DOES THE EXISTENCE OF AN ENTERPRISE RISK MANAGEMENT (ERM) PROGRAM INFLUENCE THE EXISTENCE OF MATERIAL WEAKNESSES IN INTERNAL CONTROL OVER FINANCIAL REPORTING?

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ABSTRACT

This research study explores the possibility that a relationship exists between Enterprise Risk Management (ERM) and Internal Control over Financial Reporting. Specifically, this study explores whether the existence of an ERM program reduces the risk of Material Weaknesses in Internal Control over Financial Reporting. Using data from 2011, this study evaluates the effect of ERM implementation on Material Weakness resulting from Management's Assessment of Internal Control over Financial Reporting pursuant to SOX for a sample of 86 SEC registrants (i.e. public firms). This study finds that public companies with ERM programs report less Material Weaknesses in Internal Controls over Financial Reporting than public companies without ERM programs. The strength of this finding is, however, not statistically significant. This study also finds control variable Sales Growth and control variable Profitability (ROA) are positively associated with the existence of Material Weakness in Internal Control over Financial Reporting (ICFR), and control variable Firm Size (EQUITY) is negatively associated with the existence of Material Weakness in ICFR. The strength of the relationship between Material Weakness in Internal Control over Financial Reporting and these control variables is also not significant, due to certain limitations discussed in the end.

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CHAPTER I: INTRODUCTION

Since the passage the Sarbanes-Oxley Act of 2002, a U.S. federal law, public companies, or issuers, in the U.S. have been responsible for conducting and reporting the results of an annual assessment of Internal Control over Financial Reporting (ICFR). Specifically, the SEC prescribed rules requiring each annual report required by section 13(a) or 15(d) of the SEC Act of 1934 to contain an Internal Control report, which shall (See Appendix II):

1) *State responsibility of management for establishing and maintaining an adequate internal control structure and procedures for financial reporting; and*

2) *Contain an assessment, as of the end of the most recent fiscal year of the issuer, of the effectiveness of the internal control structure and procedures of the issuer for financial reporting.*

Therefore, Management is required to disclose any material weakness (MW) in Internal Controls discovered during these annual assessments when filing its annual Financial Statements with the Securities and Exchange Commission (SEC). An MW is broadly defined by the SEC as one or more control deficiencies that create a reasonable possibility of a material misstatement in a company's annual or interim financial statements. The existence of an MW does not necessarily mean that a material misstatement in the financial statements has in fact occurred, but only that the Internal Controls might not detect or prevent a material misstatement on a timely basis. A material misstatement of the Financial Statements represents an error significant enough that it could alter the economic decisions of those users relying on the Financial Statements, namely, shareholders (AU Section 312.06, AICPA). Accounting models, such as the Audit Risk model, further suggest that the existence of an MW in ICFR increases the risk of a material misstatement (RMM) in the Financial Statements.

Background to the Problem

There are no regulatory consequences, per se, when a public company reports a material weakness (MW) in ICFR, or when a company fails to remediate a previously reported MW (Hammersley, Myers, & Zhou, 2012). Consequences for reporting MWs in Internal Controls over Financial Reporting, however, do emerge. For example, it is suggested that the failure to remediate previously reported MW has led to Auditors increasing their fees for annual audits, and Auditor resignation is more likely (Hammersley, Myers, & Zhou , 2012). Understanding the factors that may decrease the likelihood of the existence of MWs in ICFR is therefore important.

Enterprise Risk Management (ERM)

Practitioners and scholars have increasingly posited Enterprise Risk Management (ERM) as an important element of governance, particularly over the past decade (Paape & Roland, 2012; Beasley, Branson & Hancock, 2010; *Committee of Sponsoring Organization (COSO) of the Treadway Commission*, 1996). According to Paape and Roland (2012), "The idea that ERM is a key component of effective governance has gained widespread acceptance." (p. 4)

More recently, the economic downturn of the late 2000's has exposed flaws in commonly found fragmented approaches to managing risk (e.g. hedging), leading to a greater emphasis on a more holistic approach to managing risk, such as ERM (Quon, Zeghal & Maingot, 2012). According to COSO (2010), ERM is defined as,

> …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 (p. 2).

ERM and Internal Controls

There has been a greater emphasis on integrating ERM and Internal Controls over the past decade. For example, according to the 2004 version of the COSO:

> This Enterprise Risk Management – Integrated Framework expands on internal control, providing a more robust and extensive focus on the broader subject of enterprise risk management. While it is not intended to and does not replace the internal control framework, but rather incorporates the internal control framework within it, companies may decide to look to this enterprise risk management framework both to satisfy their internal control needs and to move toward a fuller risk management process (p. v).

ERM can therefore play a role in managing the risk of material weaknesses in internal controls over financial reporting (COSO, 2010).

