*** |
| Fortune Score | 6.269 | 6.077 | -0.192 | -1.841* |
| Market Share | 0.085 | 0.075 | -0.010 | -1.324 |
| Employees | 25.070 | 26.38428 | 1.314 | 1.598 |
| Wage growth | 60.880 | 77.110 | 16.230 | 9.187*** |
| Relative Wage g | -0.369 | -0.258 | 0.110 | 0.380 |

*** **, *, Indicates significance at the 1%, 5%, 10% level for a two sided test.*

The debt rating score decreases significantly following ERM adoption. As ratings agencies generally view ERM adoption positively, it is unlikely that it is the act of adopting ERM that has caused a decline in the debt rating. A more realistic explanation is that a firm is experiencing a decline in its credit quality at the same time that it chose to adopt ERM.[6] In such a case ERM adoption may be a response to decling credit quality. We explore the trend of the debt rating change in a later section.

We find that the Standard and Poor's stock rank score decreases significantly. Again this is consistent with a lower letter score and indicates a decline in the financial strength of a firm. We have no doubt that this variable is correlated with the debt rating.

Our most direct measure of reputation is the Fortune "Most Admired Company Score". We find a stastitically significant decline in this score. As we discussed earlier, it seems unlikely that this decline would be caused by the adoption of ERM, as ERM is generally perceived favorably by outside shareholders. Instead we believe that this result is consistent with ERM being adopted during a period of reputation decline.

Finally, although we find that wages grow, this is to be expected in an economy with positive labor inflation. When we examine our variable "relative wage growth" which compares a firm's wage growth to that of its industry, we find that there is no significant difference.

As was stated earlier, a significant proportion of our sample is comprised of financial firms. We therefore repeat the t-tests in Table 3 on our subset of financial stocks. These results are presented in Table 4. As with the full sample, we see a significant increase in the standard deviation of cash flows. We also see a decline in credit quality, although of a slightly smaller magnitude than observed in Table 3. Wage growth is especially high in this sector, and the ERM adopting firms do demonstrate slightly higher wage growth than their industry (as manifested in the wage index variable), although this is below normal significance levels.

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[6]        We explore this possibility later in the analysis.

Table 4. Tests for Changes in Reputation Proxies - Financial Firms

The tests in this table compare the mean of the variable for the 2 years before the CRO appointment with the mean for the 2 years after the CRO appointment. Only financial firms (6000<SICC<7000) are included.

| Variable | Mean Before | Mean After | Difference | T-Statistic |
|---|---|---|---|---|
| Profit | 11.520 | 12.024 | 0.504 | 0.375 |
| ROA | 1.824 | 1.714 | -0.111 | -0.415 |
| Pr(Bankruptcy) | 0.100 | 0.083 | -0.017 | -0.662 |
| Restatements | 0.124 | 0.111 | -0.012 | -0.304 |
| Pr(Manip) | 0.981 | 0.981 | 0.000 | 0.001 |
| SD(Cash Flow) | 74.964 | 154.154 | 79.190 | 1.721* |
| Market to Book | 2.188 | 2.107 | -0.081 | 0.725 |
| Debt Rating | 17.184 | 16.605 | -0.579 | -2.847*** |
| SP Rank | 6.342 | 6.260 | -0.082 | -0.628 |
| Fortune Score | 6.398 | 6.232 | -0.166 | -1.227 |
| Market Share | 0.062 | 0.065 | 0.003 | 0.742 |
| Employees | 17.193 | 18.067 | 1.877 | 1.580 |
| Wage growth | 62.328 | 80.796 | 18.468 | 8.894*** |
| Relative Wage g | -0.044 | -0.138 | 0.094 | 1.521 |

*\*\*\*, \*\*, \*, Indicates significance at the 1%, 5%, 10% level for a two sided te*

Overall the tests of changes suggest that ERM is frequently adopted in the midst of declining measures of reputation of a firm. What is important to establish is whether ERM adoption is able to improve the reputational situation of a firm. To answer that question, we examine the trends in the key variables in the next section.

### 4.3 Graphical Presentation of the Changes

In this section we present the changes in some of the key variables graphically. Although we have a limited number of observations before and after the CRO appointment for each firm, patterns may emerge. These patterns may assist us in the interpretation of the results documented above. For example, a decline in a mean variable may be misinterpreted as a trend if the prior time period is showing a decline, and the following time period is flat. We present the raw data for the figures in Table 5. In the figures, we take the raw data and normalize it by the year zero value to provide an indication of the relative magnitude of any change.

