Characteristics of Firms with Material Weaknesses in Internal Control: An Empirical Analysis

Srinivasan Ragothaman
The University of South Dakota

Erin Cornelsen
The University of South Dakota

The two million fake accounts opened by Wells Fargo employees have underscored the importance of internal controls in recent times. We examine a sample of 395 MWIC firms matched with a sample 395 control firms in the same industry. The univariate test results indicate that the MWIC firms have significantly lower gross margins and are smaller when compared to control firms. The logistic regression results indicate that the total assets turnover ratio, current ratio, audit opinion and the size measure are significantly different between the two groups. Tobin's Q and capital intensity measures are marginally different between the two groups.

INTRODUCTION

Internal controls failed spectacularly at Wells Fargo when they did not prevent bank employees from opening two million dummy accounts (Rapoport, 2016). Wells Fargo had to pay $185 million in fines to the Consumer Financial Protection Bureau and had fired 5,300 employees who participated in this scam (Rapoport, 2016). Internal controls have served a role within corporate governance for both companies and auditors for quite some time *(COSO, 2013; AICPA 1988, 1995, 2001)*. Then Congress mandated the ICOFR reporting requirement because of the belief and expectation that information about ICOFR is relevant and important to investors as an early warning signal in judging the likelihood that the company's reporting system will provide reliable financial information (Sarbanes-Oxley, 2002, PCAOB, 2004). SOX's intent was to combat fraud, restore investor confidence, and to improve the reliability of the financial reporting. For SOX to successfully alleviate investor skepticism regarding the reliability of financial statements the reports released should contain meaningful information and in this spirit, the public must have confidence that all material weaknesses that exist as of the company's year-end will be publicly reported (PCAOB, 2004).

Wagner and Dittmar (2006) discuss that many companies were startled by the weaknesses and gaps that compliance reviews and assessments had exposed and go on to note that most controls adopted pursuant to SOX concerned themselves with the timeliness, integrity, and accuracy of financial data. As such the study of underlying internal control weaknesses and significant deficiencies, the capturing of relevant patterns in company data, and the implications on the reporting of such weaknesses are all important for various financial statement users to identify the triggers of the significant deficiencies and material weaknesses. This study attempts to find patterns in financial characteristics of companies that reported Material Weaknesses in Internal Control (MWIC) and contrast them with control firms. We find

interesting new results that indicate that MWIC firms have higher Tobin's Q, better governance proxy (audit opinion) and higher total assets turnover ratios when compared to control firms in the same industry.

From the external auditor's point of view, it is important to note as Bedard and Graham (2011) discuss, the definitions of "significance" and "materiality" are ambiguous which makes the judgement of materiality difficult and this could especially be the case with companies that have previously disclosed material weaknesses. Auditing Standard No. 5 requires the auditor to evaluate the severity of identified control deficiencies to determine whether they are significant deficiencies or material weaknesses. Furthermore, all deficiencies in internal control over financial reporting (i.e., those deficiencies in internal control over financial reporting that are of a lesser magnitude than material weaknesses) should be communicated by the auditor to management in writing as well as communicate the information to the audit committee (PCAOB, 2007). In the second section we discuss prior research followed by a brief enumeration of the variables used in this study. In the next section, data used in this study and the multivariate logistic regression model are discussed. In the next section, statistical results are described followed by a brief conclusion.

PRIOR RESEARCH

Although firms were required to maintain an adequate system of internal control before the enactment of Sarbanes-Oxley, they were only required to publicly disclose deficiencies if there was a change in auditor (SEC, 1988). The roles and importance of internal controls have grown immensely especially within public companies and for auditors because of the Sarbanes Oxley Act (SOX) which was swiftly enacted in 2002 by Congress in reaction to various accounting scandals, most notably Enron and WorldCom. Section 302 of the Sarbanes-Oxley Act (SOX, 2002) requires corporate officer's certification of the financial statements and the effectiveness of internal control over financial reporting (ICOFR) as well as the disclosure of any material changes in ICOFR. If management identifies a material weakness in their controls, they are precluded from reporting that the controls are effective and must disclose the identified material weakness (SEC 2002, 2004). Section 404(b) of the Sarbanes-Oxley Act (SOX, 2002) expands the role of auditors by requiring them to evaluate and report their public clients' ICOFR.

The PCAOB issued auditing standard No. 2 (PCAOB 2004) and subsequently superseded it with auditing standard No. 5 (PCAOB, 2007) to implement Section 404(b). The ICOFR describes the likelihood (i.e. the reporting threshold) that a material misstatement of the annual or interim financial statements will not be prevented or detected as well as the nature of the control deficiency (PCAOB, 2007). PCAOB auditing standard No. 5 requires auditors to issue an adverse report when the client's ICOFR has a material weakness as of the balance sheet date and also defines a material weakness by reference to the likelihood and magnitude of potential misstatements that would not be prevented or detected in the annual or interim financial statements as a result of the internal control deficiency (PCAOB 2004, PCAOB 2007).