Statement of the Problem

ERM programs are posited as a potentially effective process for managing the risks of Material Weaknesses in Internal Controls over Financial Reporting (COSO, 2010). Some scholars have investigated the effects of adopting ERM on firm value (e.g. Hoyt & Leibenberg, 2011). Other scholars have investigated the effects of the existence of an ERM program on a firm's financial performance; measured by one-year excess market returns (e.g. Gordon, Loeb, & Tseng, 2009). These scholars generally found that the adoption of an ERM program is positively associated with improved firm performance.

Yet, there is a paucity of studies investigating the effects of the existence of an ERM program on Internal Control over Financial Reporting pursuant to SOX 404. Specifically, few studies have explored whether SEC registrants (i.e., public companies) with ERM programs in place report fewer MW in ICFR than public companies that do not have an ERM program in place.

Purpose and Significance of the Study

The purpose of this study is to investigate whether the existence of an Enterprise Risk Management Program influences the existence of Material Weaknesses in Internal Control over Financial Reporting. A better understanding of the effects, if any, of ERM on Material Weaknesses in ICFR contributes both to scholarship and to practice. Specifically, this study will provide two primary benefits.

First, this study contributes to the gap in empirical research investigating the effects of ERM on material weaknesses in Internal Controls over Financial Reporting. Second, this study contributes to decisions on the cost/benefits of ERM. Bertinetti, Cavezzali, and Gardenal (2013) observed a significant increase in ERM adoption among companies listed on the STOXX Europe Large 200 Index from 4% of firms in 2002 to 39% of firms in 2011. More recently, a survey conducted by the American Institute of Certified Public Accountants (AICPA) shows a steady increase from 2009 through 2012 in the percentage of organizations that claim they have a "complete formal enterprise-wide risk management process in place." COSO (2010) reiterates the fact that ERM can play a role in designing Internal Control over Financial Reporting. This study will contribute to greater insight into whether ERM provides value by centering the value-question on reducing the risk of Material Weaknesses in Internal Control over Financial Reporting.

Research Questions

The following research questions inform this study.

> ***Research Question 1: Does the adoption of ERM reduce the existence of Material Weakness in Internal Control over Financial Reporting reported pursuant to SOX?***

The main research question focused on in this study is- Does the existence of an ERM program reduce reported material weakness in Internal Control over Financial Reporting.

Research Question 2: Do high growth companies have a higher possibility of Material Weakness in Internal Control over Financial Reporting?

Prior research suggests that a rapidly growing firm may outgrow any internal controls it has in place, and may require time to establish new procedures (Kinney & McDaniel, 1989; Stice, 1991). New personnel, processes, and technology are usually needed to match adequate Internal Control with the firm's growth (Doyle, Ge, & McVay, 2007a).

Research Question 3: Do high profitability companies have a lower possibility of Material Weakness in Internal Control over Financial Reporting?

Another determinant of effective Internal Control over Financial Reporting could be a firm's financial profitability; poorly performing firms may not be able to adequately invest the time and/or money in proper controls (Doyle, Ge, & McVay, 2007a).

Research Question 4: DO larger firms have a lower possibility of Material Weakness in Internal Control over Financial Reporting?

Prior research suggests that firm size may be a determinant of good internal control (e.g., Kinney & McDaniel, 1989; DeFond & Jiambalvo, 1991), though the evidence is mixed (DeFond & Jiambalvo, 1991; Krishnan & Visvanathan, 2005). Doyle, Ge, and McVay (2007b) asserted that large firms likely have more financial reporting processes and procedures in place and are more likely to have an adequate number of employees to ensure proper segregation of duties. Larger firms are also more likely to enjoy economies of scale when developing and implementing internal control systems. Moreover they tend to have greater resources to spend on

internal auditors or consulting fees, which may aid in the generation of strong internal control (Doyle, Ge, & McVay, 2007b).

CHAPTER II: REVIEW OF RELATED LITERATURE

This section reviews the literature to determine what is known about the main research question of this study; Does the adoption of an ERM program reduce the existence of Material Weakness in Internal Control over Financial Reporting reported pursuant to SOX?

First, the literature investigating the benefits of adopting ERM program is discussed. Second, studies investigating the significance of Material Weakness in Internal Control are discussed. Finally, studies investigating the effect of ERM on Material Weaknesses in Internal Control over Financial Reporting are discussed.

The Benefits of Adopting ERM

This section discusses studies investigating the benefits of adopting ERM. Several scholars have studied and evaluated the extent of the relationship between ERM and Firm Performance. Many of these studies have been done with the goal of uncovering signs of a link between financial value (e.g. Tobin's Q) and ERM existence and implementation within a firm.

Gordon, Loeb, & Tseng (2009) indicate a positive relationship between ERM and firm performance. This study measured firm performance using one-year excess market returns. Other studies suggest that using Tobin's Q to measure firm performance is consistent with the general practice of corporate finance literature. Tobin's Q is defined as the ratio between the sum of the market value of equity plus the book value of liabilities over the book value of assets (Smithson

& Simkins, 2005; Cummins, Lewis, & Wei, 2006). Tobin's Q is described as a more accurate measure of firm performance over accounting measures or market returns because it doesn't need to be adjusted for risk and it provides a prospective view on expectations (Lang & Stulz, 1994).