Table 5. Time series changes in key variables.
This table presents the raw data for figures 1 - 6. The data is normalized around the year 0 value in the figures to aid comparison.

| | Year relative to the CRO appointment | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| Debt Rating | 17.02 | 16.78 | 16.62 | 16.46 | 16.21 | 15.95 | 15.76 | 15.61 | 15.42 | 15.76 | 15.74 |
| SP Rank | 6.39 | 6.2 | 6.2 | 6.01 | 5.92 | 5.84 | 5.8 | 5.86 | 5.89 | 5.82 | 5.9 |
| Pr( Manipulation) | 0.91 | 0.91 | 0.93 | 0.92 | 0.92 | 0.94 | 0.93 | 0.93 | 0.95 | 0.95 | 0.95 |
| SD of Cash Flow | 42.69 | 47.21 | 77.72 | 85.48 | 82.08 | 126.87 | 141.15 | 130.35 | 152.15 | 229.35 | 179.68 |
| Fortune Ranking | 6.47 | 6.6 | 6.4 | 6.18 | 6.25 | 6.14 | 6.12 | 6.13 | 6.28 | 6.1 | 6.36 |

Looking first at Figure 1, debt rating, we see a monotonic decrease in the debt rating prior to ERM adoption. However this decline appears to be arrested once ERM is adopted. A similar pattern is revealed in Figure 2 which presents the S&P stock ranking. In both cases, this is consistent with a firm experiencing a decline in performance and choosing to adopt ERM as one method of tackling this decline.
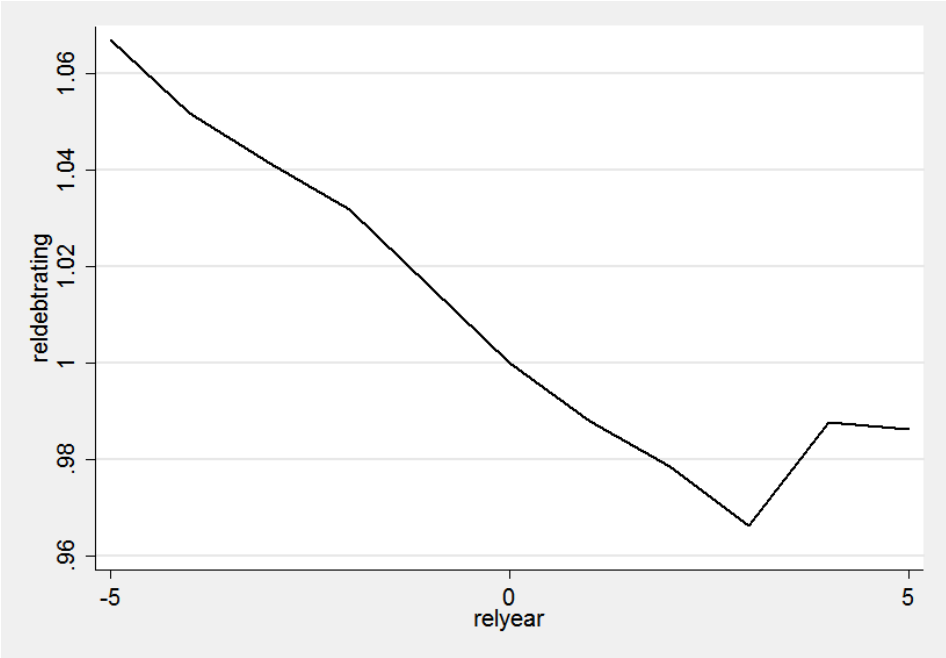
Figure 1: Debt Rating



