

**ENTERPRISE RISK MANAGEMENT, EARNINGS PREDICTABILITY AND
THE COST OF DEBT**

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ABSTRACT

The extant academic literature considers enterprise risk management (ERM) to be the fundamental paradigm for managing the portfolio of risks confronting organizations. However, there is debate as to whether ERM actually enhances stakeholder value. This study investigates whether ERM is associated with increased earnings predictability and a lower risk of firm failure, two theoretical predications regarding ERM's impact on stakeholder value.

My research utilizes the Security and Exchange Commission's (SEC) enhanced proxy statement disclosures as of February 28th, 2010 to measure ERM performance. Additionally, in order to quantify the operational construct, textual analysis is performed to develop a measure of ERM performance to be used in econometric analyses.

The analyses presented in this paper investigate whether key predicted benefits of ERM are observable. Results support the proposition that ERM is associated with increased earnings predictability. Specifically, earnings and accruals are found to be more persistent for firms with better ERM performance. Additionally, analysts' earnings forecasts are more accurate in the presence of enhanced ERM performance. Results are inconclusive with regards to ERM's ability to influence the risk of firm failure during this study's sample period (i.e., 2007-2009). One explanation for this departure, the economic volatility during the financial crisis of 2008-2009, may make it difficult to empirically detect the relationship between ERM performance and the risk of firm failure.

DEDICATION

I dedicate this dissertation to my wonderful wife and family. Sophia, you provided me with the love and support which kept me going day in and day out. To my parents, Don and Dorothy, thank you for instilling in me the will to work hard. Chuck, Anne, and Frank, thank you for your understanding and generosity.

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1. INTRODUCTION

In the wake of the 2008-2009 financial crisis, many observers have asked why companies were not better informed of the risk exposures facing organizations. Evidence of the intensified focus on risk management includes the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act, the 2010 SEC mandated proxy statement risk disclosures, and the 2008 risk management ratings included in insurance firms' bond ratings. Enterprise risk management (ERM) has received substantial attention following the financial crisis because of its holistic approach to risk management. In general, ERM is a proactive risk management strategy which provides a methodology for aggregating and correlating risks across an organization in order to ensure a firm's risks are within its desired risk appetite. Not only is ERM predicted to enhance a company's ability to mitigate the impact of an economic downturn, it is also predicted to enhance firm performance (COSO 2004).¹ In theory, the framework allows management and the board of directors additional foresight to predict operational surprises which ultimately leads to more predictable earnings streams and a lower risk of firm failure. My research empirically tests the theoretical predications as to whether ERM performance is informative of earnings predictability and a firm's cost of raising debt capital.

Disagreement exists among practitioners and academics as to whether ERM actually enhances firm performance and thus adds to stakeholder value. Due to regulatory requirements, many firms may superficially implement aspects of ERM purely for compliance reasons (Beasley et al. 2008; Baxter et al. 2011). For instance, the New York Stock Exchange's corporate governance rules require audit committees to discuss risk assessment and management

¹ For example, the CFO of Alliant Credit Union was quoted as saying: "To ensure we have financial stability and minimum earnings volatility, we need to manage risks at the enterprise level. That requires an integrated, high-level program." See Banham (2011).

(NYSE 2004). Ultimately, the academic literature has not definitively shown that firms benefit from ERM implementation via improved financial performance. Beasley et al. (2008) provide limited empirical evidence that ERM adds to shareholder value across a sample of 120 firms. Similarly, Pagach and Warr (2010) find little evidence of improved firm performance post ERM implementation across their entire sample of 106 firms. Conversely, Baxter et al. (2011) use a sample of S&P ERM ratings to show ERM is associated with firm value in the insurance industry.² Overall, low power and generalizability concerns in previous research leave the question open as to whether ERM enhances stakeholder value.

In this study, I test the hypotheses that ERM is positively associated with earnings predictability and negatively associated with the cost of debt across a broad sample of firms. The unobservable construct, ERM performance, is operationalized by utilizing the 2010 SEC mandated board of director risk oversight disclosures in firm proxy statements. Earnings persistence, a measure of how informative current period earnings are in predicting future earnings, captures an important firm characteristic from a valuation standpoint. Additionally, from a debt perspective, the cost of debt is measured to identify whether ERM performance is reflected in a firm's cost of raising debt capital. ERM is predicted to reduce earnings volatility through the minimization of "costly lower tail outcomes," thus leading to more persistent earnings and a reduction in the overall risk of firm failure.³ I predict earnings persistence to be positively correlated with the degree of ERM performance and the cost of debt to be negatively correlated with the degree of ERM performance.

² S&P explicitly rates insurance and financial firms' ERM and incorporates this rating into firms' overall bond ratings. S&P has also identified non-financial firms' ERM systems as a point of emphasis when rating non-financial firms' debt; however, at this time S&P does not provide a formal ERM rating (S&P 2008).

³ Stulz (1996, 2003) uses the phrase "costly lower tail outcomes" to describe the costs associated with negative earnings and cash flow shocks.

The board of directors' role in risk oversight is a crucial aspect of ERM. From a corporate governance perspective, the board of directors serves two primary roles (Armstrong et al. 2010). First, they provide a monitoring mechanism to ensure managers are acting in shareholders' best interests. Second, the board serves an advisory role to management. The board's role in risk management influences both roles. The new board of director risk oversight disclosure in a firm's proxy statement provides a window into ERM performance by describing the monitoring and advisory implications of the board's role in risk oversight.⁴ Thus, this disclosure serves as an important indicator of ERM's impact on firm performance.

In order to extend previous studies, the power of my tests is increased substantially by employing custom software to automate the process for obtaining the board of director risk oversight disclosures in firm proxy statements. Specifically, a connection is made to the SEC's Edgar website and a file transfer protocol (FTP) is utilized to download all proxy statements for fiscal year 2010 subsequent to the effective date of the SEC's enhanced disclosure rules, February 28, 2010.⁵ Software embedded with parsing routines extracts the board of director risk oversight disclosure from each proxy statement. This process resulted in a successful acquisition of 2,831 firm disclosures.⁶

Textual analysis is utilized to capture the variation in each disclosure and provide a measure of ERM's impact on firm performance. Accounting and finance research has increasingly incorporated this type of methodology in order to convert qualitative operational constructs (e.g., performance related narratives in the MD&A) into quantitative measures to be used in econometric analysis (Lehavy et al. 2011; Loughran et al. 2011; Kothari et al. 2009; Li

⁴ See final rules SEC (2009).

⁵ <ftp://sec.gov/edgar/full-index/2010/>

⁶ Kothari et al. (2009) employ a similar methodology and obtain 889 annual reports over the 1996 – 2001 time frame.

2008, 2009; Tetlock 2007, 2008). Specifically, the negative tone of each narrative is extracted by submitting each text to the General Inquirer (GI) content analysis software. Extant literature utilizes the GI and shows negative tone (i.e., the degree of pessimism) in financial disclosures to be an indication of firm performance (Kothari et al. 2009; Li 2008; Tetlock 2007, 2008). The GI is a nonproprietary content analysis software package developed by faculty at Harvard University. Disambiguation routines, routines which correctly identify word senses and meanings, are used in conjunction with 182 word categories to extract underlying textual themes.⁷

The empirical results are consistent with the theoretical prediction regarding ERM's influence on earnings while questions remain regarding ERM's association with the cost of debt. In general, firms' risk oversight disclosures are found to provide useful information. Firms with more negative tonal disclosures, an indication of poorer performing ERM, have lower earnings persistence compared to firms with less negative tonal disclosures. These results hold true for both negative and positive earnings firms. Loss firms with poorer performing ERM experience more persistent losses than loss firms with better performing ERM. Correspondingly, positive earnings firms with better performing ERM are found to be positively associated with more persistent gains. In further analyses, these findings remain robust when a measure of accrual persistence is analyzed (Francis et al. 2005; Dechow and Dichev 2002). Results show accrual persistence, an important predictor of earnings persistence (Dechow and Dichev 2002), to be positively associated with the measure of ERM performance.

Analysts' earnings forecasts provide an opportunity to test a third order effect of ERM's association with earnings predictability. Using two measures of analysts' earnings forecast accuracy, I find a positive association with ERM performance. Lastly, examining another

⁷ See <http://www.wjh.harvard.edu/~inquirer/>

predicted benefit of ERM, a reduced risk of failure, leads to an analysis as to whether the cost of raising debt capital is lower for firms with higher performing ERM. Possibly due to the illiquidity of the debt markets during the financial crisis, I do not find a main effect. An interaction effect is detected such that the cost of debt is lower for higher levered firms with better performing ERM.

The contribution of my research is three-fold. First, my research answers an important question regarding the value of enterprise risk management. The challenge in conducting archival ERM research is often in measuring ERM performance. Through the use of a new data sample and an innovative methodology for measuring ERM performance, my research helps to answer a persistent question: Does ERM enhance firm performance? Specifically, my results show across a diverse sample of firms that ERM is informative of firm performance through more persistent earnings and accruals. This result should be of interest to practitioners, regulators, and policy makers because it confirms a very important theoretical prediction of ERM and offers a reason why companies should allocate resources to develop an enterprise-wide risk management framework.⁸ Second, this study is the first, of which I am aware, to analyze the information content of the board risk oversight disclosure. My analyses provide further support for the information content of qualitative disclosures in the financial reporting domain. Third, my study provides evidence regarding the efficacy of the new board risk oversight disclosures. Specifically, the disclosures are not simply boilerplate narratives but contain useful information regarding ERM performance and ultimately earnings performance.

⁸ In a 2008 speech, Ben Bernanke, Chairman of the Federal Reserve, identified important principles for risk management “including the value of proper risk identification and measurement, the need for robust and objective valuation methods, the importance of preparing for liquidity disruptions, and the critical role of strong oversight by senior managers.” See <http://www.federalreserve.gov/newsevents/speech/bernanke20080515a.htm>

The remainder of this paper is organized as follows. Section 2 reviews the related research. Section 3 develops the hypotheses, while Section 4 describes the research design utilized to test my hypotheses. The sample selection process is described in Section 5, while Section 6 provides descriptive statistics and results. Finally, a summary, including conclusions and limitations, is presented in Section 7.

2. LITERATURE REVIEW

In this section, enterprise risk management (ERM) is defined and insight is provided into how ERM and the board's role in risk oversight intersect. Next, the relevant earnings quality, analyst forecast and cost of debt literature is described to supply background for their importance to accounting research. The literature review concludes with a discussion of textual analysis, a key methodology employed in this study.

2.1 Enterprise Risk Management and Board of Director Risk Oversight

ERM, a holistic approach to risk management, was formalized by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in its 2004 enterprise risk management (ERM) framework:

Enterprise risk management is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives (COSO 2004, p. 2).

In general, ERM provides a methodology for aggregating and correlating risks across an organization in order to ensure a firm's risks do not exceed its desired risk appetite, the amount of risk a company is willing to accept while enhancing stakeholder value. A more traditional but contrasting approach to risk management focuses on individual risk "silos." The silo approach

entails managing individual risk classes rather than integrating risks across multiple classes (Hoyt and Liebenberg 2011).⁹

As a corporate governance mechanism, the board of directors serves a very important role as an intermediary between shareholders and management. The board's monitoring and advising functions help to ensure the alignment of managers' interests with those of shareholders. Jensen and Meckling (1976) describe in detail the demand for bonding and monitoring mechanisms to accomplish such an alignment and alleviate agency conflicts. A well implemented ERM framework, starting with the board's role in risk oversight, leads to risk information being collected and analyzed across an entire organization, rather than solely within each risk silo. Consequently, successful board of director risk oversight can serve as an additional bonding and monitoring mechanism by which the board can reduce information asymmetry and increase information transparency in a firm.

As the cornerstone of corporate governance, the board of directors plays a crucial role in ERM. This is exemplified by COSO's ERM framework which specifically applies a top-down approach to risk management (COSO 2009a). Through strategic planning and capital resource allocations, the board of directors plays a crucial role in setting the risk culture of an organization (COSO 2009b). Thus, the recently mandated SEC proxy disclosures pertaining to board of director risk oversight provide a window into firms' risk culture and ERM performance.

ERM has received a great deal of attention in recent years from regulators and rating agencies. The Dodd-Frank Wall Street Reform Act was passed by Congress in 2010, with the intent of making several aspects of Wall Street subject to more oversight.¹⁰ Specifically, risk

⁹ Examples of risk classes include market, financial, credit and operational. Other examples include strategic, competitive and reputational risks (Branson et al. 2008).

¹⁰ The Dodd-Frank Act was signed into law in July 2010, but many provisions are still being formalized (Staff 2011).

assessment was addressed in the Act as evidenced by the establishment of the Financial Stability Oversight Council.¹¹ One of the Council's responsibilities involves monitoring firm risk management. As additional evidence of the increased focus on risk management, the SEC now requires enhanced risk disclosures in firms' proxy statements. Effective February 28, 2010, companies are required to provide risk disclosures related to the board's involvement in risk oversight. Further evidence can be found in the NYSE corporate governance rules which formally require audit committees to discuss risk assessment and management (NYSE 2004). In addition, rating agencies (e.g. S&P, Moody's) evaluate firms' ERM. S&P currently provides explicit ERM ratings for insurance and certain financial firms which are incorporated into firms' bond ratings (S&P 2008).

While risk management has received much attention from regulators, politicians and the media, empirical evidence regarding its efficacy in the academic literature is sparse. Until recently, one difficulty in conducting empirical ERM research was measuring ERM performance. For example, a common ERM proxy used in past research typically assumed the presence of ERM through the hiring of a Chief Risk Officer (CRO). Using this methodology, Beasley et al. (2008) identify 120 CRO appointments from 1992 – 2003. They find limited empirical evidence that ERM adds shareholder value across all firms in their sample.¹² Following a similar methodology, Pagach and Warr (2011) use a sample of 138 CRO announcements and find firms with volatile cash flows and stock prices are more likely to adopt ERM. In a separate study investigating the consequences of ERM on firm performance, Pagach

¹¹ The Financial Stability Oversight Council will monitor systemic risk and make recommendations to the Federal Reserve for increasingly strict rules for capital, leverage, liquidity, risk management and other requirements as companies grow in size and complexity, with significant requirements on companies that pose risks to the financial system.

¹² However, Beasley et al. find for a subsample of 73 firms, that firms with low levels of cash, low leverage and volatile earnings receive a positive reaction from shareholders upon the hiring of a CRO.

and Warr (2010) do not find evidence of improved firm performance post CRO appointment across their sample of 106 firms.¹³

Other archival ERM studies incorporate different ERM proxies into their research design. One recent study, Baxter et al. (2011), uses S&P's ERM quality ratings for insurance and financial firms to determine whether ERM quality is associated with firm value. For a sample of 165 firm-year observations in the banking and insurance industries, Baxter et al. find ERM quality is positively priced by the market as evidenced by positive ERM quality announcement returns and a positive association with Tobin's Q, a measure of firm value. Another study, Hoyt and Liebenberg (2011) find ERM to be positively associated with Tobin's Q for a sample of 117 insurance firms.¹⁴ Lastly, Gordon et al. (2009), identify ERM activities for 112 firms through 10-K and 10-Q disclosures. Gordon et al. show ERM performance is positively associated with stock price.

Due to necessary research design limitations in past studies, the question remains as to whether ERM improves earnings quality. In particular, small sample sizes and samples composed primarily of insurance related companies limit the power and generalizability of previous studies. My research attempts to fill this void by utilizing a new measure of ERM performance (i.e., board risk oversight) and a larger sample size to increase the power of the econometric tests and the generalizability of results.

¹³ Pagach and Warr (2010) find for a small subsample of firms, ROE increases, leverage increases and evidence of a decrease in the volatility of earnings post CRO adoptions. Pagach and Warr identify a subsample of firms based on methodology in Beasley et al. (2008). Specifically, Pagach and Warr identify their subsample by extracting firms with the largest CRO hiring event returns. These firms are thought to benefit the most from hiring a CRO.

¹⁴ Hoyt and Liebenberg (2009) utilize Factiva, Thomson and other search engines in combination with key word searches related to risk management.

2.2 Earnings Quality, Analysts' Forecasts and the Cost of Debt

By integrating risks across a firm, ERM provides decision makers with the ability to assess risks and compare them with the firm's risk appetite (COSO 2009b). It is argued that the ERM framework should enhance firm performance by decreasing earnings and return volatility, reducing the cost of capital, and reducing overall risk of failure (Beasley et al. 2008; Hoyt and Liebenberg 2011; Gordon et al. 2009; Pagach and Warr 2010).

2.2.1 Earnings Quality

Earnings volatility is specifically addressed in the COSO 2004 framework. In general, the framework allows management and the board of directors additional foresight in predicting operational surprises. Ultimately, ERM should enable decision makers to better identify potential losses and develop contingencies to reduce their effects.¹⁵ Empirically, the question remains whether ERM does in fact reduce earnings volatility and lead to more persistent or predictable earnings.

Earnings persistence, the degree by which current period earnings predict future periods' earnings, has been analyzed extensively in the academic literature. Studies employing earnings persistence assume a maintained hypothesis that more persistent earnings are better inputs into firm valuation models (Dechow et al. 2010). It is well documented that executives and the capital markets value consistent and stable performance. A good illustration is found in Graham et al. (2005) who show via a survey of executives that CFOs strive for persistent earnings. Seminal earnings response coefficient (ERC) studies, Kormendi and Lipe (1987), Collins and Kothari (1989) and Easton and Zmijewski (1989), show a positive association between earnings persistence and stock returns. By partitioning earnings into its accrual and cash flow

¹⁵ See Pagach and Warr (2010) and COSO (2004).

components, Sloan (1996) shows cash flows are more persistent than accruals. Dechow and Dichev (2002) also disaggregate earnings to develop a measure of accrual persistence. By regressing accruals on current, prior and post period cash flows, Dechow and Dichev calculate accrual estimation errors. Larger errors are indicative of less persistent accruals. Francis et al. (2005) expand upon the Dechow and Dichev model to show accrual quality is positively associated with the cost of capital.¹⁶ In a more recent study, Dichev and Tang (2009) formally establish a link between earnings volatility and earnings predictability. By conditioning their sample on earnings volatility, Dichev and Tang show earnings volatility to substantially improve short- and long-term earnings predictability.