Hoyt and Leibenberg (2011) performed empirical analysis to estimate the effect of ERM on Firm Value using Tobin's Q as the proxy for value. They collected ERM data on Insurance firms using a similar search for ERM evidence with keywords within the same paragraph such as, "enterprise risk management" "chief risk officer" "risk committee" "strategic risk management" "consolidated risk management" "holistic risk management" and "integrated risk management" (Hoyt & Leibenberg, 2011). They found a positive relation between firm value and the use of ERM. They controlled for other performance determinants using firm size, leverage, sales growth, ROA, Dividends, Insiders, Life (life insurers), and Beta (Hoyt & Leibenberg, 2011). This study provides additional evidence that ERM is positively related to firm financial performance.

Pagach and Warr (2010) investigated the impact of ERM on a range of observable financial measures. Hiring announcements of Chief Risk Officers (CROs) were used as a proxy for ERM adoption. They found that among those adopting ERM, the average firm is "quite highly levered, consistent with the large number of financial and utility firms in the sample". When testing the results before and after ERM adoption (separated by the year of CRO appointment), they found a significant decline in the standard deviation of stock returns consistent with firms becoming less risky after the appointment of CRO. These findings are important to our study because they highlight two industries that are more evolved in their ERM implementation. Ultimately they found little evidence in their sample of ERM adopters for any

significant changes in various key firm variables. The main limitation to this study is that the first announcement of CRO doesn't necessarily indicate that it is the first time the firm has a formal ERM program, thus diluting the value of this particular study. Pagach and Warr acknowledge that even with the appointment of a CRO, it could take time for ERM to be implemented and functioning effectively enough to generate an impact on financial performance. This is important to our study because it highlights a general theme of ERM literature that implementation and maturity of ERM are really two different variables, but because of the lack of sufficient data they become one data source referred to as "ERM Evidence."

As measured by financial metrics such as excess market returns (Gordon, Loeb, & Tseng, 2009) or Tobin's Q (Hoyt & Leibenberg, 2011), the literature suggests that ERM is positively associated with firm performance. The COSO Integrated Framework describes the broader view point that ERM is a comprehensive approach to managing all risks (COSO, 2010), implying the inclusion of other risks outside of a traditional financial metric. In this context we've hypothesized that it is reasonable to expect there could be an impact of ERM on non-financial performance measures, specifically Management's Assessment of Internal Control. Some of the consistent limitations of ERM literature include the lack of sufficient ERM data (Pagach & Warr, 2010), the ability to quantify the stage of ERM implementation (Beasley, Clune, & Hermanson, 2005), and the subjective choice of which measurement of firm performance or value to use (Gordon, Loeb, & Tseng, 2009).

The consequences of reporting Material Weaknesses in Internal Control over Financial Reporting

This section reviews literature that evaluates the consequences of firms reporting Material Weaknesses in Internal Control over Financial Reporting and the potential consequences that come with such a report.

Doyle, Ge, & McVay (2007a) investigated the relationship between MW and Firm Size, Firm Age, Financial Health, Firm Complexity, Rapid Growth, Restructuring, Governance and Industry. They conducted a search of SEC 10K filings from August 2002 to November 2005 using keyword "material weakness" to create a sample for their study of the determinants of Material Weakness. A total sample of 705 companies was investigated. Doyle, Ge, & McVay found that smaller, younger, financially weaker, more complex, rapidly growing, or currently restructuring firms tend to have Material Weaknesses in Internal Control. They also found that firms with more serious entity-wide control programs are smaller, younger and weaker financially, while firms with less severe account specific problems are financially healthy, but have complex operations (Doyle, Ge, & McVay, 2007a).

Feng, Li McVay, and Skaife (2012) investigated the relation between Internal Control quality and the accuracy of management guidance. Consistent with the idea that managers in firms with ineffective Internal Controls may rely on erroneous internal management reports when forming guidance, they found less accurate guidance among firms reporting ineffective Internal Controls. They selected their data on MW of firms from 2004-2008 using *Audit Analytics* in the Wharton Research Database. They found that firms who remediate their Material Weakness in Internal Control see an improvement in inventory turnover, sales growth, and gross margin.

Hammersley, Myers, and Zhou (2012) found that firms who fail to remediate MW in Internal Control are those where the weaknesses are more pervasive (i.e. MW are described at the entity level, or there are more individual weaknesses) and where the firms have more complex operations (e.g. several business segments and foreign operations). Also, firms with smaller audit committees are less likely to remediate. Hammersley, Myers, and Zhou find that the possible consequences these firms face are increased audit fees and higher likelihood of auditor resignation. They also find that non-remediating firms are more likely to receive modified audit opinions and going concern issue. They identified these findings through a detailed comparison of remediating and non-remediating firms. These findings are important because they highlight the possibility that those firms with entity-level MW as described by Doyle, Ge, & McVay (2007a) are less inclined to address MW, and therefore could be less likely to have adopted a formal ERM program.