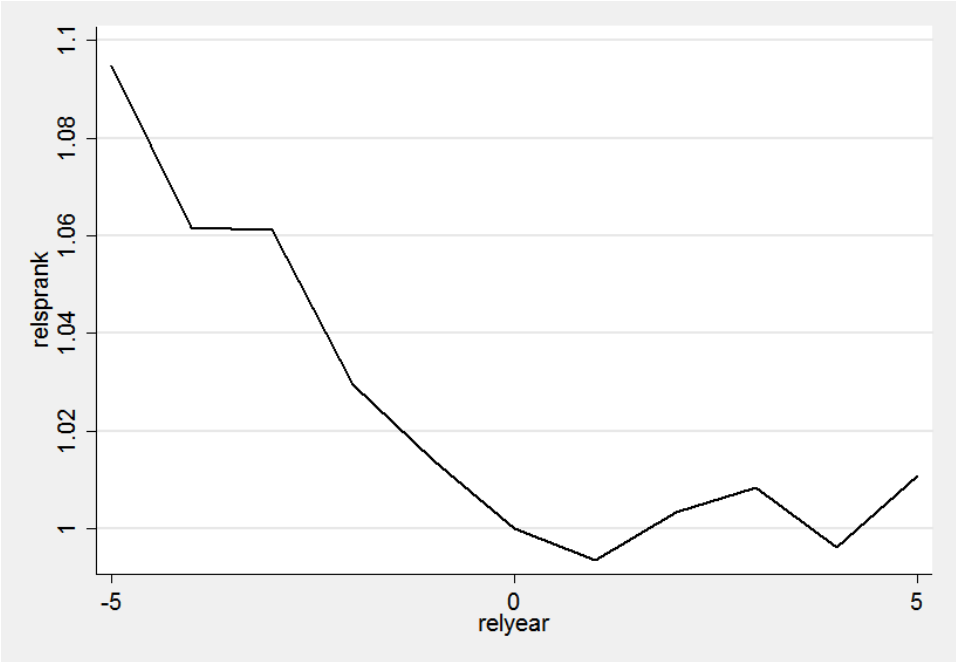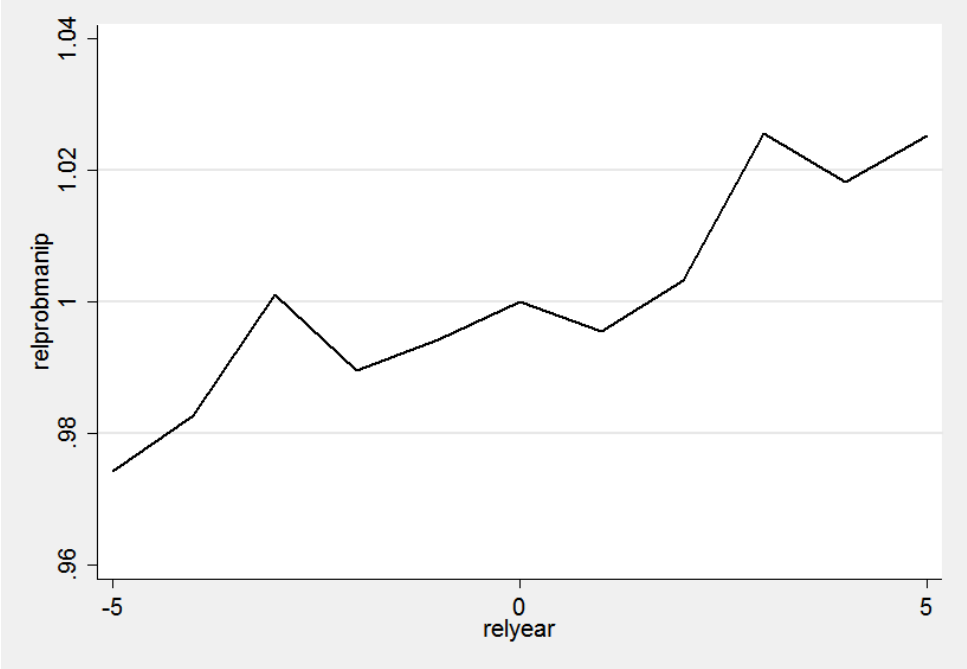Figure 2: Standard and Poors' Ranking



Figure 3 presents the graph for the Probability of Earnings Manipulation. Although we did not

find a significant change around the 2 years before and after the adoption of ERM, there does appear to be some broad upward trend over the longer time horizon. From a reputational view point, this is a disconcerting increase. Furthermore, there does not appear to be a reduction in the rate of increase in the measure around ERM adoption.