2.2.2 Analysts' Forecasts

Sell-side analysts consume various sources of information (e.g., SEC filings, proxy statements, conference calls, quarterly and annual reports) in order to produce earnings forecasts and stock recommendations.¹⁷ Investors and other capital market participants use analysts' forecasts and stock recommendations to make trading decisions. If capital markets are efficient, the information content of analysts' forecasts will be reflected in stock prices (Ramnath et al. 2008).

Analysts' earnings forecasts receive much attention in the accounting domain. Kothari (2001) outlines several areas where analysts' earnings forecasts are important. First, firm valuation models require explicit or implicit (e.g., discounted cash flow models) earnings forecasts.¹⁸ Second, value relevance studies typically employ an earnings expectation in order to develop a measure of unexpected earnings. Lastly, analysts' earnings forecasts influence firms'

¹⁶ Similar to Dechow and Dichev (2002), accrual quality is the standard deviation of the estimation errors. The lower the standard deviation of the estimation errors, the more persistent the accruals (i.e., higher quality).

¹⁷ Revenue and cash flows from operations are two examples of additional financial numbers forecasted by analysts.

¹⁸ Specifically, Brown et al. (1987) show analysts' earnings forecasts are superior to time-series models in predicting earnings.

information environment. Ramnath et al. (2008) provide two explanations which support this assertion. Investors benefit from more accurate forecasts since forecasts are an input to the analysts' stock recommendations. In an efficient market, more accurate forecasts improve the market's information.

The impact forecasts have on stock price depends on numerous factors. Forecast timing is one such property. For instance, forecasts issued closer to the related earnings announcement are more accurate (O'Brien 1988). Additionally, the information content of the forecast can impact price. Gleason and Lee (2003) show analysts' forecast revisions are more informative when they diverge from the consensus forecast. Clement and Tse (2005) further support the information content of diverging forecasts by showing they are more accurate. The quality of the forecast's inputs also impacts the association between forecast accuracy and stock price. Conference call information and the quality of managers' MD&A disclosures impact forecast accuracy (Bowen et al. 2002; Barron et al. 1999). Williams (1996) shows management earnings forecast reliability influences analysts' forecasting decisions.

Given that more accurate forecasts are value relevant, determinants of analyst forecast accuracy is an important research area. By decreasing earnings and return volatility, ERM should be an important determinant of analyst forecast accuracy.

2.2.3 Cost of Debt

Due to the diverse nature of various stakeholders (e.g., creditors, stockholders, managers) within a corporation, contracting costs arise. Specifically, costs arise because stakeholders have differing goals. One such cost, the agency cost of debt, results from the differing interests of stockholders, and bondholders and frequently leads to higher borrowing costs.

For example, compensation contracts, which align managers' interests with stockholders' interests can result in wealth expropriation from bondholders. Agency theory predicts management will substitute riskier assets in order to increase equity volatility (i.e., asset substitution). This example illustrates the conflict which exists between different claimants. Equity holders essentially have a call option on a firm's assets. Stated a different way, equity investors' returns are only limited by the firm's investment opportunity set and management motivations (Jensen and Meckling 1976). Conversely, debt holders have a fixed claim against firm assets and bear downside risk. They do not fully share in the firm's future profits (Fisher and Verrechia 1997; Plummer and Tse 1999). As a result of the bondholder-equityholder conflict, a moral hazard problem is created. In order to mitigate the moral hazard problem, restrictive covenants are employed. Costs associated with the covenants include monitoring and enforcing costs, as well as missed investment opportunities (Klock, Mansi and Maxwell 2005). As a result, bondholders charge a premium in anticipation of shareholders' divergent interests.

The capital structure choice between debt and equity financing has resulted in a multitude of studies seeking to identify how and why firms make their corporate financing decisions. Extant literature identifies theoretical costs and benefits of debt. The benefits of debt include tax savings due to interest deductibility (Kraus and Litzenberger 1973) and lender monitoring (Jensen and Meckling 1976). Costs of debt financing include the debt overhang problem (Myers 1977) and financial distress (Scott 1976).

Of particular importance to this study, archival evidence confirms and quantifies the financial distress costs associated with the theoretical costs of debt. Financial distress costs include litigation fees, loss of market share, and inefficient asset sales (Almedia and Philippon 2007). Andrade and Kaplan (1998) find highly levered firms have financial distress costs in

excess of 10% of firm value. Graham (2000) and Almedia and Philippon (2007) further provide support for the financial distress costs associated with debt by incorporating risk-adjusted default probabilities. These findings are important because ERM is predicted to reduce the risk of firm failure, thus lowering the cost of debt by lowering financial distress costs.

2.3 Textual Analysis

Social science disciplines such as psychology and sociology frequently utilize content analysis to identify underlying themes in text. Financial reporting offers a plethora of qualitative data in the form of mandatory and voluntary financial disclosures.¹⁹ Ignoring textual information in financial accounting research severely limits our ability to understand the information environment and its impact on information users. Accounting and finance research has increasingly incorporated this methodology in order to convert qualitative operational constructs (e.g., firm performance in financial disclosures) into quantitative measures to be used in econometric analysis. In general, this methodology has allowed researchers to capture the content and variation in qualitative information sources to examine their information content (Kothari et al. 2009; Li 2008; Li 2009; Loughran and McDonald 2011).

Textual analyses in accounting and finance studies typically utilize content and readability analyses. While similar, content analysis extracts underlying themes from the text such as trends, attitudes, and content categories (Jones and Shoemaker 1994). Readability analysis is more concerned with specific aspects of textual characteristics (e.g., passive versus active voice). Content analysis will be employed in this study because it offers a measurement of underlying textual themes. For example, negative tone, or the degree of pessimism in

¹⁹ Li (2010) provides a succinct example. Li describes a 207 page annual report which only contains 5 pages of financial statements and 25 pages of tables. The remainder of the report consists of text which includes the Management Discussion and Analysis and notes to the Financial Statements.

financial documents, has been shown to be correlated with financial performance (Loughran and McDonald 2011).

Researchers typically employ one of three methodologies for conducting content analysis (Fisher et al. 2010). First, manual content analysis employs human evaluation of qualitative information in order to quantify data. The second method, partially computerized content analysis, utilizes software to help facilitate textual analysis. Both methodologies can suffer from low power statistical tests due to small sample sizes. Additionally, the subjective nature of the manual grading techniques commonly employed in manual content analysis and partially computerized content analysis leads to studies which are difficult to replicate (Krippendorff, 2004).

The third and final method for conducting content analysis is full computer analysis, which effectively replaced manual grading techniques. In this setting, a “bag of words” or dictionary approach to conducting content analysis is commonly employed to quantitatively measure a desired textual characteristic (e.g., negative tone). Software packages apply mapping algorithms to read and appropriately classify text based on preset categories (i.e., dictionaries). The General Inquirer (GI), a non-proprietary software package, incorporates 182 dictionaries to provide a vast array of underlying textual theme measurements. The GI runs disambiguation routines, procedures which are able to identify word roots and senses, in order to correctly classify text. A common dictionary used to classify negative tone, the Harvard Psychosociological Dictionary’s negative word category, is based on the social cognition work of Phillip Stone and has been used extensively in the accounting and finance domain (e.g., Kothari et al. 2009; Li 2008; Loughran and McDonald 2011).²⁰ The primary conclusion from

²⁰ Philip Stone headed a group which developed computerized textual analysis from linguistic, psychological, sociological, anthropological, and communication vantage points (Stone et al. 1966; Neuendorf 2002).

these papers is that textual content offers explanatory power in explaining stock and earnings performance.

Several studies illustrate the utility in employing computerized content analysis. Li (2006) measures risk sentiment in annual reports by employing computer programs which count the frequency of words synonymous with risk or uncertainty. Li finds a negative relationship between the frequency of risk sentiment words and future earnings. Li (2008) employs the FOG index, a measure of readability, in order to show a negative relationship between annual report readability and contemporaneous earnings.²¹ Li further shows more readable annual reports are positively correlated with persistent and positive earnings. Hanley and Hoberg (2010) utilize content analysis of initial public offering (IPO) prospectuses and find more accurate offer prices in the presence of higher information content. Tetlock (2007) finds a positive association between the *Wall Street Journal's* "Abreast of the Market" column's degree of pessimism and future stock price and trading volume. Tetlock et al. (2008) focus on financial news stories in the entire *Wall Street Journal* and Dow Jones News Service to quantify whether the tone of the popular press can forecast future firm performance. The authors provide evidence that negative words in the printed media can indeed forecast poor future earnings performance.

In the next section, ERM theory intersects with earnings predictability and the cost of debt in order to build my hypotheses.

3. HYPOTHESIS DEVELOPMENT

The theoretical link between ERM and firm performance is well documented in authoritative and academic literature. ERM theoretically enhances earnings quality by

²¹ The FOG index is constructed from the number of syllables per word and the number of words per sentence (Li 2008).

minimizing the potential for risk aggregation across multiple risk classes. This benefit is predicted to manifest itself in the form of less volatile and more persistent earnings.²²

The silo-based, or traditional, approach to risk management considers risks individually.²³ This approach lacks the coordination which ERM offers. ERM improves upon the traditional approach to risk management through the identification of interdependencies between risks at an entity-wide level.²⁴ Specifically, the COSO ERM framework predicts companies benefit from the increased foresight that ERM offers because it allows the board of directors and managers the ability to establish responses to operational surprises, thus minimizing their effects (COSO 2004).

Pagach and Warr (2010) and Stulz (1996, 2003) provide additional theoretical support for the link between ERM and earnings performance by describing the organizational costs avoided under the framework. Organizational costs can result from operational surprises. Large negative shocks to earnings can result in the inability to pursue positive NPV projects, costs associated with missed earnings targets and debt covenant violations. ERM has the potential to reduce the probability of large negative earnings and cash flows by identifying and controlling risks across the organization and, in turn, reducing the corresponding organizational costs.

While theory predicts ERM should decrease earnings volatility, tension exists as to whether it does so in practice. Regulatory requirements may lead to superficial adoption of ERM (Beasley et al. 2008; Baxter et al. 2011). Additionally, academic studies provide mixed results concerning firm performance benefits (Beasley et al. 2008; Pagach and Warr 2010). This leads to my first hypothesis, stated in alternative form:

²² See Hoyt and Liebenberg 2009; Beasley et al. 2008; Pagach and Warr 2010/2011; Gordon et al. 2009.

²³ Common traditional risk management activities include purchasing insurance and/or hedging related activities (Pagach and Warr 2010).

²⁴ For example, ERM could identify and exploit natural hedges existing between risk classes, which under the individual silo, approach would lead to duplicate risk management costs (Hoyt and Liebenberg 2009).

H1: *Ceteris paribus, ERM performance is associated with earnings persistence.*

This first hypothesis can be further partitioned and operationalized into the following sub-hypotheses:

H1a: *Ceteris paribus, ERM performance is negatively associated with loss (i.e., negative earnings) persistence.*

H1b: *Ceteris paribus, ERM performance is positively associated with profit (i.e., positive earnings) persistence.*

The first hypothesis addresses whether ERM performance is associated with earnings persistence. A natural question which follows this hypothesis is whether the accrual component of earnings is associated with ERM performance. This would provide further evidence of ERM's impact on earnings. The accrual component of earnings has received much attention in the academic earnings quality literature. Dechow (1994) shows earnings are more representative of firm value than cash flows. Specifically, Dechow shows, through an association with stock returns, that the accrual component of earnings increases the value relevance of earnings because of the inherent timing and matching issues present in cash flows. Further evidence can be found in Pennman and Sougiannis' (1998) inputs to valuation study which documents earnings to be superior to cash flow and dividend models in forecasting current market value. Dechow et al. (2010) interpret the Pennman and Sougiannis (1998) finding as accruals give earnings superior ability to reflect market value compared to cash flows. In a related vein, Dechow and Dichev (2002) show the magnitude of accrual estimation errors, a measure of accrual persistence, are negatively associated with earnings persistence.²⁵ Overall, the accrual component of earnings and, in particular, accrual persistence, has been shown to influence earnings persistence.

As an important component of earnings, accruals offer another avenue to test the theoretical predictions regarding ERM and firm performance. ERM's ability to minimize costly

²⁵ Stated another way, the larger the accrual estimation error, the lower the accrual persistence.

lower tail outcomes and the associated operational costs alleviates the need to record accruals related to these preventable events. Consequently, in the presence of ERM, firms should benefit from smoother accruals. This leads to my second hypothesis stated in alternative form:

***H2:** Ceteris paribus, ERM performance is positively associated with accrual persistence.*

Taken together, the first two hypotheses investigate whether earnings are more predictable in the presence of better performing ERM. From a forecasting perspective, a third order effect of more predictable earnings streams should lead to more accurate earnings forecasts. Since more accurate forecasts improve the market's information, determining whether ERM influences analysts' forecast accuracy is an important question. Therefore, I pose a third hypothesis stated in alternative form:

***H3:** Ceteris paribus, ERM performance is positively associated with analysts' earnings forecast accuracy.*

Due to the inherent structure of debt contracts, debt market participants have a different viewpoint of firm performance than equity market participants. Debt holders differ from equity holders since debt holders bear firms' downside risk but do not fully share in the firm's future profits (Fisher and Verrecchia 1997; Plummer and Tse 1999). Extant literature shows certain firm performance characteristics are associated with increased costs of debt financing. Minton and Schrand (1999) find firms with high cash flow volatility experience high debt costs since bond holders place a premium on firms with more unpredictable cash flows. In general, debt holders are more interested in liquidity and solvency firm characteristics.

The debt markets present a very appropriate arena to investigate the theoretical predictions of ERM performance. ERM is presumed to lower a firm's overall risk of failure and thus increase performance (Gordon et al. 2009). Theoretically, ERM should decrease the volatility of earnings and cash flows, a very important firm performance characteristic for debt

holders. Evidence supporting ERM's benefits to debt market participants lies in practitioner and academic literature. S&P evaluates firms' ERM across non-financial firms when determining bond ratings (SEC 2008). Beasley et al. (2008) provide evidence that risky firms (i.e., high leverage) experience a positive market reaction to the appointment of a CRO, a proxy for the implementation of ERM. Beasley et al. interpret their results as providing evidence that ERM can lead to lower financing costs. Pagach and Warr (2010) identify firms which have the largest market reaction to a CRO hiring and find a statistically significant increase in leverage following the CRO appointment. The authors interpret their findings as evidence that ERM reduces financial risk such that a firm can bear additional debt. This leads to my fourth hypothesis stated in alternative form:

H4: Ceteris paribus, firms with higher performing ERM experience a lower cost of debt.

A description of how the hypotheses are empirically examined is detailed in the next section.

4. RESEARCH DESIGN

The substantive question of interest in this study is whether ERM performance benefits a firm. In particular, I focus on two general measures (i.e., earnings predictability and the cost of debt) in order to test my hypotheses. In this section, I describe how ERM performance, earnings and accrual persistence, analyst forecast accuracy and the cost of debt are operationalized. Additionally, for each hypothesis, multiple methodologies are employed to increase the robustness of the statistical inferences.

4.1 ERM Performance

A major hurdle in conducting ERM research involves limited available data to measure the presence of ERM and its performance within a firm. As discussed earlier, prior literature has

proxied for ERM through the hiring of a Chief Risk Officer, S&P ERM ratings for insurance financial firms, or by scouring press releases and mandatory disclosures for evidence of ERM implementation. In order to increase my sample size and the generalizability of results, I enhance previous methodologies by utilizing a new data source. The recently mandated SEC board of director risk oversight disclosures in proxy statements provides a window into the central tenant of the ERM framework, the board's involvement in setting the risk culture of the organization. Therefore, ERM performance is operationalized as the narrative related to the board of director risk oversight.

The new SEC proxy statement disclosure rules provide general guidelines regarding the content of the board risk oversight disclosure (SEC 2009). The SEC rules indicate firms can describe specific individuals who oversee risk and the reporting structure employed at the firm to address risk. Additionally, through supplemental ERM guidance, COSO provides additional insight into the type of information which can be contained in the SEC proxy disclosures. COSO outlines the following four board of director risk responsibilities and oversight areas which contribute to ERM performance (COSO 2009a; COSO 2009b):

1. Understand the entity's risk philosophy and concur with the entity's risk appetite.
2. Know the extent to which management has established effective enterprise risk management of the organization.
3. Review the entity's portfolio of risk and consider it against the entity's risk appetite.
4. Be apprised of the most significant risks and whether management is responding appropriately.

In order to quantify ERM performance across a large sample of proxy disclosures, textual analysis is employed to develop a measure of negative tone for each proxy disclosure. Negative tone, or the degree of pessimism in a disclosure, has been used in the accounting and finance domain to extract a measure of performance from financial media. A positive association between risk sentiment words in annual reports and future earnings was shown by Li (2006). Tetlock et al. (2008) show tone in the popular press can predict future firm performance. Kothari

et al. (2009) perform content analysis over a diverse sample of text (e.g., MD&A, news articles, and management provided guidance) and find the cost of capital is higher in the presence of negative tonal text. The authors interpret this finding to mean that negative tonal disclosures are indicative of the content's uncertainty. In the ERM performance context, the tonal measurement offers a measure of the ERM system's efficacy. A tonal measurement captures the uncertainty in the ERM system as expressed by the language in the board risk oversight disclosure. Therefore, I measure ERM performance as the underlying negative tone expressed in the risk oversight proxy statement disclosure with higher levels of negative tone representing lower ERM performance.