ERM and Reporting Material Weaknesses from the Assessment of Internal Control over Financial Reporting

This section identifies studies that specifically investigated the effects of ERM on Material Weaknesses in Internal Control over Financial Reporting.

In September 2004, the Council of Sponsoring Organizations (COSO) of the Treadway Commission on Fraudulent Financial Reporting issued *Enterprise Risk Management - Integrated Framework.* The new publication intended to provide a more robust framework for COSO's earlier seminal work Internal Control - Integrated Framework (1992) (Gauthier, 2005).

Building on the efforts for SOX to improve Internal Controls, more and more Firms are starting to adopt Enterprise Risk Management (ERM), because a sound Internal

Control system rests on adequate and comprehensive analysis of enterprise-wide risks (Tseng, 2007).

In summary, our study considers whether ERM implementation can be an important factor in mitigating the risk of MW in Internal Control over Financial Reporting. The goal of this study is to answer our main research questions by evaluating the possible relationships between ERM implementation and Management's MW Assessment of Internal Control, a non-financial performance measure. Described further in the following Research Design and Methodology section, our study uses methods, data sources, and control variables consistent with ERM and MW Literature outlined herein to evaluate the extent of this effect.

CHAPTER III: RESEARCH DESIGN AND METHODOLOGY

Research Design Rationale

The purpose of this study is to answer the main research question by exploring the relationship between Enterprise Risk Management and the existence of a Material Weakness in ICFR through statistical modeling and analysis. The independent variable is the adoption of ERM, the dependent variable is Material Weaknesses in Internal Control over Financial Reporting, and control variables are Firm Growth (Growth of Sales), Firm Profitability (ROA), and Firm Size (EQUITY). Data concerning ERM and MW were collected and analyzed to produce quantitative results that help answer the research question of whether ERM influences the reporting of Material Weaknesses in ICFR. This study will explore whether or not a relationship exists between these variables as well as the strength or significance of the relationship. The following details the rationale for our research design and methodology.

Independent Variable – Enterprise Risk Management

The independent variable for this study is the existence of an ERM program in an SEC registrant. The main limitation to ERM research is the lack of sufficient data on those firms that have officially adopted and implemented ERM. Accordingly, consistent with previous studies, this study used a proxy for the existence of an ERM program. Additionally, this study focused on the industries most likely to have implemented ERM, the financial service industry and the utility industry (Pagach & Warr, 2010).

ERM practice is strongly emphasized by many organizations and institutions. This observation is supported by the existence of specific Financial Risk Manager (FRM) and Energy Risk Professional (ERP) designations offered by GARP (Global Association of Risk Professionals). Also, as of February 28, 2010, the SEC requires companies to disclose three items in their proxy and information statements, annual reports, and registration statements: (1) Risk – the board's role in risk oversight and compensation risks, (2) Governance and Director Qualifications – director background and professional qualifications, and (3) Compensation – revising the reports of stock and options awards and disclosing potential conflicts of interest in compensation consultants. The SEC acknowledges that under this amendment, firms have flexibility in describing how they administer their risk oversight function (SEC 2010). While this improvement does not specifically require firms to implement ERM, it does help generate a reliable source of evidence regarding the existence of Enterprise Risk Management. Therefore, this study will focus only on data from the year following this new requirement, 2011, to further compensate for the limitation on ERM data.

Dependent Variable – Material Weakness in Internal Control over Financial Reporting

The dependent variable for this study is MW in ICFR. Management is required by the SEC to annually assess Material Weaknesses in Internal Control over Financial Reporting and report to the public Material Weaknesses in ICFR discovered during their annual assessments pursuant to the Sarbanes Oxley Act of 2002. This study selected a population of firms reporting MW in ICFR during 2011.

Population and Sample

The population for this study includes 43 public firms reporting a Material Weakness in ICFR in 2011 as well as a matching control group of 43 public firms that did not report material weakness in ICFR in 2011. The practical procedures for selecting the population and subsequently selecting the appropriate sample are outlined in the following section.

Data Collection Procedures

Sample Group

The initial population was selected from the *Wharton Research Data Services (WRDS)*-based *Audit Analytics* database. We selected Public Companies with a Material Weakness in Internal Control in 2011, as assessed by Management. *Audit Analytics* includes the evaluation of Internal Control over Financial Reporting (effective or ineffective). We excluded any companies outside of the United States to control for SEC requirements. Based on the rationale above, we further selected firms from the universe of the finance industry and the utility industry according to their Standard Industry Classification codes (finance – between 6000 & 6999, utility – between 4800 & 4999). This detailed search resulted in 43 U.S. Public Companies in either the

financial or utility (energy) industry that reported a Material Weakness in ICFR in 2011. The sample selection method is summarized in the following table.