Figure 3: Probability of Manipulation



A brighter picture is presented in Figure 4 which shows the frequency of financial restatements. In the year following the adoption of ERM, the upward trend is sharply reversed. This result is consistent with greater financial controls being implemented, and perhaps better overall management practices.
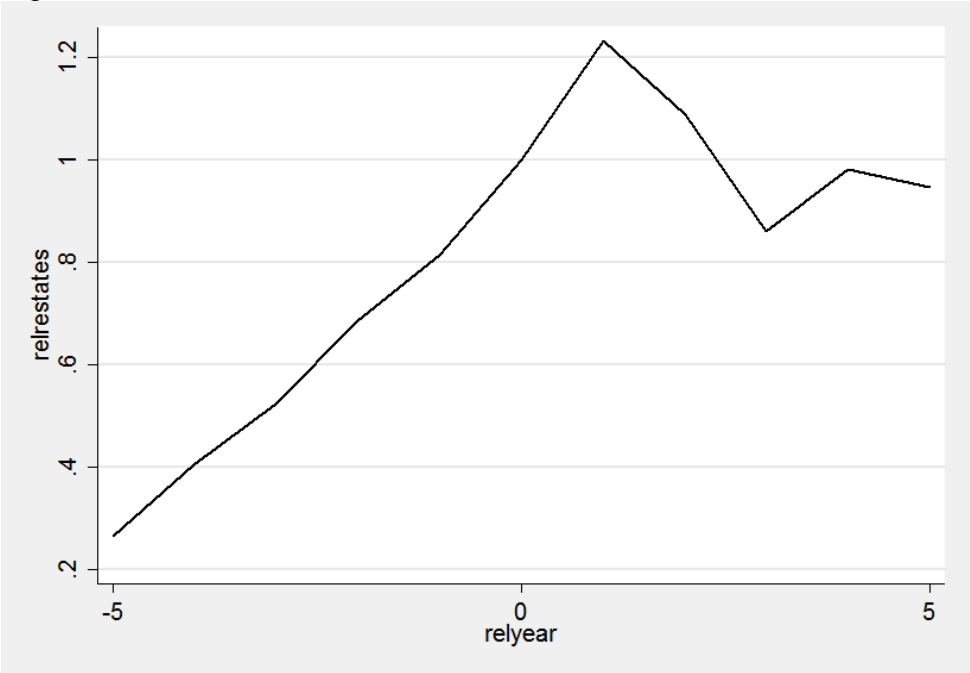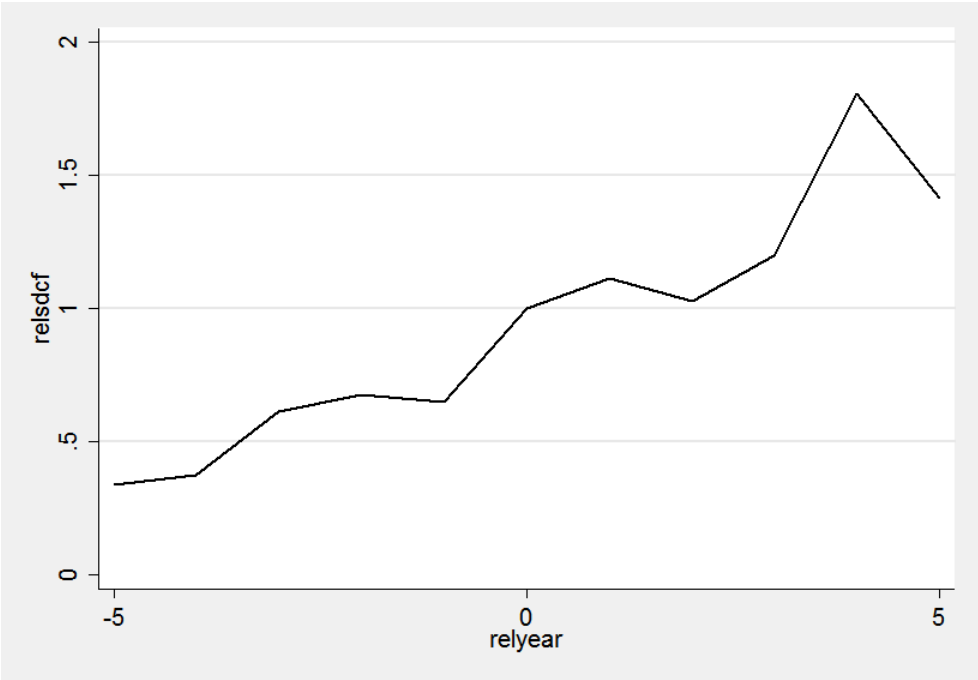
Figure 4: Restatements