The General Inquirer (GI) content analysis software and its Harvard-IV-4 TagNeg dictionary is employed to provide the following textual characteristics for each proxy disclosure: i) word count; ii) raw negative word frequency counts; and iii) simple proportion of matched negative words. The simple proportion of matched words serves as a measure of ERM performance. Specifically, the following measure of ERM performance is constructed:

$$ERMPerf_{it} = NR_{it} \quad (1)$$

Where NR_{it} is the proportion of negative words contained in the disclosure. A larger measure of $ERMPerf_{it}$ is interpreted as poorer performing ERM.

To provide additional insight, two board of director risk oversight proxy disclosures are included in Appendix A. These disclosures provide an example of the content and variation exhibited across the population of board risk oversight disclosures. Upon an initial read, example 1, the Hospital Corporation of America, intuitively appears to have a better performing ERM system compared to the second example, Petroleum Development Corporation. The COSO issued guidance outlined above provides a lens by which the examples can be analyzed

(COSO 2009a; COSO 2009b). Example 1 contains information related to all four of the board of director ERM responsibility objectives put forth by COSO. For instance, the first paragraph for the Hospital Corporation of America (i.e., example 1) explains how the company understands its risk appetite and corresponding risk philosophy (objective 1). The first paragraph also explains management's responsibility and the board's role in risk oversight (objective 2). The second paragraph provides details as to how the board is kept apprised of significant risks and manages the portfolio of risk facing the company (objectives 3&4). Example 2 offers a stark contrast, since it only provides information related to objective 2, the board's role in risk oversight, and none of the other objectives. In order to quantify ERM performance based on the negative language used in each disclosure, they are submitted to the GI textual analysis software. The GI provides a negative tonal measure, $ERMPerf_{it}$, for each disclosure, which represents the degree of uncertainty underlying the text. The negative tonal measure is calculated using the Harvard-IV-4 TagNeg dictionary, which is comprised of 2,291 negative words or word phrases. Confirming the qualitative analysis above, and providing some support for the use of a tonal measure of ERM performance, the Petroleum Development Corporation, example 2, has a larger proportion of negative words ($ERMPerf_{it}=0.127$) than the Hospital Corporation of America, example 1, ($ERMPerf_{it}=0.102$).²⁶

There are certain advantages to employing textual analysis in order to address the phenomena of interest in this study, ERM performance. First, the degree of pessimism in financial text has been successfully used to extract a measure of firm performance. For example, Kothari et al. (2009) use the GI to associate the negative tone of a comprehensive sample of media from firms, popular press and analyst reports with a firm's cost of capital. Second, in the context of this study, textual analysis offers a methodology to analyze the content of a new data

²⁶ The $ERMPerf_{it}$ measure is inversely related to performance.

source, the enhanced SEC risk disclosures. Employing computerized textual analysis alleviates the limitations associated with manual grading techniques (e.g., small sample size).

Additionally, using predefined word lists, such as the Harvard-IV-4 TagNeg dictionary, limits the subjectivity a researcher can employ in analyzing textual content. Lastly, research which incorporates predefined word lists is more replicable than studies which use subjective dictionaries (Loughran and McDonald 2011).

From a research design standpoint, operational construct measurement is often inherently noisy. As it pertains to textual analysis, a tonal measure of ERM performance has certain limitations. First, textual analysis may be inappropriate if the SEC board risk oversight disclosures are “boilerplate.” Therefore, the data would exhibit little variation and an econometric analysis would be limited. Second, ERM performance measurement error potentially limits the ability to make statistical inferences. Li (2010) acknowledges the measurement error in the dictionary approach to textual analysis and observes if a researcher finds a result in the face of measurement error, then the results are likely to be strong because measurement error biases against finding significant results.

In order to provide additional support for the tonal measure of ERM performance, the $ERMPerf_{it}$ measure is correlated with firms’ long-term debt ratings S&P includes an evaluation of ERM into their corporate ratings for non-financial firms.²⁷ S&P currently focuses on risk culture and strategic risk management, but plans to incorporate additional components of ERM into future evaluations (S&P 2008; S&P 2010). By conditioning the $ERMPerf_{it}$ distribution into quintiles, where a higher quintile represents better performing ERM, a positive correlation

²⁷ S&P incorporates the ERM evaluation into their review of management and corporate governance practices which is an input into the corporate credit rating.

between the quintile ranking and S&P's long-term debt rating helps to corroborate the $ERMPerf_{it}$ measure's efficacy.

4.2 Earnings Persistence

To address the first hypothesis, a measure of earnings persistence is developed based on Dichev and Tang (2009) and Dechow et al. (2010). Both studies employ an autoregressive regression to measure the persistence of earnings. Specifically, future earnings before extraordinary items ($Earn_{i,t+n}$) is regressed on current period earnings before extraordinary items ($Earn_{it}$). In order to capture how earnings persistence varies across different levels of ERM performance, the rank of ERM performance ($ERMPerfRnk_{it}$), based on the tonal measure extracted from the proxy statement disclosures, is included along with an interaction term ($ERMPerfRnk_{it} * Earnings_{it}$).²⁸ Additionally, unobservable cross-sectional dependence (i.e., time effect) is controlled for through an annual fixed effect transformation ($Year_{it}$). Finally, to control for the possibility that particular industries inherently have more persistent earnings and further isolate the effect of an individual firm's ERM performance on earnings persistence, I also control for unobservable industry effects (FF_{it}).²⁹ The relationship can be represented as follows:

$$Earnings_{i,t+1} = \beta_0 + \beta_1 Earnings_{it} + \beta_2 ERMPerRnk_{it} + \beta_3 Earnings_{it} \times ERMPerfRnk_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{47} \beta_k FF_k + \varepsilon_{it} \quad (2)$$

Where:

$Earnings_{it+1}$ Income before extraordinary items (Compustat IB) divided by Average total assets (Compustat AT) for firm i in year t.

²⁸ The rank is developed by conditioning the sample on the level of negative tone measured by the GI content analysis software. The higher the rank, the higher the ERM performance (e.g., rank = 1 implies higher performing ERM than rank = 0). An advantage of using ranks is that it allows for non-linearities in the tonal measure as well as a decrease in the influence of outliers (Dichev and Tang 2009).

²⁹ The industry fixed effects are based on the Fama and French (1997) classification.

ERMPerfRnk_{it} Developed by conditioning the sample on the level of negative tone measured by the GI content analysis software. A rank = 0 implies poor performing ERM while a rank = 1 implies high ERM performance.

ERMPerf_{it} NR_t where NR is the proportion of negative words provided by the GI content analysis software.

Year_{it} Year dummies for 2008-2009.

FF_{it} Fama-French industry classification (k=1 to 47).

In order to incrementally test the results from Equation 2, control variables are added to provide an additional robustness check. Specifically, Equation 2 is augmented with *Size_{it}*, *Acc_{it}* and *MktBook_{it}*.³⁰ *Size_{it}* controls for the possibility that larger firms have more persistent earnings. *Acc_{it}*, the level of accruals, captures the negative relationship between the level of accruals and earnings persistence as described in Sloan (1996). *MktBook_{it}* controls for variation in earnings persistence across firms with differing growth opportunities. Lastly, to ensure the sample of firms is more homogenous with regards to industry representation, financial, insurance and public utility industries are removed.

$$Earnings_{i,t+1} = \beta_0 + \beta_1 Earnings_{it} + \beta_2 ERMPerfRnk_{it} + \beta_3 Earnings_{it} \times ERMPerfRnk_{it} + \beta_4 Size_{it} + \beta_5 MktBook_{it} + \beta_6 Acc_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{43} \beta_k FF_k + \varepsilon_{it} \quad (3)$$

Where:

ERMPerfRnk_{i,t} Developed by conditioning the sample on the level of negative tone measured by the GI content analysis software. A rank = 0 implies poor performing ERM while a rank = 4 implies high ERM performance.

Size_{it} Natural logarithm of total assets (Compustat AT) for firm i in year t.

MktBook_{it} Firm i's market value of equity divided by its book value of equity measured at the beginning of the year t-1 (Mansi et al. 2011). Compustat: (PRCC_F*CSHO) / CEQ

Acc_{it} Absolute amount of accruals calculated as the difference between operating income after depreciation and cash flows from operations (Li 2008). Compustat (OIADP - OANCF)/AT

³⁰ Li (2008) provided the functional form of each control variable.

All variable definitions are also available in Appendix B. A positive and statistically significant coefficient on the interaction term (β_3) would generally support my first hypothesis. No prediction is made regarding the size coefficient (β_4) and growth coefficient (β_5) because of the relatively short measurement period the model is estimated over. Based on Sloan (1996), the coefficient on the level of accruals (β_6) is expected to be negative, an indication that the larger the level of accruals, the less persistent the earnings stream. To help ensure standard errors are not understated due to the presence of a lagged dependent variable ($Earn_{it}$), industry clustered standard errors are calculated to correct for serial-correlated residuals (Peterson 2009).³¹

Hypotheses 1a and 1b are addressed by dividing the sample into negative (positive) earnings observations and analyzing the ordinary least squares (OLS) estimators and statistics for Equations 2 and 3. For loss firms, I expect a negative and statistically significant coefficient on the interaction term (β_3) to support H1a. This would be interpreted as losses are *less* persistent for firms with better performing ERM. For positive earnings firms, I expect a positive and statistically significant coefficient on the interaction term (β_3). This would be interpreted as positive earnings are *more* persistent for firms with better performing ERM.

4.3 Accrual Persistence

In order to test the second hypothesis, a model developed by Dechow and Dichev (2002) is employed to measure accrual persistence. Dechow and Dichev (DD) model short-term accruals as a function of past, present and future cash flows from operations, in order to capture the timing and matching issues inherent with cash flows. The standard deviation of the residual from the model serves as a measure of accrual quality (i.e., accrual persistence) because a larger

³¹ Industry clustered standard errors are calculated based on two-digit SIC codes (Li 2009). Industry clustered standard errors also control for within-industry earnings persistence correlation.

standard deviation of the residual was found to be negatively associated with earnings persistence and positively associated with accrual and earnings volatility.

In addition to past, present and future cash flows, two variables are added to the DD model in order to incorporate additional innovations found in the literature (McNichols 2002; Francis et al. 2005). To control for performance and expand the model to include depreciation, McNichols (2002) and Francis et al. (2005) add the yearly change in revenue (ΔRev_{it}) and the level of property, plant and equipment (PPE_{it}) to the base DD model. McNichols (2002) finds the additions increase the explanatory power of the model and reduce the measurement error in forming short-term accrual expectations. Therefore, the following model is utilized to develop a measure of accrual persistence:

$$TCA_{it} = \alpha_0 + \alpha_1 CFO_{it-1} + \alpha_2 CFO_{it} + \alpha_3 CFO_{it+1} + \alpha_4 \Delta REV_{it} + \alpha_5 PPE_{it} + \zeta_{it} \quad (4)$$

TCA_{it} is measured two different ways to strengthen the results of the analysis. First, total current accruals (TCA_{it}) will be measured using the indirect method or balance sheet and income statement approach in order to provide some assurance regarding variable measurement and methodology. The benefits of using the indirect method include comparability to Francis et al. (2005), while also providing an additional test of H2. Second, the direct method or statement of cash flows approach will be used to minimize measurement error in TCA_{it} (Hribar and Collins 2002). Since statement of cash flow data is available during my sample period, the direct method will serve as the primary measurement of TCA_{it} in order to test H2.

Additionally, CFO_{it+n} is measured differently under the indirect and direct methods. Under the indirect method, CFO_{it+n} is calculated as the difference between net income before extraordinary items and total accruals. CFO_{it+n} is simply extracted from the statement of cash flows under the direct method. In addition to the descriptions provided throughout the text, all variable definitions are also defined in Appendix B.

Variable measurement under the *indirect* method is as follows:

- TA_{it} Total accruals calculated under the indirect method: firm i's total accruals measured as the change in current assets less the change in current liabilities less the change in cash and cash equivalents plus the change in the current maturities of long-term debt and other short-term debt less depreciation and amortization expense (Francis et al. 2005). Compustat $\Delta ACT - \Delta LCT - \Delta CHE + \Delta DLC - DP$
- TCA_{it} Total current accruals calculated under the indirect method: firm i's total current accruals measured as the change in current assets less the change in current liabilities less the change in cash and cash equivalents plus the change in the current maturities of long-term debt and other short-term debt (Francis et al. 2005). Compustat $\Delta ACT - \Delta LCT - \Delta CHE + \Delta DLC$
- CFO_{it+n} Cash flows from operations calculated under the indirect method: Income before extraordinary items (Compustat IB) - total accruals (TA_{it}) divided by Average (Compustat AT). See Francis et al. (2005).
- REV_{it} Firm i's revenue (Compustat SALE) scaled by Average (Compustat AT)
- PPE_{it} Firm i's property, plant and equipment (Compustat PPEGT) scaled by Average (Compustat AT)

Variable measurement under the *direct* method is as follows:³²

- TCA_{it} Total current accruals calculated under the direct method: firm i's total current accruals measured as the negative decrease (increase) in accounts receivable plus the decrease (increase) in inventory plus the increase (decrease) in accounts payable plus the increase (decrease) in taxes payable plus the net change in other current assets plus depreciation expense (Hribar and Collins 2002).
Compustat $-(RECCH+INVCH+APALCH+TXACH+AOLOCH+DPC)$
- CFO_{it+n} Cash flows from operations calculated under the direct method: firm i's cash flows from operations from the statement of cash flows (Compustat OANCF).

Using the residual obtained from an OLS estimation of Equation 3 by year and industry, a moving standard deviation of the residual over the past three years ($\sigma(\zeta_{it-2})$) is calculated. A larger residual standard deviation is interpreted as poorer accrual quality. The standard deviation of the residual measures the degree of uncertainty corresponding to accruals (Francis et al. 2005). The measure does not take into account the magnitude of accruals, but rather their predictability

³² REV_{it} and PPE_{it} are measured the same under the indirect and direct methods. TA_{it} is not required under the direct method.

or uncertainty. Thus, the standard deviation of the residuals, AcQ_{it} , can be interpreted as a measure of accrual persistence. Next, ranks ($ERMPperfRnk_{it}$) are developed based on the ERM performance measure ($ERMPperf_{it}$).³³ Utilizing a t-test, the standard deviation of residuals across ranks is compared to test H2. A comparison of the top performing ERM firms' residual standard deviation to the bottom performing ERM firms' will determine whether the standard deviation of the residuals is statistically smaller for better performing ERM firms. The effects found under the above analysis may be overstated because they do not control for other factors which could influence accrual persistence. Therefore, an additional test further identifies the relationship between AcQ_{it} and $ERMPperfRnk_{it}$. A linear OLS estimated regression of AcQ_{it} on $ERMPperfRnk_{it}$ supplemented with control variables provides an appropriate test of H2. The relationship is as follows:

$$AcQ_{it} = \alpha_0 + \alpha_1 ERMPperfRnk_{it} + \alpha_2 Size_{it} + \alpha_3 MktBook_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{43} \beta_k FF_k + \varepsilon_{it} \quad (5)$$

Where:

- AcQ_{it} Standard deviation of the residual from Equation 4: $\sigma(\zeta)_{it}$ over the past 3 years.
- $Size_{it}$ Natural logarithm of total assets (Compustat AT) for firm i in year t.
- $MktBook_{it}$ Firm i's market value of equity divided by its book value of equity measured at the beginning of the year t-1 (Mansi et al. 2011). Compustat: $(PRCC_F * CSHO) / CEQ$
- $Year_{it}$ Year dummies for 2008-2009.
- FF_{it} Fama-French industry classification (k=1 to 43). Financial, insurance and utility industries are removed due to differences in their regulatory environments.

A negative and statistically significant coefficient on $ERMPperfRnk_{it}$ (α_1) provides support for H2. Namely, that higher ERM performance is indicative of smaller accrual estimation errors. Similar to the rationale described under the earnings persistence analysis, $Size_{it}$ captures many aspects of

³³ The $ERMPperf_{it}$ distribution is first partitioned into the top and bottom 50% for analysis. The $ERMPperf_{it}$ distribution is then partitioned into quintiles for additional analyses.

a firm's business environment which could influence accrual persistence and $MktBook_{it}$ controls for variation in accrual persistence across firms with differing growth opportunities. No prediction is made regarding the coefficient on size (α_2) and growth (α_3) due to the lack of consistency by which these variables explain accrual persistence. Cross-sectional dependence is controlled through year indicators ($Year_{it}$). To control for the possibility that particular industries inherently have more persistent accruals and further isolate the effect of an individual firm's ERM performance on accrual persistence, unobservable industry effects (FF_{it}) are also controlled for in the model.³⁴

The above methodology tests the proposition that ERM performance influences earnings persistence. In the next section, analysts' earnings forecasts are utilized to test H3, a third-order effect of ERM's association with earnings predictability.

4.4 Analysts' Forecast Accuracy

The Institutional Broker Estimate System (I/B/E/S) Summary history file is utilized to develop a measure of forecast accuracy. Two measures of forecast accuracy are calculated to test H3. First, following the basic procedure in Lang and Lundholm (1996), forecast accuracy is captured as the median absolute forecast error scaled by the beginning of the year stock price. Specifically, forecast accuracy is calculated as follows:³⁵

$$FcstAcc_{it} = |Actual\ EPS - Analysts'\ consensus\ forecast| / Beginning\ of\ the\ year\ price \quad (6)$$

The measure is deflated by beginning of the year stock price to facilitate comparisons across firms. To determine if the choice of deflator influences results, a second measure of forecast

³⁴ The industry fixed effects are based on the Fama and French (1997) classification.