Table 1: Sample Selection

Number of global companies with the assessment of material weakness in ICFR by Management in 2011	1543
Exclude: Number of companies outside the United States	(610)
Exclude: Number of companies in an industry other than financial or utility industries	(846)
Exclude: Number of companies with incomplete information	(44)
Test Sample	43

Control Group

We also identified a control group of 43 U.S. Public Companies in the finance or utility industries that did not report a Material Weakness in Internal Control over Financial Reporting in 2011, as assessed by Management. The control group was randomly selected from the same *Audit Analytics* database in *Wharton Research Data Services* (WRDS). The purpose of the control group was to expand the sample so that when it was evaluated in relation to the resulting ERM data, a clear contrast could be seen between firms that reported an MW in ICFR and firms that did not. The total sample comprised 86 U.S. Public Companies in the finance or utility industries, 43 of which did report a MW in ICFR in 2011, and 43 of which did not.

Data Collection Procedures for the Independent Variable – Enterprise Risk Management

To identify whether the sample of public companies in our study had an ERM program in place, we searched the resulting sample and the control group (86 total firms) and their 2011

EDGAR SEC filings, such as 10Q, 10K, and 14A, for convincing signs of "ERM evidence." Specifically, we searched with keywords including the following phrases, and their acronyms, as well as the individual words within the same paragraph; "enterprise risk management," "chief risk officer," "risk committee," "strategic risk management," "consolidated risk management," "holistic risk management," and "integrated risk management" (Gordon, Loeb, & Tseng, 2009; Hoyt & Leibenberg, 2011). The results of the search indicate that 53 out of 86 firms, or 62%, had an ERM in place.

Data Collection Procedure for the Control Variables – Firm Growth, Profitability, & Size

The purpose of control variables is to account for other factors or characteristics that could influence the relationship between the independent variable (i.e. ERM program) and the dependent variable (reported MW in ICFR). Based on prior literature, we chose three control variables: Firm Growth, Firm Profitability, and Firm Size.

The first control variable is Firm Growth, measured by the growth of sales according the function, Growth in Sales = (Sales in 2011- Sales in 2010)/ Sales in 2010 using Microsoft Excel. Data on companies' annual sales in 2010 and 2011 is available in Compustat through WRDS. The next control variable is Firm Profitability, as measured by Return on Assets. The relevant data is available in the Data and Ratio (XLS) section of Compustat. The last control variable is Firm Size, measured by the log value of shareholders' equity, which is obtained from Compustat.

Data Analysis and Model

The purpose of this section is to describe the method used to test these variables to answer the research question whether ERM has an effect on the existence of a Material Weakness in ICFR - specifically, the statistical model used and the type of results produced. This

provides context in our study for interpreting the data and analyzing the results to find the answers to our research questions.

The data analysis was performed using a linear regression analysis from the software Statistical Package for the Social Sciences (SPSS). Regression analysis provides statistical results in three formats: Descriptive Statistics, Correlations table, and Coefficients table. First, Descriptive Statistics tell us the main quantitative features of a collection of data such as mean, or standard deviation. Second, a correlations table refers to any of a broad class of statistical relationships involving dependence, or reliance, of one variable on another variable. This allows us to track which variables in our study are interacting and which are not. Third, in statistics, standardized coefficients or beta coefficients are the estimates resulting from an analysis, and they can tell us the positive or negative relationship between different independent variables and a dependent variable. Most importantly, the coefficients indicate which of the independent variables has a greater effect on the dependent variable in a regression analysis.

The test was run on a total observation of 86 sample firms (43 test and 43 control group). The variables tested for this study have been specified in the research question section and the data collection section, and the relevant equation for the associated test model is as follows:

MW = β0+ β1 ERM + β2 Growth + β3 ROA + β4 SH Equity + ε

Table 2: Description of the Model

Variable	Type (IV, DV or CV)	Description
MW	Dependent	The existence of Material Weakness in ICFR; existence for 1, otherwise 0
ERM	Independent	The adoption of ERM program; adoption for 1, otherwise 0
Growth	Control	The growth of sales
ROA	Control	Return on Assets financial ratio
SH Equity	Control	The log value of shareholders' equity

This model, known as a linear regression model, uses variables, selected based on prior research, that are most applicable to our study. The following section details the results gained from testing the data with this model and contains an interpretation of our findings.

CHAPTER IV: FINDINGS AND DISCUSSION

In this section we present the regression results and interpret these results; we answer the research questions, and we discuss our findings. The purpose of this study is to provide quantitative evidence of the effect, if any, of Enterprise Risk Management on the existence of a Material Weakness in ICFR. There are certain limitations to this study discussed later on, such as the lack of sufficient ERM data, which impact the significance of our findings, and other factors besides the adoption of ERM program may affect MW in ICFR, such as Firm Growth, Firm Profitability, and Firm Size.