Figure 5 confirms the results of Table 3 and 4 and shows a steady increase in cash flow volatility.
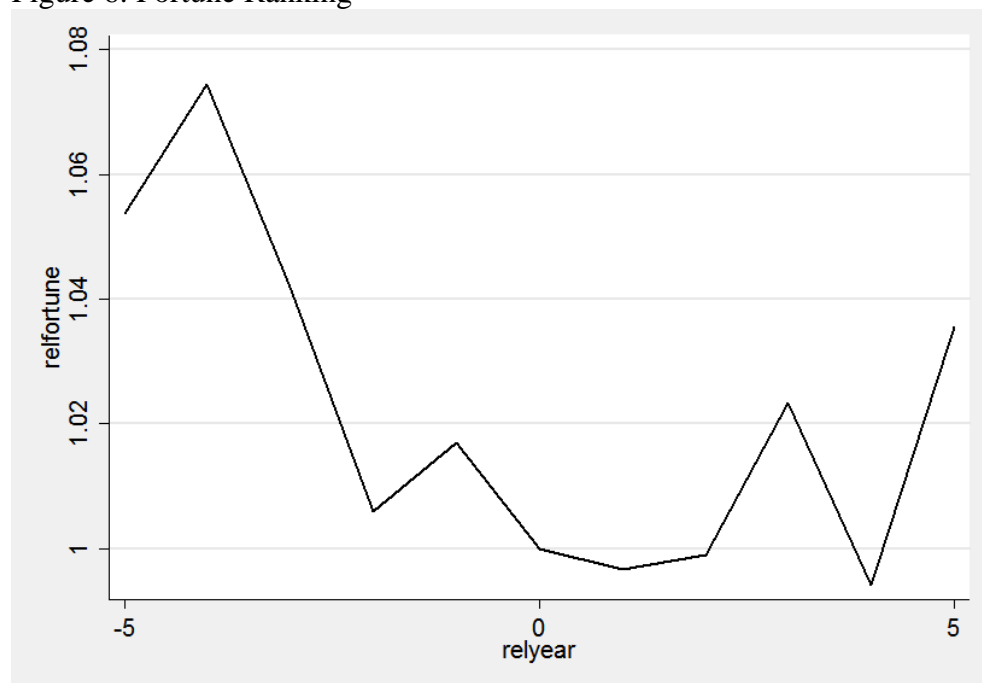
Figure 5: Standard Deviation of Cash Flows



Finally, Figure 6 shows a decline in the Fortune "Most Admired Firms" ranking in the years prior

to ERM adoption, but after the adoption, the decline levels off and shows signs of being reversed in the later years.  Again, the adoption of ERM appears to be related to a firm responding to a period of declining reputation.

Figure 6: Fortune Ranking



## 5  Conclusion

In this paper we attempt to quantify the effect that adoption of enterprise risk management has on reputation risk.  We believe that this is the first study to conduct such an analysis.  We face several significant implementation issues in conducting our tests.  The most significant of which is that it is difficult to define and quantify a "reputation" variable.  To overcome this shortcoming we use a wide range of proxies that capture the essence of a firm's reputation from the perspective of numerous stakeholders.  Our choice of proxies is limited to those which can be constructed using publicly available data.  Our method provides a useful addition to the existing methodology for measuring corporate reputation.

Our tests for changes in these proxies, over a short-run period, show little positive impact of ERM adoption on a firm's reputation.  However, this does not mean that ERM is negatively impacting reputation.  In some cases, it appears that ERM is adopted by firms that have experienced some decline in their reputation, either through a decline in their stock ranking or credit quality.  Graphical representation shows that in the case of the Fortune rankings, the firms experienced, on average, a decline in the ranking prior to ERM adoption, but this decline appears to be have been arrested coincident with ERM adoption.

While our results do not suggest that ERM adoption provides a quick fix to a company's reputation, we do find evidence that ERM may be working in the longer term.  Specifically,

ERM adoption reduces the decline and in some cases improves reputational measures. In fact, this longer-term result may be more appropriate when examining reputation risk as reputation is difficult and costly to rebuild.

Our results suggest numerous avenues for future research with respect to ERM and reputation. First, additional research is needed to examine how long it takes to embed an ERM framework throughout an organization. Second, additional research is needed to understand how managers balance non-quantifiable risks, such as reputation, with quantifiable risks. Finally, research addressing how CRO's measure and incorporate reputation into risk maps is encouraged.

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