³⁵ Actual earnings per share (EPS) is obtained from I/B/E/S to be consistent with analysts' EPS forecasts (Givoly et al. 2009).

accuracy is calculated. The actual value of earnings taken from I/B/E/S is used as a deflator.

This leads to the following calculation (Givoly et al. 2009):

$$FcstAcc_{it} = |Actual\ EPS - Analysts'\ consensus\ forecast| / Actual\ EPS \quad (7)$$

The annual median consensus earnings forecasts provided immediately after the prior fiscal year earnings announcement is used to calculate a measure of forecast accuracy.³⁶ Additionally, the mean consensus earnings forecasts are also analyzed to further corroborate the results. $FcstAcc_{it}$ provides an inverse measure of analysts' forecast accuracy. Following Hope (2003) and Lehavy et al. (2011), an OLS estimated linear regression of analyst forecast accuracy on $ERMPerfRnk_{it}$ and several variables known to explain forecast accuracy provide a test of H3. Specifically, the following model is employed:

$$FcstAcc_{it} = \alpha_0 + \alpha_1 ERMPerfRnk_{it} + \alpha_2 AnlstFoll_{it} + \alpha_3 Size_{it} + \alpha_4 MktBook_{it} + \alpha_5 Sgmt_{it} + \alpha_6 PInst_{it} + \alpha_7 \sigma Ret_{it-1} + \alpha_8 R\&D_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{43} \beta_k FF_k + \varepsilon_{it} \quad (8)$$

Where:

- $AnlstFoll_{it}$ Number of analysts following firm i in year t (I/B/E/S NUMEST).
- $Size_{it}$ Natural logarithm of total assets (Compustat AT) for firm i in year t.
- $MktBook_{it}$ Firm i's market value of equity divided by its book value of equity measured at the beginning of the year t-1. Compustat (PRCC_F*CSHO) / CEQ
- $Sgmt_{it}$ Number of business segments for firm i in year t (Computstat Segment File).
- $PInst_{it}$ The percentage of the most recent quarterly institutional holdings to common shares outstanding prior to the 10-K filing (located in Thomas Reuters 13F filings) for firm i in year t.
- σRet_{it-1} Standard deviation of firm i's prior year monthly returns (located in the CRSP monthly file).
- $R\&D_{it}$ Firm i's research and development expense (Compustat XRD) in year t.
- $Year_{it}$ Year dummies for 2008-2009.
- FF_{it} Fama-French industry classification (k=1 to 43). Financial, insurance and utility industries are removed due to differences in their regulatory environments.

³⁶ Forecasts with at least two analysts are used for the analysis. The median consensus forecast reduces the influence of outliers.

$ERMPerfRnk_{it}$ is calculated by conditioning the sample into $ERMPerf_{it}$ quintiles. Known factors which explain a firm's information environment and influence analyst forecast accuracy are also included in the model. $AnlstFoll_{it}$ controls for differences in incentives for analysts to provide accurate forecasts in the presence of other analysts. $Size_{it}$ also controls for a firm's information environment. It is expected $AnlstFoll_{it}$, $Size_{it}$ will have a negative relationship with the dependent variable suggesting a positive correlation with forecast accuracy. $MktBook_{it}$ controls for differences in the difficulty to accurately forecast earnings for high growth firms. $MktBook_{it}$ is predicted to have a negative correlation with forecast accuracy due to the added complexity of forecasting growth firms' financial performance (Lehavy et al. 2011). Firm complexity, $Sgmt_{it}$, is also likely to influence analysts' ability to accurately forecast earnings and is predicted to be negatively associated with forecast accuracy. Institutional ownership, $PInst_{it}$, has been shown to influence firms' information environments and positively influence analysts' forecast accuracy (Lehavy et al. 2011). Information uncertainty is controlled for by the standard deviation of prior year monthly stock returns (σRet_{it-1}). σRet_{it-1} is predicted to have a positive relationship with the dependent variable (Lehavy et al. 2011). $R\&D_{it}$ controls for the business complexity associated with high intangible asset firms and is predicted to negatively influence analysts' forecast accuracy (Barth et al. 2001). Lastly, year ($Year_{it}$) and industry (FF_{it}) indicator variables are included to control for time varying factors and industry effects related to analysts' forecast accuracy.³⁷ A negative and significant coefficient on $ERMPerfRnk_{it}$ (α_1) provides support for H3. Namely, higher ERM performance is expected to be associated with smaller forecast errors.

³⁷ All variable definitions are also listed in Appendix B.

4.5 Cost of Debt

The bond markets provide a large source of new capital for companies, thus, they represent an important area for researchers to investigate factors which influence the cost of raising debt capital.³⁸ In order to test H4, two proxies of a firm's cost of debt are calculated. First, corporate bond ratings and yields are collected from the Securities Data Company's Global New Issues database. Second, a realized cost of debt is calculated from data collected from COMPUSTAT. Both measures are incorporated into the analysis in order to provide robustness tests and ensure sufficient power to make statistical inferences.

The bond yield spread serves as a measure for a firm's cost of debt as dictated by the bond market (Sengupta 1998; Shi 2003; Jiang 2008; Crabtree and Maher 2009; Edmonds, Edmonds and Maher 2011). Bond ratings also serve as a common proxy for the cost of debt. Due to an endogeneity concern, bond ratings are not an appropriate proxy for the cost of debt in this analysis. Rating agencies (e.g., S&P, Moody's) incorporate an ERM evaluation into their ratings such that the direction of causality is not obvious.³⁹ Credit spreads serve as a superior measure because they provide a measure of how the market values information while minimizing an endogenous relationship between $ERMPerfRnk$ and the cost of debt. While bond yield spreads serve as the dependent variable, the initial issue rating will serve as an important control variable.

Given that the information contained in $ERMPerfRnk_{it}$ is partially contained in a firm's bond rating, I follow Mansi, Maxwell and Miller (2011) and Edmonds, Edmonds and Maher (2011), and utilize a two-stage regression to measure: the association between ERM

³⁸ As of 2009, the global bond market had approximately \$90 trillion outstanding (Securities Industry and Financial Markets Association – <http://www.sifma.org/research/statistics.aspx>) while the global equity market capitalization was approximately \$40-50 trillion (World Federation of Exchanges - <http://www.world-exchanges.org/statistics>).

³⁹ For instance, it is possible credit ratings provide an incentive for firms to invest more time and energy into ERM performance in order to improve their rating. This is problematic if credit ratings serve as a proxy for the cost of debt since a mechanical relationship exists between the rating and ERM performance.

performance and the bond yield spread. In the first stage, the bond rating ($Rating_{it+1}$) is orthogonalized. This ensures the rating variable contains unique information not explained by the remaining control variables. To orthogonalize $Rating_{it+1}$, the residuals are taken from the following first stage regression model:⁴⁰

$$Rating_{it+1} = \alpha_0 + \alpha_1 ERMPerfRnk_{it} + \alpha_2 Size_{it} + \alpha_3 Leverage_{it} + \alpha_4 ROA_{it} + \alpha_5 \sigma(ROA)_{it} + \alpha_6 MktBook_{it} + \alpha_7 IdioRisk_{it-1} + \alpha_8 IssueSize_{it} + \alpha_9 CallProv_{it} + \alpha_{10} Sub_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{43} \beta_k FF_k + \varepsilon_{it} \quad (9)$$

Where:⁴¹

- $Rating_{it+1}$ Rating is firm i's average Moody's and S&P's senior debt rating in year t+1. Ratings are converted to integers from 1 (D) - 23 (Aaa+).
- $Leverage_{it}$ Firm i's leverage is calculated as the amount of long term debt divided by total assets at the end of year t (Edmonds, Edmonds and Maher 2011). Compustat (DLTT/AT)
- $Size_{it}$ Natural logarithm of total assets (Compustat AT) for firm i in year t.
- ROA_{it} Return on assets calculated as earnings before extraordinary items scaled by total assets. Compustat IB/AT.
- σROA_{it} Standard deviation of ROA_{it} over the past three years for firm i in year t. Compustat items IB/AT.
- $MktBook_{it}$ Firm i's market value of equity divided by its book value of equity measured at the beginning of the year t-1 (Mansi et al. 2011). Compustat: (PRCC_F*CSHO) / CEQ
- $IdioRisk_{it-1}$ The standard deviation of firm i's daily excess return over the market return for the prior year's 255 trading days (Mansi et al. 2011).
- $IssueSize_{it}$ Natural logarithm of the offering amount of the bond issue.
- $CallProv_{it}$ Firm i's bond issue call provision in year t. Ratio between 0 and 1, of the number of years to first call divided by the number of years to maturity. Equals 1 if no call provision. Equals 0 if callable from date of issuance.
- Sub_{it} Firm i's bond issue dummy in year t: 1 for subordinated bonds and 0 for senior bonds.
- $Year_{it}$ Year dummies for 2008-2009.
- FF_{it} Fama-French industry classification (k=1 to 43). Financial, insurance and utility industries are removed due to differences in their regulatory environments.

⁴⁰ Mansi et al. (2005) describe the underlying assumption in a regression model utilizing an ordinal dependent variable. Specifically, the regression model assumes uniform differences between the credit ratings.

⁴¹ All variables are also defined in Appendix B.

In the second stage, the bond yield spread is regressed on *ERMPperfRnk* in addition to the residual rating obtained from Equation 9 and the control variables previously described. The model is specified as follows:

$$Yield_{it+1} = \alpha_0 + \alpha_1 ERMPperfRnk_{it} + \alpha_2 ERMPperfRnk * Leverage_{it} + \alpha_3 Size_{it} + \alpha_4 Leverage_{it} + \alpha_5 ROA_{it} + \alpha_6 \sigma(ROA)_{it} + \alpha_7 MktBook_{it} + \alpha_8 IdioRisk_{it} + \alpha_9 IssueSize_{it} + \alpha_{10} CallProv_{it} + \alpha_{11} Sub_{it} + \alpha_{12} ResidRating_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{47} \beta_k FF_k + \varepsilon_t \quad (10)$$

$Yield_{it+1}$ is firm i's yield to maturity at the issuance date minus the Treasury bond yield with a similar maturity. A smaller credit spread ($Yield_{it+1}$) is interpreted as a lower cost of debt.

$ERMPperfRnk_{it}$ is calculated as previously described. Additional independent variables control for known factors which explain the cost of debt.

A negative and significant coefficient on $ERMPperfRnk_{it}$ (α_1) would provide support for H4 since a larger yield spread is indicative of a higher cost of debt. An interaction term ($ERMPperfRnk_{it} * Leverage_{it}$) allows ERM performance's impact on the cost of debt to shift with the level of leverage. The coefficient on the interaction term (α_2) provides insight into how ERM performance and the level of leverage explain the variation in the cost of debt. Based on Pagach and Warr's (2010) results, firms were shown to increase leverage post ERM implementation. Pagach and Warr interpret their finding as evidence that firms can bear additional risk upon ERM adoption. Therefore, a negative coefficient is expected on the interaction term (α_2).

Prior research has shown that the cost of debt is linked to firm performance and risk (Kaplan and Urwitz 1979; Ahmed et al. 2002; Campbell and Taskler 2003). Dispersion of return on assets (σROA_{it}), interest coverage ratio ($IntCoverage_{it}$), return on assets (ROA_{it}) and book-to-market ratio ($MktBook_{it}$) control for firm performance. Because better performing firms typically have a lower cost of debt, a positive coefficient is expected on σROA_{it} , and a negative coefficient on $IntCoverage_{it}$ and $MktBook_{it}$. To control for risk, firm size ($Size_{it}$), idiosyncratic

risk⁴² (*IdioRisk_{it}*), leverage (*Leverage_{it}*) and research and development expense (*R&D_{it}*) are included in the model. Positive coefficients are predicted on *Leverage_{it}*, *R&D_{it}*, and *IdioRisk_{it}* and a negative coefficient is predicted on *Size_{it}*. As a liquidity control, cash and cash equivalents (*Cash_{it}*) proxy for a firm's ability to meet future interest payments. *Cash_{it}* is expected to be negatively related to the dependent variable. Subordinated bond issues (*Sub_{it}*) capture the default risk associated with subordinated debt and is expected to be negatively related to the bond yield spread. Year (*Year_{it}*) and industry (*FF_{it}*) indicator variables are included to control for cross-sectional and industry invariant effects related to the bond yield spread.

Bond characteristics have also been shown in prior research to affect the initial bond yield spread (Fisher 1959; Ziebart and Reiter 1992; Sengupta 1998; Bhojraj and Sengupta 2003). The bond's debt rating (*ResidRating_{it}*), issue size (*IssueSize_{it}*), and call provision (*CallProv_{it}*) control for bond characteristics that could affect the initial yield spread. A negative coefficient on *ResidRating_{it}* and *CallProv_{it}* is expected. Higher rated bonds should be negatively related to the dependent variable, so a negative coefficient is expected on *ResidRating_{it}*. *CallProv_{it}* is expected to be negatively related to the bond's initial yield spread because a longer call provision is indicative of a lower exposure to interest risk for bondholders. No prediction is made with regards to the coefficient on *IssueSize_{it}* because of conflicting research results (Sengupta 1998; Shi 2003).

In addition to the above analysis, the cost of debt is calculated as the realized cost of debt. This additional proxy for the cost of debt is used to increase the sample size and provide an additional test of H4. Following Francis et al. (2005), the cost of debt is calculated as the ratio of a firm's interest expense in year t+1 to average interest-bearing debt outstanding during years t

⁴² Idiosyncratic risk, a firm's excess return over the market return, has been found to be positively associated with the variation in bond yield spreads (Campbell and Taksler 2003; Mansi et al. 2011).

and $t+1$.⁴³ A similar model to Equation 10 is employed with bond issuing characteristics removed. The model is as follows:

$$CostDebt_{it} = \alpha_0 + \alpha_1 ERMPerfRnk_{it} + \alpha_2 ERMPerfRnk * Leverage_{it} + \alpha_3 Size_{it} + \alpha_4 Leverage_{it} + \alpha_5 ROA_{it} + \alpha_6 \sigma(ROA)_{it} + \alpha_7 MktBook_{it} + \alpha_8 IdioRisk_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{43} \beta_k FF_k + \varepsilon_t \quad (11)$$

A negative and significant coefficient on *ERMPerfRnk* would provide support for H4 since a larger realized cost of debt is indicative of a poorer performing ERM.

These analyses provide insights into the efficacy of ERM. Specifically, they shed light on whether ERM is achieving its stated goals. ERM is predicted to allow managers and the board of directors an enhanced ability to assess capital needs and improve capital allocation (COSO 2004). A discussion of the sample and descriptive statistics ensues in the next section.

5. SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

5.1 Sample Selection

Models used to address the hypotheses are measured over the sample period 2007 to 2009. My sample is obtained from the 5,611 available proxy statements filed with the SEC during 2010. Utilizing custom software, a connection is made to the SEC's website and through file transfer protocol (FTP), proxy statements filed with the SEC after the effective date of the new board of director risk oversight disclosure (i.e., February 28, 2010) are downloaded.⁴⁴ Next, software embedded with textual parsing routines is employed to extract the board risk oversight disclosure contained within each proxy statement.⁴⁵ Due to data limitations at the time of

⁴³ Where the cost of debt is computed as Compustat XINT_{t+1} / Average(DLTT_{t,t+1}+DLC_{t,t+1})

⁴⁴ The proxy statements are available at: <ftp://ftp.sec.gov/>

⁴⁵ The proxy statements obtained from the SEC FTP site are HTML tagged text files.

collection and the newness of the disclosure, proxy disclosures which correspond to the year 2009 serve as the basis for the $ERMPerf_{it}$ measure.⁴⁶

Following Pagach and Warr (2011), I assume the measure of ERM performance ($ERMPerf_{it}$) in 2009 is representative of ERM performance in years 2007 and 2008. The underlying assumption is that ERM is not a turnkey solution. It can take several years to implement ERM (COSO 2004; COSO 2010). Therefore, measuring ERM in a particular year is likely to be representative of the state of ERM two years subsequent to the measurement.

Additional data is obtained over the time period from 2006 to 2010.⁴⁷ COMPUSTAT XPRESSFEED provides financial data. The Center for Research in Security Prices (CRSP) provides daily and monthly stock return data for individual firms. CRSP also provides the value-weighted return, a common measure used as a proxy for the market return. Analysts' annual consensus forecast information is compiled from the Institutional Broker Estimate System (I/B/E/S) Summary History file. Institutional holding data is obtained from Thomson-Reuters' Institutional Holdings (13F) database. The Security Data Company's (SDC) Global New Issues database provides bond ratings, and yield spreads and details regarding the issue (i.e., whether the issue is subordinate and callable).⁴⁸ Lastly, the Segment Detail dataset contained within COMPUSTAT's Segment History file provides business segment data.

Since several databases are required to be combined, merging procedures are crucial in developing the datasets used to test the hypotheses in this study. COMPUSTAT's *names* file and CRSP's *stocknames* file are two linking tables which provide the necessary unique firm

⁴⁶ Proxy statements filed during fiscal year 2010 contain data for the most recently completed twelve month business cycle. Due to model requirements, one period ahead financial data are required and as such, firm observations which correspond to year 2009 remain in the sample. 2010 firm observations would require data for 2011 which were not available at the time the sample was drawn.

⁴⁷ Variable measurement over the sample period 2007 – 2009 requires leading and lagging data. Therefore, 2006 provides lagging financial information for 2007 and 2010 provides leading financial information for the year 2009.