Linear Regression Results

Descriptive Statistics

Table 3: Descriptive Statistics

Descriptive Statistics

	Mean	Std. Deviation	N
MW	.50	.503	86
ERM	.62	.489	86
GROWTH	.07	.584	86
ROA	-.03	.161	86
EQUITY	2.33	.953	86

Descriptive Statistics tells us the main quantitative features of a collection of data such as mean, or standard deviation. The descriptive statistics of each variable are summarized in Table 3. The mean of dependent variable MW is exactly 0.5, and the standard deviation is 0.503. This is because we have 43 companies with MW in ICFR as our test group, and 43 companies without MW as our control group. We used a dummy variable to measure the adoption of ERM (1 yes, 0 no) and the descriptive statistics result shows that 62% of companies have adopted an ERM program. The mean of profitability, measured by ROA ratio, is -0.03, and it indicates that almost half of the companies in our sample have positive ROA (increasing profitability), and half of the companies have negative ROA (decreasing profitability).

Correlations Analysis

Table 4: Correlations Chart

Correlations

		MW	ERM	GROWTH	ROA	EQUITY
Pearson Correlation	MW	1.000	-.072	.057	-.055	-.143
	ERM	-.072	1.000	.057	.267	.133
	GROWTH	.057	.057	1.000	.060	.126
	ROA	-.055	.267	.060	1.000	.431
	EQUITY	-.143	.133	.126	.431	1.000
Sig. (1-tailed)	MW	.	.256	.300	.307	.094
	ERM	.256	.	.302	.007	.111
	GROWTH	.300	.302	.	.291	.124
	ROA	.307	.007	.291	.	.000
	EQUITY	.094	.111	.124	.000	.

A Correlations table refers to any of a broad class of statistical relationships involving dependence, or reliance, of one variable on another variable. Table 4 exhibits the correlation coefficient matrix of the existence of Material Weakness in ICFR and the four selected factors for our total sample of 86 firms (43 with MW and 43 control group). Through the correlation matrix, it is noticeable that among the variables ERM, ROA, and EQUITY have a negative correlation with the existence of MW in ICFR. The variable GROWTH has a mild positive correlation with the existence of MW in ICFR. In the 1-tailed significance test, the impact of all the independent variables, ERM, GROWTH, ROA, and EQUITY on the existence of MW in ICFR is not overly significant. This indicates that while there is definitely a relationship between Independent Variables and Dependent Variable MW in ICFR, the impact of the relationship, based on our study, is not significant. As discussed further in the limitations section, this may be due to the small sample size used for our study.

The correlation relationship between ROA and ERM and the relationship between ROA

and EQUITY are significantly positive. This tells us that firms with high profitability (ROA) are more likely to have ERM and have a higher Shareholder's Equity value. This is an important finding to consider while interpreting the results of the coefficients chart.

Coefficients Analysis

Table 5: Coefficients Chart

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.728	.180		4.040	.000					
	ERM	-.064	.117	-.062	-.544	.588	-.072	-.060	-.060	.927	1.079
	GROWTH	.068	.095	.079	.715	.477	.057	.079	.078	.983	1.018
	ROA	.074	.389	.024	.189	.850	-.055	.021	.021	.769	1.300
	EQUITY	-.082	.064	-.155	-1.271	.207	-.143	-.140	-.139	.804	1.244

According to the table 5, the model is calculated as:

MW=0.728- 0.064 ERM+ 0.068 GROWTH+ 0.074 ROA- 0.082 EQUITY

The coefficients indicate which of the independent variables has a greater effect on the dependent variable in a regression analysis. Table 5 shows that the relationship between the dependent variable Material Weakness (MW) and the control variable GROWTH (0.068) is positive, which is consistent with previous ERM literature. This result indicates that higher Sales Growth within a firm could signal that it has or will have an MW in ICFR for the reasons described in our Research Question Two section.

The relationships between the independent variable ERM (-0.064) and control variable EQUITY (-0.082), and the dependent variable MW are negative. These results support the main research question that the implementation of Enterprise Risk Management (ERM) within a firm will decrease the likelihood of MW in ICFR. This means ERM adoption can lead to an improved

Assessment of Internal Control over Financial Reporting by Management indicating stronger operational performance. In addition, it tells us that Firm Size (EQUITY) could help to predict the likelihood of MW as described in the Research Question Four section.

Lastly, Table 5 shows a positive relationship between firm profitability (ROA) and the existence of MW in ICFR. This result is inconsistent with our prediction for Research Question Three. This result also stands to create conflict with the central focus of this study. If firms that are more profitable are more likely to have MW in ICFR, but are also more likely to have ERM, then there must be other firm characteristics that can impact these variables. It is important to note that the VIFs of all variables are below five, indicating that there aren't any major concerns regarding multi-collinearity, or interaction between independent variables.

Research Questions: Data and Analysis

This section summarizes the main research questions, the methods used to answer them, and the answers based on the results of the analysis. Table 6 highlights the data sources used to collect the data relevant for each research question. We aim to provide a clear and concise answer to each research question and explain the implications in our discussion of our findings.