⁴⁸ For firms with multiple issues in a given year, the largest issue is retained (Jiang 2008; Khurana and Raman 2003).

identifiers to merge the databases described above. COMPUSTAT data is joined to the proxy disclosure data based on the SEC's Central Index Key (CIK). The COMPUSTAT GVKEY and CRSP PERMNO identifiers are utilized to create the primary link between the remaining datasets.⁴⁹ This process yields a sample of 2,270 firms to address the first hypothesis, a sample of 1,478 firms to address the second hypothesis, 994 firms to address the third hypothesis and finally 1,013 firms for the fourth hypothesis. A detailed breakdown of the sample selection process is displayed in Table 1.

Table 1
Sample Selection

Sample Period 2007 - 2009	Total Firms			
Proxy statements filed during fiscal year 2010	5,611			
Proxy statements filed after February 28, 2010 which correspond to 2009†	(2,780)			
<hr/>				
Total proxy statements applicable to 2009	2,831			
<hr/>				
Additional Data Restrictions‡	H1	H2	H3	H4
COMPUSTAT	(561)	(1,353)	(5)	(1,782)
CRSP	-	-	(1,043)	(36)
I/B/E/S	-	-	(519)	-
COMPUSTAT Segment File	-	-	(139)	-
Thomson Reuters 13F	-	-	(131)	-
SDC	-	-	-	-
TOTAL FIRM OBSERVATIONS	2,270	1,478	994	1,013

Notes:

† The SEC proxy statement disclosure enhancements had an effective date of February 28, 2010. Additionally, proxy statements which correspond to 2009 are kept since the models require one-year ahead financial data.

‡ Observations are eliminated which do not have enough financial data to calculate the necessary Equations for each hypothesis.

⁴⁹ An additional identifier, CUSIP (Committee on Uniform Securities Identification Procedures), linked the SDC Global New Issues database to COMPUSTAT.

5.2 Industry Analysis and Descriptive Statistics

An industry analysis comparing the sample utilized for Hypothesis 1 to the COMPUSTAT population for fiscal year 2009 is presented in Table 2. Following Barth, Cram, and Nelson (2001) and Rees and Sivaramakishnan (2007), the industry groupings are limited to fifteen for ease of exposition. The sample contains a greater concentration of firms in Finance, Insurance and Real-Estate (20.97% vs. 3.78%) and a lower concentration of Mining and Construction (2.29% vs. 7.55%) industries compared to the COMPUSTAT population. Hypotheses 1 and 2 are each analyzed with and without Finance, Insurance and Real-Estate firms in the sample. The Finance, Insurance and Real-Estate firms are removed in the test of Hypotheses 3 and 4 due to the differences in their regulatory environment which affect analysts' forecast accuracy and the cost of debt. Otherwise, the developed sample is reasonably representative of COMPUSTAT industry percentages.

Table 2
Frequency of Firm Observations Across Industry

Variable ^a	Group	Sample		Compustat	
		n	% of obs	n ^b	% of obs
Agriculture, Forestry and Fishing	1	4	0.18%	22	0.43%
Mining and Construction	2	52	2.29%	386	7.55%
Food and Tobacco	3	49	2.16%	128	2.50%
Textiles and Printing / Publishing	4	69	3.04%	187	3.66%
Chemicals	5	43	1.89%	132	2.58%
Pharmaceuticals	6	174	7.67%	391	7.65%
Extractive	7	102	4.49%	370	7.24%
Durable Manufacturers	8	415	18.28%	1010	19.76%
Computers	9	302	13.30%	708	13.85%
Transportation	10	119	5.24%	383	7.49%
Utilities	11	74	3.26%	327	6.40%
Retail	12	185	8.15%	456	8.92%
Services	13	161	7.09%	340	6.65%
Finance, Insurance and Real-estate	14	476	20.97%	193	3.78%
Healthcare	15	45	1.98%	79	1.55%
TOTAL		2270	100.00%	5112	100.00%

Notes:

^a - Groupings based on Barth, Cram, and Nelson (2001) and Rees and Sivaramakishnan (2007).

^b - 1 observation did not fall within the industry classifications.

Descriptive statistics for the sample are provided in Table 3 Panel A. Additionally, due to the relatively short (three years) and volatile sample period, a comparison of the descriptive statistics for my sample to extant literature is provided here to help identify important differences in key variables. The *ERMP_{perf}* mean (median) is .015 (.014). The value at the 75% tail of the sample distribution is .0205. The board risk oversight length, *Word Count*, average is slightly over 351 words per disclosure. As a reflection of the volatility during the sample period, the mean (median) earnings is -0.082 (0.017) and the mean (median) accrual quality (*AcQ_{it}*) is .152 (.098). Francis et al. (2005) measured accrual quality over a 30 year period under the direct

method and finds a mean (median) of 0.044 (0.031). Forecast accuracy ($FcstAcc_{it}$) as calculated using the actual level of earnings as a deflator (Equation 9) has a mean (median) of 0.347 (0.093). Givoly et al. (2009) report a mean (median) earnings forecast accuracy of 0.533 (0.067) from 1993 to 2005. The realized cost of debt ($CostofDebt_{it}$) calculated as the ratio of realized interest expense to debt outstanding has a mean (median) of 0.169 (0.061). Francis et al. (2005) report a mean (median) realized cost of debt of 0.099 (0.092) from 1970 to 2001.

A comparison of the sample to the COMPUSTAT population is shown in Panel B. My sample consists of somewhat better performing ($Earnings$ -0.08 compared to -.11 and CFO -0.17 compared to -0.25) firms than the average firms within the COMPUSTAT population. Additionally, my sample consists of firms with slightly less volatile accruals (AcQ 0.15 compared to 0.17). Overall, the developed sample is marginally different from the COMPUSTAT population, but should provide a reasonably representative group to test my hypotheses.

Table 3
Descriptive Statistics

Panel A: Descriptive Statistics for Sample Variables

Variable	n ^s	Mean	Std. Dev.	25th	Median	75th
ERMPerf	2270	0.015	0.010	0.009	0.014	0.021
Word Count	2270	351.586	458.427	155.000	237.000	363.000
Earnings	2270	-0.082	0.595	-0.082	0.017	0.064
Size	2270	6.456	2.117	5.054	6.487	7.846
MktBook	2270	2.236	4.446	0.926	1.529	2.709
ACC	2270	-0.048	0.216	-0.075	-0.026	0.006
ΔSales	1478	-0.100	0.315	-0.206	-0.039	0.038
PPE	1478	0.514	0.430	0.176	0.386	0.753
TCA	1478	0.033	0.445	-0.108	0.014	0.157
CFO	1478	-0.166	0.718	-0.210	-0.059	0.055
AcQ	1478	0.152	0.183	0.049	0.098	0.184
FestAcc	693	0.347	4.564	-0.115	0.093	0.333
σ(Ret)	693	0.165	0.068	0.118	0.155	0.198
AnlstFoll	693	7.914	6.113	3.000	6.000	11.000
PInst	693	0.689	0.269	0.504	0.752	0.899
Leverage	587	0.564	0.583	0.334	0.505	0.643
CostofDebt	587	0.169	0.527	0.039	0.061	0.100
IdioRisk	587	0.045	0.030	0.025	0.037	0.054
σ(ROA)	587	0.116	0.234	0.016	0.040	0.123

Panel B: Sample Comparison with COMPUSTAT

Variable	Sample	COMPUSTAT	Difference	t-statistic	Sig.
	(n= 1478)	(n=5113)			
Earnings	Mean -0.08	Mean -0.1122	0.03	1.78	**
ΔRevenue	-0.10	-0.0922	-0.01	-0.88	
PPE	0.51	0.5832	-0.07	-5.37	***
TCA	0.03	0.0143	0.02	1.38	
CFO	-0.17	-0.2494	0.08	3.37	***
AcQ	0.15	0.1774	-0.02	-4.3	***

Notes:

All two-tailed Satterthwaite t-tests for unequal variances.

*** significant at .01, ** significant at .05, * significant at .1

§ - Due to required data restrictions, the number of firm observations varies by sample. See Table 1 for more details.

Where: $[\]$ denote COMPUSTAT data definitions. *Earnings* is defined as earnings before extraordinary items divided by average total assets $[IB/Avg(AT)]$. *ERMPerf* is defined as the proportion of negative words in the board risk oversight disclosure counted by the General Inquirer. *MktBook* or market-to-book is the ratio of the market value of equity to book value $[(PRCC_F*CSHO)/CEQ]$. *AcQ* is defined as the moving standard deviation of the residual, $\sigma(\zeta)$, from Equation 3, over the past three years. *CFO* is cash flows from operations calculated as net income before extraordinary Items (IB) – total accruals. *TCA* is total current accruals calculated as Δ Current Accruals – Δ Current Liabilities - Δ Cash + Δ Short-Term Debt (Δ ACT - Δ LCT - Δ CHE + Δ DLC). *FestAcc* is defined as the difference in absolute value of the actual amount as reported in I/B/E/S and the first median annual consensus forecast after the prior year announcement scaled by the actual amount. *AnlstFoll* is the number of analysts included in the consensus forecast. *CostofDebt* is the ratio of interest expense in year t+1 to average interest-bearing debt outstanding $[XINT/ Avg(DLTT + DLC)_{t,t+1}]$. *Leverage* is the ratio of total liabilities to total assets $[(AT-CEQ)/AT]$. *Size* is the natural logarithm of total assets $[AT]$. *Pinst* or the percentage of institutional investors was obtained from Thomson Reuters 13F database. $\sigma(Ret)$ is the standard deviation of monthly returns obtained from CRSP in year t-1. $\sigma(ROA)$ is three year standard deviation of ROA $[IB/AT]$.

6. RESULTS

6.1 Significant Correlations

Four Spearman correlation matrices are presented in Table 4 Panels A, B, C and D.

Significant correlations ($p < 0.10$) are indicated in bold. Panel A correlations relate to ERM performance and Standard and Poor's long-term debt ratings. Due to data availability restrictions across all models used in this study, incremental Spearman correlations are presented in Panels B, C and D. Panel B represents variables used to estimate Equation 3 (H1). Panel C provides correlations for Equation 8 (H3) variables. Finally, variables used in Equations 3, 4, 5, 8 and 11 (H1 to H4) are correlated in Panel D. This piecemeal approach alleviates the small number of observations which results from correlating all variables across all models (i.e., Panel D).

To provide support for the ERM performance measurement (*ERMPerfRnk*), the Spearman correlation coefficient between *ERMPerfRnk* and S&P's long-term debt rating is presented in Table 4 Panel A. As previously mentioned, S&P incorporates an evaluation of ERM into their debt rating. A positive and significant correlation between the ERM performance measurement and S&P's long-term debt rating provides univariate support for its use as an

operationalization of ERM performance (i.e., the proportion of negative words in a firm's board of director risk oversight proxy disclosure). Indeed, *ERMPerfRnk* and S&P's long-term debt rating are positively correlated at the .05 level for 1,797 firm-year observations with the necessary data.

The earnings predictability hypothesis (H1) investigates whether the interaction between ERM performance and current period earnings allows for a change in earnings persistence. Specifically, in Table 4 Panel B, the Spearman correlation coefficients are presented for Equation 3 variables resulting in 4,619 firm-year observations. The main variable of interest, $ERMPerfRnk_{it} \times Earnings_{it}$, is positive and significantly correlated with all variables at the 10% level. Of particular interest to H1, the univariate results provide some support that ERM performance influences earnings persistence as evidenced by the positive and significant correlation coefficient between the interaction term and one period ahead earnings ($Earnings_{it+1}$). As a supplemental analysis, the standard deviation of cash flow from operations over the past three years (σCFO_{it}) is included in the correlation analysis. While a positive and significant correlation between σCFO_{it} and $ERMPerfRnk_{it}$ departs from a predicted negative relationship, it provides some support for research which suggests firms with more volatile cash flows are more likely to adopt ERM (Beasley et al. 2008; Pagach and Warr 2011).

Analysts' earnings forecasts are predicted to be more accurate for firms with higher performing ERM (H3). Table 4 Panel C provides univariate support for this proposition through a Spearman correlation analysis of the 1,798 firm-year observations used to estimate Equation 8. $ERMPerfRnk_{it}$ is negatively and significantly correlated with the inverse measure of analysts' earnings forecast accuracy ($FcstAcc_{it}$).

Spearman correlation coefficients for variables in Equations 3, 4, 5, 8 and 11 are presented in Table 4 Panel D with significant correlations ($p < 0.10$) indicated in bold. Due to necessary data restrictions, the Spearman correlation coefficients are calculated for 461 firm-year observations over the sample period. ERM performance ($ERMPerfRnk_{it}$) is positively correlated with size ($Size_{it}$), growth ($MktBook_{it}$), percentage of institutional ownership ($PInst_{it}$) and the number of analysts covering a firm ($AnlstFoll_{it}$). The correlation coefficient between the $ERMPerfRnk_{it}$ variable and accrual persistence (AcQ_{it}) is negative but not significant at conventional levels ($p = .14$). The volatility of returns (σRet_{it-1}) is negatively correlated with $ERMPerfRnk_{it}$, but the correlation coefficient is not significant at conventional levels. Interestingly, $ERMPerfRnk_{it}$ and the cost of debt ($CostofDebt_{it}$) are positive and significantly correlated. Similar to the result in Panel B, the $ERMPerfRnk_{it}$ variable and the volatility of cash flows from operations (σCFO_{it}) are positively correlated. Both of these correlations depart from their predicted direction. Namely, $ERMPerfRnk_{it}$ is predicted to be negatively associated with the cost of debt (H4) and cash flow volatility.

While this analysis does not control for many factors and it is unclear how these differences in univariate correlations affect the multivariate analyses, it does provide some evidence that the predicted relationship between $ERMPerfRnk_{it}$ and the $CostofDebt_{it}$ does not hold for the sample of firms over the 2007 to 2009 time period.

Table 4
Significant Correlations

Panel A: Spearman Correlation Between ERMPerfRnk and Standard and Poor's (S&P) Long-Term Debt Rating, n=1,797

ERMPerfRnk	S&P Long-Term Debt Rating	p-value	Significance
	0.0567	0.0161	**

Notes:

*** significant at .01, ** significant at .05, * significant at .1

Where: **S&P Rating** is an ordinal representation of a company's Standard and Poor's long-term debt rating. S&P Rating is coded from 1 to 23, with higher numbers corresponding to better ratings (i.e. 23 = AAA+, 22 = AAA, ..., 1 = D). **ERMPerfRnk**, is the quintile rank (0=low ERM performance to 4=high ERM performance) based on **ERMPerf**. **ERMPerf** is defined as the proportion of negative words in the board risk oversight disclosure counted by the General Inquirer.

Panel B: Spearman Correlation Matrix for H1, n=4,619

	ACC _{it}	Size _{it}	MktBook _{it}	Earnings _{it}	Earnings _{it+1}	σCFO _{it}	ERMPerfRnk _{it} *Earnings _{it}
ERMPerfRnk _{it}	-0.004	0.038	0.005	0.034	0.028	0.042	0.217
ACC _{it}	1	0.212	0.072	0.439	0.290	0.111	0.382
Size _{it}		1	0.318	0.385	0.347	0.755	0.352
MktBook _{it}			1	0.302	0.299	-0.010	0.239
Earnings _{it}				1	0.636	0.166	0.855
Earnings _{it+1}					1	0.171	0.540
σCFO _{it}						1	0.163

Panel C: Spearman Correlation Matrix for H3, n=1,798

	FcstAcc _{it}	AnlstFoll _{it}	Size _{it}	MktBook _{it}	σRet _{t-1}	Seg _{it}	PInst _{it}	R&D _{it}
ERMPerfRnk _{it}	-0.045	0.060	0.026	0.047	-0.015	0.013	0.041	-0.042
FcstAcc _{it}	1	-0.162	-0.203	-0.363	0.294	-0.083	-0.089	-0.117
AnlstFoll _{it}		1	0.623	0.640	-0.269	0.103	0.408	0.336
Size _{it}			1	0.803	-0.465	0.442	0.469	0.362
MktBook _{it}				1	-0.391	0.308	0.411	0.470
σRet _{t-1}					1	-0.264	-0.295	-0.162
Seg _{it}						1	0.107	0.185
PInst _{it}							1	0.107

Panel D: Spearman Correlation Matrix for select variables across H1-H4, n=461

	Size _{it}	MTB _{it}	AcQ _{it}	TCA _{it}	CFO _{it}	FcstAcc _{it}	σ(Ret) _{it-1}	PInst _{it}	AnlstFoll _{it}	CostofDebt _{it}	Leverage _{it}	σ(ROA) _{it}	σ(CFO) _{it}
ERMPerfRnk _{it}	0.180	0.076	-0.064	-0.005	0.071	-0.041	-0.023	0.129	0.165	0.108	0.010	-0.048	0.108
Size _{it}	1.000	0.332	-0.357	0.074	0.461	0.312	-0.444	0.502	0.610	-0.209	0.027	-0.428	0.650
MTB _{it}		1.000	-0.063	0.044	0.207	-0.004	-0.028	0.092	0.164	-0.031	-0.077	-0.078	0.021
AcQ _{it}			1.000	0.028	-0.294	-0.210	0.350	-0.214	-0.218	0.113	0.112	0.453	0.001
TCA _{it}				1.000	-0.356	0.116	-0.051	0.044	-0.056	0.042	-0.163	-0.068	-0.046
CFO _{it}					1.000	0.354	-0.350	0.308	0.265	-0.287	-0.066	-0.402	0.246
FcstAcc _{it}						1.000	-0.206	0.264	0.089	-0.160	-0.095	-0.275	0.111
σ(Ret) _{it-1}							1.000	-0.280	-0.180	0.131	-0.008	0.464	-0.225
PInst _{it}								1.000	0.331	-0.194	-0.059	-0.297	0.326
AnlstFoll _{it}									1.000	-0.157	0.087	-0.141	0.494
CostofDebt _{it}										1.000	0.025	0.148	-0.190
Leverage _{it}											1.000	0.226	0.308
σ(ROA) _{it}												1.000	-0.030

Notes:

Correlations significant at $p < .10$ in bold.

Where: \square denote COMPUSTAT data definitions. **Earnings** is defined as earnings before extraordinary items divided by average total assets [IB/Avg(AT)]. **ERMPerfRnk**, is the quintile rank (0=low ERM performance to 4=high ERM performance) based on **ERMPerf**. **ERMPerf** is defined as the proportion of negative words in the board risk oversight disclosure counted by the General Inquirer. **MktBook** or market-to-book is the ratio of the market value of equity to book value [(PRCC_F*CSHO)/CEQ]. **AcQ** is defined as the moving standard deviation of the residual, $\sigma(\zeta)$, from Equation 3, over the past three years. **CFO** is cash flows from operations calculated as net income before extraordinary items (IB_t) – total accruals. **TCA** is total current accruals calculated as Δ Current Accruals – Δ Current Liabilities – Δ Cash + Δ Short-Term Debt (Δ ACT – Δ LCT – Δ CHE + Δ DLC). **FcstAcc** is defined as the difference in absolute value of the actual amount as reported in I/B/E/S and the first median annual consensus forecast after the prior year announcement scaled by the actual amount. **AnstFoll** is the number of analysts included in the consensus forecast. **CostofDebt** is the ratio of interest expense in year $t+1$ to average interest-bearing debt outstanding [XINT/ Avg(DLTT + DLC)_{t,t+1}]. **Leverage** is the ratio of total liabilities to total assets [(AT-CEQ)/AT]. **Size** is the natural logarithm of total assets [AT]. **Plnst** or the percentage of institutional investors was obtained from Thomson Reuters 13F database. σ (Ret) is the standard deviation of monthly returns obtained from CRSP in year $t-1$. σ (ROA) is three year standard deviation of ROA [IB/AT]. σ (CFO) is three year standard deviation of cash flows from operations [OANCF].

6.2 Regression Analysis

Eight multivariate linear regression models are estimated using OLS to investigate the impact of ERM performance on earnings predictability, analysts' earnings forecast accuracy and the cost of debt. Since the data used to test the hypotheses in this study contain multiple observations for each unique firm across time (i.e., panel data), certain econometric techniques are employed to help ensure correct inferences are made. Specifically, to minimize residual dependence issues (i.e., serially correlated residuals) inherent to panel data sets and to control for heteroskedasticity, t-statistics are reported using two-digit industry clustered standard errors which are robust to within cluster correlation (Peterson 2009; White 1980). Additionally, time and industry fixed effects are present in all models to mitigate cross-sectional and temporal dependence.⁵⁰

6.2.1 Earnings Persistence Analyses

Results related to the earnings persistence analysis (H1) are presented in Table 5 and Table 6. Overall, they provide support for the proposition that ERM performance is positively associated with profit persistence and negatively associated with loss persistence.

In Table 5, Equation 2 is estimated using a total of 6,810 firm-year observations with no limitations on industry membership. The distribution is winsorized by the highest and lowest 1% for *Earnings* in order to mitigate the effects of outliers. A dichotomous $ERMPerfRnk_{it}$ measure (0=low ERM performance; 1=high ERM performance) serves as the measure of ERM performance. The results of investigating the impact of ERM performance on loss firms is shown in Table 5, Column A. The negative and significant coefficient on the interaction term

⁵⁰ Since $ERMPerf_{it}$ is assumed to be relatively constant over the sample period, firm fixed effects are not appropriate because they would completely absorb the effect of ERM performance on the dependent variable of interest.

($ERMPerfRnk_{it} * Earnings_{it} = -0.2781$, $p < .01$) indicates, on average, firms in the highest 50% of ERM performance have less persistent losses than firms in the bottom 50%.

Table 5 Column B presents results related to the impact of ERM performance on profit firms (Equation 2). Consistent with my predictions, ERM performance is positively associated with earnings persistence. The coefficient on the interaction term is positive and highly significant ($ERMPerfRnk_{it} * Earnings_{it} = 0.1872$, $p < .01$) which indicates, on average, firms in the highest 50% of ERM performance have more persistent positive earnings than firms in the bottom 50%.

Table 5
Earnings Persistence Results

$$Earnings_{i,t+1} = \beta_0 + \beta_1 Earnings_{it} + \beta_2 RnkERMPerf_{it} + \beta_3 Earnings_{it} \times ERMPefRnk_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{47} \beta_k FF_k + \varepsilon_{it}$$

Variable	Coefficient over [t-value] ^a		Coefficient over [t-value] ^a	
	Predicted Sign	Column A: Loss Firms	Predicted Sign	Column B: Profit Firms
Intercept	+/-	-0.1615 [-12.48]***	+/-	-0.0203 [-.68]
Earnings _{it}	+	0.3333 [3.49]***	+	0.0543 [.31]
ERMPefRnk_{it}	-	-0.06306 [-2.91]***	+	0.00837 [3.16]***
ERMPefRnk_{it} x Earnings_{it}	-	-0.2781 [-3.42]***	+	0.18728 [7.77]***
Year FE		Y		Y
Industry FF		Y		Y
N		2792		4018
Adj. R ²		0.3271		0.1243

Notes:

*** significant at .01, ** significant at .05, * significant at .1

^a - All t-statistics are calculated using standard errors which are robust to within cluster correlation by two-digit SIC code (Rogers or clustered standard errors).

Where: [] denote COMPUSTAT data definitions. *Earnings* is defined as earnings before extraordinary items divided by average total assets [IB/Avg(AT)]. *ERMPefRnk* is the rank (0=low ERM performance; 1=high ERM performance) based on *ERMPef*. *ERMPef* is defined as the proportion of negative words in the board risk oversight disclosure counted by the General Inquirer. *Year* are annual dummies to control for unobserved time effects while *FF* are industry dummies based on the Fama and French (1997) classification to control for unobserved industry effects.

The economic interpretation is as follows. Using the inter-quartile range for *Earnings*, the earnings persistence for loss firms in the top 50% of ERM performance decreases by .04 (calculated as $-.2781 * [.064 - (-.082)]$ where $-.2781$ is the coefficient on $ERMPerfRnk_{it} * Earnings_{it}$ from column A of Table 5 and $.064$ and $-.082$ are the inter-quartile range for $Earnings_{it}$ in Table 3).⁵¹ For profit firms, earnings persistence increases by .03 for the top 50% ERM performance firms.⁵²

To further test H1, Equation 3 is augmented with additional control variables: $Size_{it}$, Acc_{it} and $MktBook_{it}$. In addition, $ERMPerfRnk_{it}$ is constructed using the quintile ranking (0=low ERM performance to 4=high ERM performance) of $ERMPerf_{it}$, rather than a dichotomous variable. Financial, insurance and real-estate firms are removed from the sample resulting in 1,936 loss and 2,683 profit firm-year observations with the necessary data. Results are presented in Table 6.

Table 6 Column A corroborates the results in Table 5 Column A. The coefficient on the interaction term is negative and significant ($ERMPerfRnk_{it} * Earnings_{it} = -0.4116$, $p < .01$) indicating losses are less persistent for firms with higher performing ERM. The control variables are statistically insignificant.

Similarly, Table 6 Column B largely confirms the results presented in Table 5 Column B. The coefficient on the interaction term is positive and significant ($ERMPerfRnk_{it} * Earnings_{it} = 0.0455$, $p < .01$), supporting the proposition that profits are more persistent in the presence of higher performing ERM. Of the control variables present, $MktBook_{it}$ and Acc_{it} are statistically significant at conventional levels and follow their predicted signs.

⁵¹ For a frame of reference, Li (2008) finds an increase in the absolute amount of accruals to decrease earnings persistence by approximately .05. Li uses this finding as a baseline to compare changes in earnings persistence across measures of annual report readability.

⁵² Calculated as $.1873 * [.064 - (-.082)]$ where $.1873$ is the coefficient on $Earnings_{it} * ERMPerfRnk_{it}$ from column B of Table 5 and $.064$ and $-.082$ are the inter-quartile range for $Earnings$ in Table 3.

Table 6
Earnings Persistence Robustness Results: With Control Variables Added and Financial Firms Removed

$$Earnings_{i,t+1} = \beta_0 + \beta_1 Earnings_{it} + \beta_2 RnkERMPerf_{it} + \beta_3 Earnings_{it} \times ERMPerfRnk_{it} + \beta_4 Size_{it} + \beta_5 MktBook_{it} + \beta_6 Acc_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{43} \beta_k FF_k + \varepsilon_{it}$$

Variable	Predicted Sign	Coefficient over [t-value]	
		Column A: Loss Firms	Column B: Profit Firms
Intercept	+/-	-0.2624 [-0..89]	-0.051* [-1.39]
Earnings _{it}	+	0.3506*** [3.88]	0.2755*** [6.49]
ERMPerfRnk_{it}	-	0.1013 [0.77]	-0.002** [-1.67]
ERMPerfRnk_{it} * Earnings_{it}	-	-0.4116*** [-4.16]	0.0455*** [2.47]
Size _{it}	+/-	0.00007 [1.15]	0.001 [0.85]
MktBook _{it}	+/-	-0.0001 [-0.68]	-0.0001*** [-3.62]
Acc _{it}	+	0.1924 [0.64]	-0.0714** [-1.81]
Year FE		Y	Y
Industry FF		Y	Y
n		1936	2683
Adj. R ²		0.1553	0.1877

Notes:

*** significant at .01, ** significant at .05, * significant at .1

^a - All t-statistics are calculated using standard errors which are robust to within cluster correlation by two-digit SIC code (Rogers or clustered standard errors).

Where: [] denote COMPUSTAT data definitions. *Earnings* is defined as earnings before extraordinary items divided by average total assets [IB/Avg(AT)]. *ERMPerfRnk* is the quintile rank (0=low ERM performance to 4=high ERM performance) based on *ERMPerf*. *ERMPerf* is defined as the proportion of negative words in the board risk oversight disclosure counted by the General Inquirer. *Size* is the natural logarithm of total assets [AT]. *MktBook* or market-to-book is the ratio of the market value of equity to book value [(PRCC_F*CSHO)/CEQ]. *Acc* or the absolute amount of accruals is defined as operating income after depreciation less net cash flows from

operations scaled by total assets $[(OIDP - OANCF)/AT]$. *Year* are annual dummies to control for unobserved time effects while *FF* are industry dummies based on the Fama and French (1997) classification to control for unobserved industry effects.

Overall, Table 5 and Table 6 provide statistical and economic support for the supposition that ERM performance is associated with earnings persistence (H1).

6.2.2 Accrual Persistence Analyses

The accrual persistence analysis starts by running Equation 4 on the sample to extract a measure of accrual persistence (Francis et al. 2005). The model is run by year and industry group based on the Fama and French (1997) categories. The distribution is winsorized by the highest and lowest 1% for TCA_{it} in order to mitigate the effects of outliers. As indicated earlier, the variables are calculated under both the indirect and direct methods. Regulated industries are also removed when the direct method is used to address the concern that financial and other regulated industries are driving the results. A residual is calculated for each firm year and provides the basis for the required measure of accrual persistence. The standard deviation of the residual ($\sigma(\zeta_{it})$) over the past $t - 2$ years provides a commonly utilized measure of accrual quality (Dechow and Dichev 2002). The larger the standard deviation of the residuals, the poorer the quality of the accruals. An interpretation put forth by Francis et al. (2005) explains how this measure provides a degree of persistence. Francis et al. (2005) discuss how the standard deviation of the residual measures the degree of uncertainty corresponding to accruals. The measure does not take into account the magnitude of accruals but rather their predictability or uncertainty. Thus, following Francis et al. (2005), I interpret the standard deviation of the residual as a measure of accrual persistence.

Table 7, Panel A provides statistical support for my second hypothesis. Equation 4 is estimated using indirect variable measurement with all industries included in the analysis. By

conditioning the sample on ERM performance ($ERMPerf_{it}$), quintiles are developed to test the hypothesis that ERM performance is positively associated with accrual persistence. A means comparison for the top and bottom quintiles of ERM performance shows the top 20% of ERM performing firms have more persistent accruals (Means Difference of .023, $p < .05$).

Additionally, Panel B provides additional, although weaker, support for the second hypothesis. All firms are partitioned into the top and bottom 50% of ERM performance and results indicate mean difference between the top 50% of ERM performing firms are marginally significant (Means Difference of .009, $p < .10$).

Table 7
Accrual Persistence Results: Indirect Method

$$TCA_{it} = \alpha_0 + \alpha_1 CFO_{it-1} + \alpha_2 CFO_{it} + \alpha_3 CFO_{it+1} + \alpha_4 \Delta REV_{it} + \alpha_5 PPE_{it} + \zeta_{it}$$

Panel A: Comparison of Top & Bottom 20% ERM Performance

	n=886 Bottom	n=887 Top			
Variable	Mean	Mean	Difference	t-statistic	Sig.
AcQ	0.1660	0.1430	0.0230	2.28	**

Panel B: Comparison of Top & Bottom 50% ERM Performance

	n=2213 Bottom	n=2223 Top			
Variable	Mean	Mean	Difference	t-statistic	Sig.
AcQ	0.1509	0.1419	0.0090	1.63	*

Notes:

All one-tailed Satterthwaite t-tests for unequal variances.

*** significant at .01, ** significant at .05, * significant at .1

Where: [] denote COMPUSTAT data definitions. AcQ is defined as the moving standard deviation of the residual, $\sigma(\zeta)$, from Equation 3, over the past three years. CFO is cash flows from operations calculated as net income before extraordinary items [IB]– total accruals. TCA is total current accruals calculated as Δ Current Accruals – Δ Current Liabilities - Δ Cash + Δ Short-Term Debt [Δ ACT - Δ LCT - Δ CHE + Δ DLC]. PPE is the annual property plant and equipment [PPEGT]. ΔRev is defined as the change in yearly revenue [Δ SALE].

Equation 4 is also estimated using direct variable measurement and regulated industries are excluded from the sample to ensure results reported in Table 7 are robust. Table 8 Panel A results are a little weaker than the results in Table 7 Panel A. The AcQ mean of the top $ERMPerfRnk$ quintile is smaller than the bottom quintile and marginally significant ($p < .10$). A comparison of the top and bottom 50% of the $ERMPerf$ distribution confirms the results in Table 7 Panel B. The top 50% of ERM performers have more persistent accruals than the bottom 50% (Means Difference of .004, $p < .05$).

Equation 5 is estimated since the effects found under the above analysis may be overstated because they do not control for other factors which could influence accrual persistence. Therefore, an additional test is utilized to more clearly define the relationship between AcQ_{it} and $ERMPerfRnk_{it}$. An OLS estimated linear regression of AcQ_{it} on $ERMPerfRnk_{it}$ supplemented with size and growth control variables provides an alternative test of H2. Table 8 Panel C shows the coefficient on $ERMPerfRnk$ follows its predicted sign and is statistically significant at the .05 level ($ERMPerfRnk = 0.00135$, $p < .05$).

Table 8
Accrual Persistence Results: Direct Method with Financial Firms Removed

$$TCA_{it} = \alpha_0 + \alpha_1 CFO_{it-1} + \alpha_2 CFO_{it} + \alpha_3 CFO_{it+1} + \alpha_4 \Delta REV_{it} + \alpha_5 PPE_{it} + \zeta_{it}$$

Panel A: Comparison of Top & Bottom 20% ERM Performance

	n=886 Bottom	n=887 Top			
Variable	Mean	Mean	Difference	t-statistic ^a	Sig.
AcQ	0.0306	0.0250	0.0056	1.56	*

Panel B: Comparison of Top & Bottom 50% ERM Performance

Variable	n=2213	n=2223	Difference	t-statistic ^a	Sig.
	Bottom	Top			
AcQ	Mean 0.0269	Mean 0.0229	0.0040	2.01	**

Panel C: OLS Regression

$$AcQ_{it} = \alpha_0 + \alpha_1 ERMPerfRnk_{it} + \alpha_2 Size_{it} + \alpha_3 MktBook_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{43} \beta_k FF_k + \varepsilon_{it}$$

Variable	n=1559			
	Pred. Sign	Coefficient	t-statistic ^b	Sig.
Intercept	+/-	0.0412	8.32	***
ERMPerfRnk _{it}	-	-0.00135	-1.72	**
Size _{it}	+/-	-0.00001	-2.92	***
MktBook _{it}	+/-	0.00049	1.87	**
Year		NR		
Industry		NR		
adj-R ²		0.02		

Notes:

*** significant at .01, ** significant at .05, * significant at .1

a – All one-tailed Satterthwaite t-tests for unequal variances.

b – All t-statistics are calculated using standard errors which are robust to within cluster correlation by two-digit SIC code (Rogers or clustered standard errors).

NR – Not Reported

Where: [] denote COMPUSTAT data definitions.

AcQ is defined as the moving standard deviation of the residual, $\sigma(\zeta)$, from Equation 3, over the past three years. *CFO* is cash flows from operations [OANCF]. *TCA* is firm i's total current accruals measured in year t as: - [RECCH+INVCH+APALCH+TXACH+AOLCH +DPC]. *PPE* is the annual property plant and equipment [PPEGT]. *ΔRev* is defined as the change in yearly revenue [ΔSALE]. *ERMPerfRnk*, is the quintile rank (0=low ERM performance to 4=high ERM performance) based on *ERMPerf*. *ERMPerf* is defined as the proportion of negative words in the board risk oversight disclosure counted by the General Inquirer. *Size* is the natural logarithm of total assets [AT]. *MktBook* or market-to-book is the ratio of the market value of equity to book value [(PRCC_F*CSHO)/CEQ]. *Year* are annual dummies to control for unobserved time effects while *FF* are industry dummies based on the Fama and French (1997) classification to control for unobserved industry effects.