Table 6: Summary of Research Questions

Research Questions	Data Source	Statistical Analysis to Answer the Research Questions
The effect of ERM on MW	Audit Analytics	Linear Regression Analysis
The relationship between Growth and MW	Compustat	Linear Regression Analysis
The relationship between Profitability and MW	Compustat	Linear Regression Analysis
The relationship between Firm Size and MW	Compustat	Linear Regression Analysis

- Research Question 1: The adoption of ERM as non-significant variable: The adoption of ERM can reduce Material Weakness in ICFR, but the impact is not significant.
- Research Question 2: Growth as non-significant variable: High growth companies are more likely to have a Material Weakness in ICFR, but the relationship is not significant.
- Research Question 3: Profitability as non-significant variable: High profitability companies are more likely to have a Material Weakness in ICFR, but the relationship is not significant.
- Research Question 4: Firm size as non-significant variable: Large firms are less likely to have a Material Weakness in ICFR, but the relationship is not significant.

Discussion of Findings

The variables necessary to perform this study were selected based on the research questions to be answered. The data for each variable were collected using methods consistent with ERM and MW literature. The method used to test the sample data to answer the research questions were selected in order to produce the quantitative form of evidence desired. The results of this study are discussed in the following sections by variable as they relate to the existence of Material Weaknesses in Internal Control over Financial Reporting.

Independent Variable – Enterprise Risk Management

The results of this study indicate that ERM does have an effect on the existence of MW in ICFR. The coefficients chart tells us that this effect is slightly negative. This means that firms with ERM are less likely to report a Material Weakness in Internal Control over Financial Reporting. However, because the coefficient result (-.064) is low, this study cannot declare that

ERM is a significant factor in reducing the existence of MW in ICFR. Therefore, there could be other factors that impact Material Weakness in ICFR.

Control Variables – Firm Growth, Firm Profitability, & Firm Size

The results of this study indicate that firms with higher, or accelerated, Sales Growth are more likely to report a Material Weakness in ICFR. This finding is consistent with prior literature (e.g. Kinney & McDaniel, 1989; Stice, 1991). However, the coefficients chart tells us that the impact of Firm Growth on MW in ICFR is only slightly positive which means it is not a strongly significant factor. Similarly, this study finds that the relationship between Firm Profitability and the existence of Material Weakness in ICFR is fairly positive. This indicates that more profitable firms are at higher risk or likelihood of reporting an MW in ICFR. Therefore, there may be other factors or characteristics of highly profitable firms that contribute to this result, which are not included for analysis in this study. Lastly, this study finds that the relationship between Firm Size and the existence of MW in ICFR is fairly negative. In other words, larger firms are less likely to report a Material Weakness in ICFR. The impact of this result is also limited based on the moderate value (-.082) from the coefficients chart.

Summary

This study has effectively answered each of the four research questions proposed: what is the effect of ERM on MW in ICFR? what is the relationship, if any, between Firm Growth and MW in ICFR? what is the relationship, if any, between Firm Profitability and MW in ICFR? what is the relationship, if any, between Firm Size and MW in ICFR? This study has specifically provided quantitative evidence to support the notion that adopting an Enterprise Risk Management program can be a factor in reducing the existence of Material Weakness in Internal

Control over Financial Reporting. The importance of this discovery is two-fold. One, it provides evidence of a possible solution for firms seeking remediation of MW in ICFR. Two, it provides an added layer of research on the importance and credibility of Enterprise Risk Management. There are certain factors, discussed in the following chapter, that limit the significance of our findings.

CHAPTER V: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of Study

This study was designed to address a gap in the empirical research regarding the effect of ERM on Material Weakness in Internal Control over Financial Reporting as assessed by Management. First, we identified the variables that were most appropriate to answer the corresponding research questions. Then, using methods consistent with prior literature we selected data for the dependent variable – Material Weakness, and for the independent variable – ERM, arriving at a total sample of 86 firms (43 test and 43 control). The study was performed based on data from one year, 2011, in an effort to achieve the most qualified sample of firms that may have ERM data available for testing. Through linear regression analysis we tested the sample to generate statistical results. We found quantitative evidence that ERM can aid in reducing the existence of an MW in ICFR. We also found that certain control variables (e.g. Firm Size, Firm Growth) can have an effect on the likelihood of MW in ICFR as well. Unfortunately, the statistical significance of the results is low, indicating that there are certain limitations to the study.

Limitations

The purpose of this section is to describe the main aspects of this study that limit the significance of our findings. The first limitation is that the statistical significance of the ERM variable on the existence of MW in ICFR is quite low, most likely due to the small sample size of 86 firms used for the study (43 test and 43 control group). The reason for the small sample size in this study is that we focused our efforts on data collected from one year, 2011, in an effort to achieve the most qualified sample of firms that may have ERM data available (see next limitation). Had we compiled a larger sample size by including other industries or a longer time period, it may have resulted in a more significant analysis.

The second limitation to this study is really the inherent limitation of most ERM literature to this point: the fact that there is insufficient ERM data available. It is difficult to definitively determine the true existence of ERM within a firm, and it is even more difficult to know the extent or maturity of ERM implementation. However, the methodology in this study is consistent with ERM literature to this point. We felt it would be more productive to have one year of reliable ERM data (2011) than several years of potentially inconsistent ERM data (before SEC requirements). On the basis of the SEC requirements for disclosing risk data in early 2010, our method of data collection by searching SEC filings for "ERM evidence" resulted in identifying 62% of firms in our sample as having ERM. This method proved to be mildly effective; however, it does not provide depth regarding the maturity or stage of implementation of ERM, further limiting the study.