Overall, Tables 7 and 8 provide support for the supposition that ERM performance influences accrual persistence. By investigating a key predictor of earnings persistence, accrual persistence, ERM performance is empirically shown to be positively associated with accrual persistence (H2).

6.2.3 Analysts' Forecast Accuracy Analyses

The next set of analyses relates to H3, the relationship between ERM performance and analysts' forecast accuracy. Results are presented in Table 9, Table 10 and Table 11 and provide some support for a positive association between $ERMP_{it}$ and analysts' earnings forecast accuracy. Additional data is collected from I/B/E/S to provide insight into the association between ERM performance and analysts' forecasts. An analysis of analysts' cash flow per share (CPS) and revenue forecast accuracy supplement the earnings forecast analyses. In order to mitigate the effects of outliers, the distribution is winsorized by the highest and lowest 1% for $FcstAcc_{it}$.

Table 9 presents a means comparison between the top and bottom quintile of ERM performance. Forecast accuracy is calculated using Equation 6. Because the measure of forecast accuracy is inversely related to accuracy, a smaller measure is considered more accurate relative to a larger measure of forecast accuracy ($FcstAcc_{it}$). In Panel A, the top 20% of ERM performing observations have a mean forecast accuracy measure ($FcstAcc_{it}$) marginally smaller than the bottom 20% of ERM performing firms (Means Difference of .0331, $p < .10$). Panel A provides an indication that ERM performance is positively associated with analysts' earnings forecast accuracy.

In further analyses, the mean forecasts for CPS and revenue are compared across the top and bottom quintile of ERM performance. Panel B presents a means comparison for CPS. The

difference is not statistically significant (Means Difference of .013, $p > .20$). Similar results are presented in Panel C. The mean revenue forecast accuracy is not significantly different between the top and bottom 20% of ERM performance (Means Difference of -1.32, $p > .20$).

Table 9
Analyst Forecast Accuracy Scaled By Price Across ERMPerf Quintiles

Panel A: EPS Forecast Accuracy					
	n=360	n=359			
	Bottom	Top			
Variable	Mean	Mean	Difference	t-statistic	Sig.
FcstAcc	0.0750	0.0419	0.0331	1.89	**

Panel B: CPS (Cash Flow Per Share) Forecast Accuracy					
	n=103	n=104			
	Bottom	Top			
Variable	Mean	Mean	Difference	t-statistic	Sig.
FcstAcc	0.0570	0.0440	0.0130	0.64	

Panel C: Revenue Forecast Accuracy					
	n=173	n=166			
	Bottom	Top			
Variable	Mean	Mean	Difference	t-statistic	Sig.
FcstAcc	4.0700	5.3900	-1.3200	-0.91	

Notes:

*** significant at .01, ** significant at .05, * significant at .1
All one-tailed Satterthwaite t-tests for unequal variances.

Where: *FcstAcc* is defined as the difference in absolute value of the actual amount as reported in I/B/E/S and the first median annual consensus forecast after the prior year announcement scaled by beginning of the year price.
Note: Revenue forecasts differ from cash flow and earnings in that revenue is not forecasted on a per share basis.

While the above analyses provide some insight into the relationship between analysts' forecast accuracy and ERM performance, an estimation of Equation 8 provides a more rigorous test of H3. Results in Table 10 are based on the dependent variable ($FcstAcc_{it}$) calculated using Equation 6 (i.e., absolute forecast accuracy scaled by beginning of the year price) for a sample of

1,798 firm-year observations. Results for $ERMPerfRnk_{it}$ in Panel A indicate it is negative and significant ($ERMPerfRnk_{it} = -0.00327$, $p = .07$). The remaining control variables follow their predicted signs. Growth ($MktBook_{it}$), percentage of institutional investors ($PInst_{it}$), return volatility (σRet_{it-1}) and research and development ($R\&D_{it}$) are all significant at conventional levels. Results in Column B in Table 10 indicate $ERMPerfRnk_{it}$ does not significantly explain CPS forecast accuracy for the sample of firms. Column C results show a departure from the predicted relationship (i.e., a positive relationship) between the inverse measure of revenue forecast accuracy ($FcstAcc_{it}$) and ERM performance for the sample of firms ($ERMPerfRnk_{it} = 1.57$, $p = .07$).

Table 10
Analyst Forecast Accuracy Scaled by Price: OLS Regression Results

$$FcstAcc_{it} = \alpha_0 + \alpha_1 ERMPerfRnk_{it} + \alpha_2 AnlstFoll_{it} + \alpha_3 Size_{it} + \alpha_4 MktBook_{it} + \alpha_5 Sgmt_{it} + \alpha_6 PInst_{it} + \alpha_7 \sigma(Ret)_{it-1} + \alpha_8 R\&D_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{43} \beta_k FF_k + \varepsilon_{it}$$

Coefficient over t-value []^a

Variable	Pred. Sign	Column A: EPS	Column B: CPS	Column C: Revenue
Intercept		-0.0087 [-0.22]	0.1493 [0.56]	-27.19** [-2.35]
ERMPerfRnk_{it}	-	-0.00327* [-1.47]	-0.0059 [-0.46]	1.57* [1.55]
AnlstFoll _{it}	-	-0.00109 [-1.28]	-0.0068 [-0.96]	-0.0794** [-2.07]
Size _{it}	+/-	0.0016 [-0.44]	-0.0045 [-0.36]	4.25* [1.74]
MktBook _{it}	-	-0.00001** [-2.20]	0.000002* [-1.63]	0.0076 [0.27]
Sgmt _{it}	-	0.0009 [0.09]	0.0066 [0.48]	1.95 [0.38]
PInst _{it}	-	-0.1136*** [-2.93]	-0.142 [-0.98]	-16.46*** [-3.60]
$\sigma(Ret)_{it-1}$	+	0.4256*** [2.91]	0.4322* [1.44]	64.77** [2.30]
R&D _{it}	+/-	0.0001** [2.20]	0.000001 [0.52]	0.142** [1.99]
Year FE		Y	Y	Y
Industry FE		Y	Y	Y
n		1798	517	649
Adj. R ²		0.077	0.097	0.155

Notes:

*** significant at .01, ** significant at .05, * significant at .1

^a - All t-statistics are calculated using standard errors which are robust to within cluster correlation by two-digit SIC code (Rogers or clustered standard errors).

Where: [] denote COMPUSTAT data definitions. *FcstAcc* is defined as the difference in absolute value of the actual amount as reported in I/B/E/S and the first median annual consensus forecast after the prior year

announcement scaled by the prior year stock price. Note: Revenue forecasts differ from cash flow and earnings in that revenue is not forecasted on a per share basis. *ERMPerfRnk* is the quintile rank (0=low ERM performance to 4=high ERM performance) based on *ERMPerf*. *ERMPerf* is defined as the proportion of negative words in the board risk oversight disclosure counted by the General Inquirer. *AnlstFoll* is the number of analysts included in the consensus forecast. *Size* is the natural logarithm of total assets [AT]. *Sgmt* or the number of business segments was obtained from the COMPUSTAT Segment File. *PInst*, the percentage of institutional investors, was obtained from Thomson Reuters 13F database. *R&D* is research and development expense [XRD]. $\sigma(Ret)$ is the standard deviation of monthly returns obtained from CRSP in year t-1. *MktBook* or market-to-book is the ratio of the market value of equity to book value [(PRCC_F*CSHO)/CEQ].

Equation 8 is re-estimated using a dependent variable with the functional form outlined in Equation 7 (i.e., scaling absolute forecast accuracy by actual earnings reported in I/B/E/S) over a sample of 1,892 firm-year observations. Results are reported in Table 11. A negative and statistically significant coefficient on $ERMPerfRnk_{it}$ in Column A ($ERMPerfRnk_{it} = -0.029$, $p < .05$) provides additional support for the results in Table 10 Column A. This is consistent with ERM performance being associated with analysts' earnings forecast accuracy. Table 11 Columns B and C results show that $ERMPerfRnk_{it}$ is not found to be associated with CPS and revenue forecast accuracy at conventional significance levels for the sample.

Table 11
Analyst Forecast Accuracy Scaled by Actual: OLS Regression Results

$$FcstAcc_{it} = \alpha_0 + \alpha_1 ERMPerfRnk_{it} + \alpha_2 AnlstFoll_{it} + \alpha_3 Size_{it} + \alpha_4 MktBook_{it} + \alpha_5 Sgmt_{it} + \alpha_6 PInst_{it} + \alpha_7 \sigma(Ret)_{it-1} + \alpha_8 R\&D_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{43} \beta_k FF_k + \varepsilon_{it}$$

Variable	Pred. Sign	Coefficient over t-value [] ^a		
		Column A: EPS	Column B: Cash Flow	Column C: Revenue
Intercept	+/-	-0.4887** [-2.19]	0.838 [1.00]	1.4808*** [4.96]
ERMPerfRnk_{it}	-	-0.029** [-1.70]	-0.011 [-0.27]	-0.0115 [-0.39]
AnlstFoll _{it}	-	-0.00005 [-.03]	-0.021 [-0.51]	-0.0046 [-0.54]
Size _{it}	+/-	0.0206 [.85]	-0.0004 [-0.01]	-0.0265 [-0.49]
MktBook _{it}	-	-0.00002 [-0.50]	0.00001 [-0.38]	0.0004 [0.77]
Sgmt _{it}	-	0.094 [0.89]	0.1045 [1.11]	-0.0247 [-0.46]
Pinst _{it}	-	0.263* [1.54]	-0.9923** [-1.87]	-0.238** [-1.76]
$\sigma(Ret)_{it-1}$	+	0.5335 [1.09]	1.792** [1.88]	0.95*** [2.903]
R&D _{it}	+/-	0.00002 [0.44]	0.00006 [1.25]	0.0016* [1.39]
Year FE		Y	Y	Y
Industry FE		Y	Y	Y
n		1892	526	691
Adj. R ²		0.0362	0.069	0.1328

Notes:

*** significant at .01, ** significant at .05, * significant at .1

^a - All t-statistics are calculated using standard errors which are robust to within cluster correlation by two-digit SIC code (Rogers or clustered standard errors).

Where: [] denote COMPUSTAT data definitions. *FcstAcc* is defined as the difference in absolute value of the actual amount as reported in I/B/E/S and the first median annual consensus forecast after the prior year announcement scaled by actual. Note: Revenue forecasts differ from cash flow and earnings in that revenue is not

forecasted on a per share basis. *ERMPerfRnk* is the quintile rank (0=low ERM performance to 4=high ERM performance) based on *ERMPerf*. *ERMPerf* is defined as the proportion of negative words in the board risk oversight disclosure counted by the General Inquirer. *AnlstFoll* is the number of analysts included in the consensus forecast. *Size* is the natural logarithm of total assets [AT]. *Sgmt* or the number of business segments was obtained from the COMPUSTAT Segment File. *Pinst*, the percentage of institutional investors, was obtained from Thomson Reuters 13F database. *R&D* is research and development expense [XRD]. $\sigma(Ret)$ is the standard deviation of monthly returns obtained from CRSP in year t-1. *MktBook* or market-to-book is the ratio of the market value of equity to book value [(PRCC_F*CSHO)/CEQ].

Results suggest ERM performance has an impact on analysts' earnings forecast accuracy and provides support for H3. Determining the economic benefits gained from more accurate earnings forecasts is problematic. Levahvy et al. (2011) discuss the difficulty in determining how more accurate earnings forecasts benefit a particular stakeholder (e.g., investor). Specifically, since stakeholder benefits are not directly observable, the economic significance is difficult to assess.

6.2.4 Cost of Debt Analyses

Due to the overlap between the financial crisis, 2008-2009, and my sample period, 2007-2009, the number of new bond issues which have the required financial and disclosure data is relatively small compared to the analyses presented above. The bond yield spread sample resulted in 129 firm-year observations to estimate Equation 10. An additional analysis utilizing realized interest expense as a proxy for the cost of debt resulted in 1,587 firm-year observations used to estimate Equation 11. In both analyses, the top and bottom 1% of the dependent variable's distribution is winsorized to mitigate the effects of outliers

Table 12 reports the results for the bond yield sample used to estimate Equation 10. A two-stage least squares approach is utilized to develop an orthogonal measure of each firm's credit rating (Equation 9) with the second stage results presented in Table 12. The coefficient on $ERMPerfRnk_{it}$ is positive but not significant at conventional levels ($ERMPerfRnk_{it} = 0.0701$, $p = .13$). An interaction term, $ERMPerfRnk_{it} * Leverage_{it}$, allows for a slope shift in how

$ERMPerfRnk_{it}$ influences the cost of debt with the level of leverage. A negative coefficient is interpreted as an indication that higher performing ERM firms with more leverage have a lower cost of debt relative to other firms ($ERMPerfRnk_{it} * Leverage_{it} = -0.334, p < .08$). Additional control variables follow their predicted signs when statistically significant. Size ($Size_{it}$), growth ($MktBook_{it}$), rating ($ResidRating_{it}$) and issue size ($IssueSize_{it}$) are all significant at the .05 level.

The economic interpretation indicates ERM performance to have a reasonably significant effect on the bond yield spread. Using the mean $Leverage_{it}$ found in Table 3 (0.564), a move from the bottom to top quintile of ERM performance results in a 47.2 basis point differential (calculated as $0 - 4*[0.0701 + (-0.3337 * 0.564)]$ where 0.0701 is the coefficient on $ERMPerfRnk_{it}$, -0.3337 is the coefficient on $ERMPerfRnk_{it} * Leverage_{it}$ from Table 12.⁵³

⁵³ The bottom quintile is represented as $ERMPerfRnk_{it} = 0$ while the top quintile is represented as $ERMPerfRnk_{it} = 4$.

Table 12
Cost of Debt Results: Bond Yield Spread

$$Yield_{it+1} = \alpha_0 + \alpha_1 ERMPerfRnk_{it} + \alpha_2 ERMPerfRnk * Leverage_{it} + \alpha_3 Size_{it} + \alpha_4 Leverage_{it} + \alpha_5 ROA_{it} + \alpha_6 \sigma(ROA)_{it} + \alpha_7 MktBook_{it} + \alpha_8 ResidRating_{it} + \alpha_9 IdioRisk_{it} + \alpha_{10} IssueSize_{it} + \alpha_{11} CallProv_{it} + \alpha_{12} Sub_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{43} \beta_k FF_k + \varepsilon_{it}$$

Ordinary Least Squares (n=129)

Variable	Pred. Sign	Coef.	t-stat. ^a	Sig.
Intercept	+/-	0.8126	1.41	
ERMPerfRnk_{it}	-	0.0701	1.19	
ERMPerfRnk_{it} x Leverage_{it}	-	-0.3337	-1.44	*
Size _{it}	-	-0.1546	-2.81	***
Leverage _{it}	+	0.6683	0.82	
ROA _{it}	-	0.4477	0.62	
$\sigma(ROA)_{it}$	+	1.9962	1.69	**
MktBook _{it}	+	0.8833	2.94	***
ResidRating _{it}	-	-0.1123	-3.41	***
IdioRisk _{it}	+	1.52	0.54	
IssueSize _{it}	+/-	0.183	1.87	**
CallProv _{it}	-	-0.0113	-0.11	
Sub _{it}	+	-0.012	-0.09	
Industry	Included			
Year	Included			
adj-R ²			0.7361	

Notes:

*** significant at .01, ** significant at .05, * significant at .1

^a - All t-statistics are calculated using standard errors which are robust to within cluster correlation by two-digit SIC code (Rogers or clustered standard errors).

Where: [] denote COMPUSTAT data definitions. *Yield_{t+1}* is firm *i*'s yield to maturity at the issuance date minus the Treasury bond yield with a similar maturity. *ERMPerfRnk* is the quintile rank (0=low ERM performance to 4=high ERM performance) based on *ERMPerf*. *ERMPerf* is defined as the proportion of negative words in the board risk oversight disclosure counted by the General Inquirer. *Leverage* is the ratio of total liabilities to total assets [(AT-CEQ)/AT]. *ROA* is the ratio of income before extraordinary items to total assets [IB/AT]. $\sigma(ROA)$ is three year standard deviation of ROA. *MktBook* or market-to-book is the ratio of the market value of equity to book value [(PRCC_F*CSHO)/CEQ]. *IdioRisk* or idiosyncratic risk is the standard deviation of the daily excess return over the market return for the prior 255 day trading cycle. *ResidRating* or orthogonal bond rating is the residual from a regression of the bond rating on ERMPerfRnk. The residual captures the information content of the rating unrelated to ERMPerf. *IssueSize* is the natural logarithm of the offering amount (in millions of dollars) of the bonds. *CallProv* is the ratio, between 0 and 1, of the number of years to first call divided by the number of years to

maturity. If there is no call provision CallProv is 1. If the bond is callable from the date of issuance CallProv is 0. *Year* are annual dummies to control for unobserved time effects while *FF* are industry dummies based on the Fama and French (1997) classification to control for unobserved industry effects.

Table 13 presents the results obtained from estimating Equation 11 with a sample of 1,587 firm-year observations utilizing realized interest expense as a proxy for the cost of debt. Similar to the results reported in Table 12, the coefficient on $ERMPerfRnk_{it}$ is positive and significant, a departure from its predicted direction ($ERMPerfRnk_{it} = 0.0525$, $p < .01$). The coefficient on the interaction term is negative and significant ($ERMPerfRnk_{it} * Leverage_{it} = -0.0776$, $p < .01$), corroborating the results presented in Table 12. Additional control variables follow their predicted sign when statistically significant.

The economic interpretation indicates ERM performance has a small effect on the realized cost of debt for the sample obtained to test H4. Using the mean $Leverage_{it}$ found in Table 3 (0.564), a move from the bottom to top quintile of ERM performance results in a 3.5 basis point differential (calculated as $0 - 4*[0.0525 + (-0.0776 * 0.564)]$ where 0.0525 is the coefficient on $ERMPerfRnk_{it}$, -0.0776 is the coefficient on $ERMPerfRnk_{it} * Leverage_{it}$ from Table 13.

Table 13
Cost of Debt Results: Realized Cost of Debt

$$CostDebt_{it} = \alpha_0 + \alpha_1 ERMPerfRnk_{it} + \alpha_2 ERMPerfRnk * Leverage_{it} + \alpha_3 Size_{it} + \alpha_4 Leverage_{it} + \alpha_5 ROA_{it} + \alpha_6 \sigma(ROA)_{it} + \alpha_7 MktBook_{it} + \alpha_8 IdioRisk_{it} + \sum_t^2 \beta_t Year_t + \sum_k^{43} \beta_k FF_k + \varepsilon_{it}$$

Ordinary Least Squares (n=1,587)

Variable	Pred. Sign	Coef.	t-stat. ^a	Sig.
Intercept	+/-	0.4783	8.53	***
ERMPerfRnk_{it}	-	0.0525	3.36	***
ERMPerfRnk_{it} x Leverage_{it}	-	-0.0776	-3.36	***
Size _{it}	-	-0.00502	-0.61	
Leverage _{it}	+	-0.0237	-1.06	
ROA _{it}	-	-0.1479	-1.42	*
$\sigma(ROA)_{it}$	+	0.2646	2.88	***
MktBook _{it}	+	0.0052	1.87	*
IdioRisk _{it}	+	0.1906	0.37	
Industry	Included			
Year	Included			
adj-R ²			0.1785	

Notes:

*** significant at .01, ** significant at .05, * significant at .1

^a - All t-statistics are calculated using standard errors which are robust to within cluster correlation by two-digit SIC code (Rogers or clustered standard errors).

Where: [] denote COMPUSTAT data definitions. *CostofDebt* is the ratio of interest expense in year t+1 to average interest-bearing debt outstanding [XINT/ Avg(DLTT + DLC)_{t,t+1}]. *ERMPerfRnk* is the quintile rank (0=low ERM performance to 4=high ERM performance) based on *ERMPerf*. *ERMPerf* is defined as the proportion of negative words in the board risk oversight disclosure counted by the General Inquirer. *Size* is the natural logarithm of total assets [AT]. *Leverage* is the ratio of total liabilities to total assets [(AT-CEQ)/AT]. *ROA* is the ratio of income before extraordinary items to total assets [IB/AT]. $\sigma(ROA)$ is three year standard deviation of ROA. *MktBook* or market-to-book is the ratio of the market value of equity to book value [(PRCC_F*CSHO)/CEQ]. *IdioRisk* or idiosyncratic risk is the standard deviation of the daily excess return over the market return for the prior 255 trading cycle. *Year* are annual dummies to control for unobserved time effects while *FF* are industry dummies based on the Fama and French (1997) classification to control for unobserved industry effects.

Overall, the results presented for the cost of debt analysis differ from the predictions under H4. The small sample used in the bond yield spread analysis may not have enough power to make inferences. Additionally, the relationship between the cost of debt, whether proxied for by the bond yield spread or the realized cost of debt, and ERM performance may be more difficult to detect during the sample period due to extreme economic volatility (i.e., financial crisis during 2008-2009).

In the next section, a summary of the findings, conclusions and limitations are discussed.

7. SUMMARY, CONTRIBUTIONS AND LIMITATIONS

7.1 Summary

While ERM has received a great deal of support from advocates, the archival empirical literature has yet to answer an important question regarding ERM. Namely, the question remains as to whether ERM is associated with earnings predictability and a reduced risk of firm failure, two theoretical predictions regarding the benefits of ERM implementation. Several studies have attempted to answer these questions, but typically have low power and generalizability concerns due to small sample sizes.

The analyses presented in this paper investigate whether key predicted benefits of ERM are observable. Overall, results support H1 and H2 by documenting a positive association between ERM performance and earnings predictability, an important firm characteristic for value relevant earnings. Support exists for H3, a third order effect of more predictable earnings. Analysts' earnings forecasts are more accurate in the presence of higher performing ERM. Forecast accuracy, a key input into analysts' stock recommendations, is integral to providing the market with precise information. H4 represents an important prediction regarding ERM

performance. Specifically, ERM is predicted to reduce the risk of firm failure, a key component of the cost of raising debt capital. Results are inconclusive with regards to ERM's ability to influence the cost of debt during this study's sample period (i.e., 2007-2009). One explanation for this departure, the economic volatility during the financial crisis of 2008-2009, may make it difficult to empirically detect the relationship between ERM performance and the cost of debt. Another explanation relates to the level of ERM implementation across the firms used in this study. It is possible firms' ERM systems have not attained the level necessary to impact the cost of raising debt capital. Stated differently, ERM may be in relatively early stages of implementation across the sample such that it has a negligible impact on the cost of debt. The results are summarized below:

Results Summary

Hypothesis	Table	Method	Measure	Pred.	t-statistic	Significance‡
H1a	5	OLS	ERMPerfRnk _{it} x Earnings _{it}	-	-3.42	***
H1b	5	OLS	ERMPerfRnk _{it} x Earnings _{it}	+	7.77	***
H1a	6	OLS	ERMPerfRnk _{it} x Earnings _{it}	-	-4.16	***
H1b	6	OLS	ERMPerfRnk _{it} x Earnings _{it}	+	2.47	***
H2	7	t-test	Top/Bottom 20% ERMPerfRnk _{it}	+	2.28	**
H2	8	t-test	Top/Bottom 20% ERMPerfRnk _{it}	+	1.56	*
H2	8	OLS	ERMPerfRnk _{it}	-	-1.72	**
H3	9	t-test	Top/Bottom 20% ERMPerfRnk _{it}	+	1.89	**
H3	10	OLS	ERMPerfRnk _{it}	-	-1.47	*
H3	11	OLS	ERMPerfRnk _{it}	-	-1.7	**
H4	12	OLS	ERMPerfRnk _{it}	-	1.19	**
H4	13	OLS	ERMPerfRnk _{it}	-	3.36	***

‡ one-tailed with *** significant at .01, ** significant at .05, * significant at .1

7.2 Contributions

Little empirical research has investigated how ERM impacts firms. Academic ERM research has struggled to adequately test the theoretical predictions regarding the value of ERM.

In particular, archival ERM research struggles to quantify ERM performance. First, my research furthers the literature by utilizing a new data source to identify a diverse and large sample of firms across many industries in order to test the proposition that ERM performance is positively associated with earnings predictability and the cost of raising debt capital. Through an innovative research design, the external validity of the results in this study is enhanced over prior research. Software obtains and extracts the 2010 SEC mandated board risk oversight disclosure in order to test the hypotheses presented in this study. Second, many argue the primary goal of ERM is to reduce the probability of lower tail events which leads to more stable, predictable earnings performance. Therefore, results of this study are of interest to practitioners, regulators and policy makers since the 2008-2009 financial crisis dramatically increased the attention placed on the benefits of ERM performance. Lastly, by analyzing the new board of director risk oversight disclosures, the research presented in this study adds to the qualitative data literature in the accounting domain. The results suggest the disclosures contain valuable information regarding ERM performance. In total, the analyses presented in this study extend our knowledge of ERM by testing key theoretical predications regarding its impact on firm performance.

7.3 Limitations

While my research benefits from a larger and more diverse sample, it has certain limitations. Specifically, the measurement of the unobservable ERM performance construct via textual analysis adds noise to the measurement of its associations with earnings predictability and the cost of debt such that it attenuates the ability to make inferences. Importantly, it biases my analysis from finding statistically significant results. Li (2010) corroborates this notion through a description of the measurement error inherent in textual analysis. Li articulates the idea by stating if a researcher is able to make inferences in the presence of measurement error,

the researcher should feel reasonably confident they were able to obtain a significant result in the face of substantial bias against finding results. An additional limitation, the short duration of the temporal period over which the models are measured, is another limitation of this study. The newness of the risk oversight disclosure led to one year of measurement, limiting the time the measure was representative of ERM performance. Lastly, an inherent research design limitation exists when employing regression models. Namely, this study cannot address causality between ERM performance and the measures of interest in this study (i.e., earnings predictability and the cost of debt).

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Appendix A: Board’s Role in Risk Oversight – Two Examples⁵⁴

Example 1

April 2, 2010 Proxy Disclosure for: Hospital Corporation of America

Board’s Role in Risk Oversight. Risk is inherent with every business. Management is responsible for the day-to-day management of risks the Company faces, while the Board of Directors, as a whole and through its committees, has responsibility for the oversight of risk management. In its risk oversight role, the Board of Directors has the responsibility to satisfy itself that the risk management processes designed and implemented by management are adequate and functioning as designed. Our Board of Directors oversees an enterprise-wide approach to risk management, designed to support the achievement of organizational objectives, including strategic objectives, to improve long-term organizational performance and enhance stockholder value. A fundamental aspect of risk management is not only understanding the risks a company faces and what steps management is taking to manage those risks, but also understanding what level of risk is appropriate for the company. The involvement of the full Board of Directors in setting the Company’s business strategy is a key part of its assessment of management’s appetite for risk and also a determination of what constitutes an appropriate level of risk for the Company.

We conduct an annual enterprise risk management assessment, which is facilitated by the Company’s enterprise risk management team in collaboration with the Company’s internal auditors. The senior internal audit executive officer reports to the Chief Executive Officer and Chairman and to the Audit and Compliance Committee in this capacity. In this process, we assess risk throughout the Company by conducting surveys and interviews of Company employees and directors soliciting information regarding business risks that could significantly adversely affect the Company, including the achievement of its strategic plan. We then identify any controls or initiatives in place to mitigate any material risk and the effectiveness of any such controls or initiatives. The enterprise risk management team annually prepares a report for senior management and, ultimately, the Board of Directors regarding the key identified risks and how the Company manages these risks to review and analyze both on an annual and ongoing basis. Senior management attends the quarterly Board meetings and is available to address any questions or concerns raised by the Board regarding risk management and any other matters. Additionally, each quarter, the Board of Directors receives presentations from senior management on strategic matters involving our operations.

While the Board of Directors has the ultimate oversight responsibility for the risk management process, various committees of the Board assist the Board in fulfilling its oversight responsibilities in certain areas of risk. In particular, the Audit and Compliance Committee focuses on financial and enterprise risk exposures, including internal controls, and discusses with management, the senior internal audit executive officer, the senior chief ethics and compliance officer and the independent auditor the Company’s policies with respect to risk assessment and risk management. The Audit and Compliance Committee also assists the Board in fulfilling its duties and oversight responsibilities relating to the Company’s compliance with applicable laws and regulations, the Company Code of Conduct, and related Company policies and procedures, including the Corporate Ethics and Compliance Program. The Compensation Committee assists the Board in fulfilling its oversight responsibilities with respect to the management of risks arising from our compensation policies and programs. The Patient Safety and Quality of Care Committee assists the Board in fulfilling its risk oversight responsibility with respect to the Company’s policies and procedures relating to patient safety and the delivery of quality medical care to patients.

Textual analysis statistics as reported by the General Inquirer⁵⁵ content analysis software:

Negative Word Count	Proportion of Negative Words*
59	0.102

**Definition of ERMPerf*

⁵⁴ Professor Mark Beasley, the director of the Enterprise Risk Management Initiative at North Carolina State University, was kind enough to provide these disclosures.

⁵⁵ The General Inquirer performs content analysis across 182 dictionaries and provides a word count for each dictionary and the proportion of words matched to each dictionary.

Example 2

April 30, 2010 Proxy Disclosure for: Petroleum Development Corporation

The Board Role in Risk Management

The Board seeks to understand and oversee critical business risks. Risks are considered in every business decision, not just through Board oversight of the Company's Risk Management system. For instance, a special assessment of risks (financial and otherwise) is included in every acquisition proposal presented to the Planning and Finance Committee. The Board realizes, however, that it is not possible to eliminate all risk, nor is it desirable, and that appropriate risk-taking is essential to achieve the Company's objectives.

The Board risk oversight structure provides that management report on risk to the Planning and Finance Committee. Other committees, however, are active in managing the risks related to such committees' oversight areas. For example, the Audit Committee reviews many risks and related controls in areas that it considers fundamental to the integrity and reliability of the financial statements, such as counterparty risks and derivative program risks. Similarly, the Compensation Committee considers risks related to the structure and size of the Company's compensation plan.

Textual analysis statistics as reported by the General Inquirer⁵⁶ content analysis software:

Negative Word Count	Proportion of Negative Words*
20	0.127

**Definition of ERMPerf*

⁵⁶ The General Inquirer performs content analysis across 182 dictionaries and provides a word count for each dictionary and the proportion of words found for each dictionary.

Appendix B: Variable List

Acc_{it}	Absolute amount of accruals calculated as the difference between operating income after depreciation and cash flows from operations (Li 2008). Compustat (OIADP - OANCF)/AT
$AcQ_{i,t}$	Standard deviation of the residual from Equation 4: $\sigma(\zeta)_{it}$ over the past 3 years.
$AnlstFoll_{it}$	Number of analysts' following firm (I/B/E/S)
$CallProv_{it}$	Firm i's bond issue call provision in year t. Ratio between 0 and 1, of the number of years to first call divided by the number of years to maturity. Equals 1 if no call provision. Equals 0 if callable from date of issuance.
CFO_{it+n}	Cash flows from operations calculated under the indirect method: Income before extraordinary items (Compustat IB) - total accruals ($TA_{i,t}$) divided by Average(Compustat AT). See Francis et al. (2005).
CFO_{it+n}	Cash flows from operations calculated under the direct method: firm i's cash flows from operations from the statement of cash flows (Compustat OANCF).
$CostofDebt_{it}$	Realized cost of debt calculated as firm i's interest expense in year t+1 divided by the average interest-bearing debt outstanding during years t and t+1 (Francis et al. 2005). $Compustat\ XINT_{t+1} / Average(DLTT_{t,t+1} + DLC_{t,t+1})$
$Earnings_{it+n}$	Income before extraordinary items (Compustat IB) divided by average total assets (Compustat AT) for firm i in year t.
$ERMPerf_{it}$	NR_t where NR is the proportion of negative words provided by the GI content analysis software.
$ERMPerfRnk_{it}$	Developed by conditioning the distribution of the proportion of negative words contained in the board risk oversight disclosure (NR_t) for firm i in the year t=2009 (i.e., only one year available at time sample was drawn). A low rank implies poor performing ERM while a high rank implies higher performing ERM.
FF_{it}	Fama-French 48 industry classification (k=1 to 47). See Fama and French (1997).
$IdioRisk_{i,t-1}$	The standard deviation of firm i's daily excess return over the market return for the prior year's 255 trading days (Mansi et al. 2011).
$IssueSize_{it}$	Natural logarithm of the offering amount of the bond issue.
$Leverage_{it}$	Firm i's leverage is calculated as the amount of long term debt divided by total assets at the end of year t (Edmonds, Edmonds and Maher 2011). Compustat (DLTT/AT)
$MktBook_{it}$	Firm i's market value of equity divided by its book value of equity measured at the beginning of the year t-1 (Mansi et al. 2011). Compustat (PRCC_F*CSHO) / CEQ

- $PInst_{it}$ The percentage of the most recent quarterly institutional holdings to common shares outstanding prior to the 10-K filing (located in Thomas Reuters 13F filings) for firm i in year t (Lehavy et al. 2011).
- $PPE_{i,t}$ Firm i 's amount of property, plant and equipment (Compustat PPEGT) scaled by Average (Compustat AT) in year t .
- $R\&D_{it}$ Firm i 's research and development expense (Compustat XRD) in year t .
- $Rating_{it}$ Firm i 's average Moody's and S&P's senior debt rating in year $t+1$. Ratings are converted to integers from 1 (D) - 23 (Aaa+).
- REV_{it} Firm i 's revenue (Compustat SALE) scaled by Average (Compustat AT) in year t .
- ROA_{it} Return on assets calculated as earnings before extraordinary items scaled by total assets. Compustat IB/AT.
- $Sgmt_{it}$ Number of business segments (located in Computstat Segment File) for firm i in year t .
- $Size_{it}$ Natural logarithm of total assets (Compustat At) for firm i in year t .
- Sub_{it} Firm i 's bond issue dummy in year t : 1 for subordinated bonds and 0 for senior bonds.
- TA_{it} Total accruals calculated under the indirect method: firm i 's total accruals measured as the change in current assets less the change in current liabilities less the change in cash and cash equivalents plus the change in the current maturities of long-term debt and other short-term debt less depreciation and amortization expense (Francis et al. 2005). Compustat $\Delta ACT - \Delta LCT - \Delta CHE + \Delta DLC - DP$
- $TCA_{i,t}$ Total current accruals calculated under the **indirect method**: firm i 's total current accruals measured as the change in current assets less the change in current liabilities less the change in cash and cash equivalents plus the change in the current maturities of long-term debt and other short-term debt (Francis et al. 2005). Compustat $\Delta ACT - \Delta LCT - \Delta CHE + \Delta DLC$
- TCA_{it} Total current accruals calculated under the **direct method**: firm i 's total current accruals measured as the negative decrease (increase) in accounts receivable plus the decrease (increase) in inventory plus the increase (decrease) in accounts payable plus the increase (decrease) in taxes payable plus the net change in other current assets plus depreciation expense (Hribar and Collins 2002).
Compustat $-(RECCH+INVCH+APALCH+TXACH+AOLOCH+DPC)$
- $Year_{it}$ Year indicators for 2008-2009.
- $\sigma Ret_{i,t-1}$ Standard deviation of firm i 's prior year monthly returns (located in the CRSP monthly file).
- σROA_{it} Standard deviation of ROA_{it} over the past three years. Compustat items IB/AT.