A third limitation to this study is that it focuses on firms in the U.S. in two particular industries, financial and utility. This was done in an effort to target firms that are most likely to have adopted ERM based on their harsh regulatory environment (e.g. SOX 302/404, Dodd-

Frank, Basel I, II, and III). However, it is likely that there are a number of firms in other industries not included in this study that also reported a Material Weakness in ICFR or have adopted an ERM program, or both.

The last limitation is that there could simply be other firm characteristics affecting the existence of a Material Weakness in Internal Control over Financial Reporting that are not included in this study. For example, we did not consider the size or reputation of the CPA firms that Audit these U.S. Public Companies. We also did not consider the impact of the presence of an Internal Auditor in these sample firms. These limitations present challenges that allow for further investigation into the true effect of ERM on all aspects of firm performance and what firm characteristics impact MW in ICFR.

Findings and Conclusion

This study provides quantitative evidence regarding the effect of ERM on Material Weaknesses in ICFR. The results indicate that ERM is negatively associated with the existence of MW in ICFR, meaning that those firms with ERM are less likely to have an MW in ICFR. This result begins to fill a gap in the empirical research on this topic. In practice, these results also contribute to the importance of ERM implementation for those considering the cost/benefit of such programs. Prior literature suggests that the existence of MW in ICFR could lead to consequences such as increased Audit Fees or possibly even Auditor Resignation (Hammersley, Myers, & Zhou, 2012). Therefore, we believe that evidence of a firm characteristic that can aid in the reduction of MW in ICFR can help Management avoid these consequences, manage their risk of material misstatements, and improve efficiency.

Closing Remarks

There is an abundance of ERM literature supporting the belief that Enterprise Risk Management has a positive effect on firm value (e.g. Hoyt & Leibenberg, 2011). The results of this study show that ERM is negatively associated with the existence of Material Weakness in ICFR. We believe our results are promising for further investigation into this area. We acknowledge that our findings are limited for the reasons outlined herein.

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APPENDIX I

Sarbanes Oxley Act: 302

SEC. 302. CORPORATE RESPONSIBILITY FOR FINANCIAL REPORTS

(a) REGULATIONS REQUIRED. — The Commission shall, by rule, require, for each company filing periodic reports under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m, 78o(d)), that the principal executive officer or officers and the principal financial officer of officers, or persons performing similar functions, certify in each annual or quarterly report filed or submitted under either such section of such Act that

(1) the signing officer has reviewed the report;

(2) based on the officer's knowledge, the report does not contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements made, in light of the circumstances under which such statements were made, not misleading;

(3) based on such officer's knowledge, the financial statements, and other financial information included in the report, fairly present in all material respects the financial condition and results of operations of the issuer as of, and for, the periods presented in the report;

(4) the signing officers:

(A) are responsible for establishing and maintaining internal controls;

(B) have designed such internal controls to ensure that material information relating to the issuer and its consolidated subsidiaries is made known to such officers by others within those entities, particularly during the period in which the periodic reports are being prepared;

(C) have evaluated the effectiveness of the issuer's internal controls as of a date within 90 days prior to the report; and

(D) have presented in the report their conclusions about the effectiveness of their internal controls based on their evaluation as of that date;

(5) the signing officers have disclosed to the issuer's auditors and the audit committee of the board of directors (or persons fulfilling the equivalent function) —

(A) all significant deficiencies in the design or operation of internal controls which could adversely affect the issuer's ability to record, process, summarize, and report financial data and have identified for the issuer's auditors any material weaknesses in internal controls; and (B) any fraud, whether or not material, that involves management or other employees who have a significant role in the issuer's internal controls; and

(6) the signing officers have indicated in the report whether or not there were significant changes in internal controls or in other factors that could significantly affect internal controls subsequent to the date of their evaluation, including any corrective actions with regard to significant deficiencies and material weaknesses.

APPDENDIX II

Sarbanes Oxley Act: 404

SEC. 404. MANAGEMENT ASSESSMENT OF INTERNAL CONTROLS
(a) RULES REQUIRED. — The Commission shall prescribe rules requiring each annual report required by section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m or 78o(d)) to contain an internal control report, which shall — (1) state the responsibility of management for establishing and maintaining an adequate internal control structure and procedures for financial reporting; and (2) contain an assessment, as of the end of the most recent fiscal year of the issuer, of the effectiveness of the internal control structure and procedures of the issuer for financial reporting. (b) INTERNAL CONTROL EVALUATION AND REPORTING. — With respect to the internal control assessment required by subsection (a), each registered public accounting firm that prepares or issues the audit report for the issuer shall attest to, and report on, the assessment made by the management of the issuer. An attestation made under this subsection shall be made in accordance with standards for attestation engagements issued or adopted by the Board. Any such attestation shall not be the subject of a separate engagement.