Prior research of the reporting of company's material weaknesses in internal controls and the prevalence of company's reporting on their ICOFR has noted that smaller firms (size), poorly performing firms (profitability) and firms in financial distress are more likely to make an internal control deficiency disclosure (Ashbaugh-Skaife, Collins, and Kinney, 2007). Ashbaugh-Skaife, et al (2007) further note that material weakness firms have a higher incidence of losses and restatements and face greater distress risk. They go on to note that managers of firms with weak internal controls may be more able to override the internal controls and prepare accrual estimates that facilitate meeting their financial reporting objectives as opposed to preparing accrual estimates that reflect the underlying economic condition of the company. In both situations the quality of earnings, which is a function of the accruals, is diminished when the company has weak internal controls. Doyle, Ge, and McVay (2007a) found that the most informative material weakness disclosures (those that are associated with real economic events such as lower accrual quality) are those that relate to more serious company-wide problems with the internal control disclosure controls (302) and assessment control (404) sections of SOX and that company-wide disclosures made

under Section 302 seem to be more strongly related to lower accruals quality than the company-wide disclosures under Section 404. In another study which focused on material weakness disclosures, Doyle, et al (2007b) found that firms with entity-wide control problems are smaller, younger, and weaker financially. The size component was reiterated in the study by Felo et al (2003) where they also found that firm size is positively related to financial reporting quality, suggesting that analysts perceive disclosures made by larger firms to be of higher quality.

Fen et al. (2015) investigated whether ineffective internal control over financial reporting has implications for firm operations by examining the association between inventory-related material weaknesses in internal control over financial reporting and firms' inventory management. In this study, Fen et al. (2015) found that firms that correct their inventory-related material weaknesses on internal controls report significant increases in sales, gross profit, and operating cash flows after remediation. Additionally, Fen et al. (2015) found that the remediation of material weaknesses in internal control is associated with higher future returns on assets.

While the company characteristics for those entities that report material weaknesses and significant deficiencies are vital, it is important to keep in mind the reporting of material weaknesses is intended to provide an advanced warning to market participants. The adverse ICOFR report raises questions about the company's financial reporting system and is separate from a standard unqualified report on the financial statements which assures users that the financial statements are free from material misstatements. However, as Asare and Wright (2011) note, when an adverse ICOFR is issued along with the standard unqualified report it could undermine users' confidence in the latter report. This highlights the concern there may be various incentives as to whether an existing material weakness is reported. According to Plumlee and Yohn (2010), the number of firms restating financial statement to correct material errors has outpaced the number of firms reporting material weaknesses in ICOFR. Rice and Weber (2012) utilized a sample of restating firms whose original misstatements were linked to underlying control weaknesses and found that only a minority of firms acknowledge their existing control weaknesses during their misstatement periods, and that proportion has declined over time. In terms of financial reporting quality and material weakness disclosures, Myllymaki (2013) found that the likelihood of misstatements in financial information continues to be significantly higher for two years after the last material weakness disclosure compared to companies without material weakness disclosures and imply that the reason for the misstatement incidences is the unacknowledged pervasiveness of control problems.

The previous research findings emphasize the importance of understanding the conditions and triggers for the disclosure (non-disclosure) of existing control weaknesses. Despite the audit requirement of SOX 404, evidence from Rice and Weber (2012) indicates that the majority of restating firms provided no advance warning of the control problems that lead to their misstatements. All of the research findings noted above highlight the importance of discovering and disclosing material weaknesses in internal control over financial reporting for future financial reporting quality and are economically significant for the effects on firm operations.

In this study, we look at relevant patterns in the financial data structures to determine the impact of internal control mandates by SOX on U.S. Companies and hence to develop a prediction model that will forecast firms with internal control weaknesses. Many similar company characteristics, such as size, capital intensity, liquidity, and financial performance have an impact on material weaknesses, material weakness remediation, as well as financial reporting quality. In this study, we use variables that are significant in material weakness in internal control research to distinguish variations within the company characteristics.

VARIABLES USED

Gross margin is one of several of the variables used in this study to measure profitability. We anticipate the return on assets and gross margin will be lower for firms reporting material weaknesses in internal control and those firms that remediate their internal control weaknesses or do not report material weaknesses in their ICOFR will be higher over the course of several years. Fen et.al (2015) in studying

the connections of inventory-related material weaknesses in internal control established a relationship between the return on assets, gross margin, and the material weaknesses in internal control. In another study, Cheng et al (2013), studied the financial impact of material weaknesses in internal control and investment efficiency both before and after a given firm's initial disclosure of its internal control weakness, as required by the Sarbanes Oxley Act of 2002.

Cheng et al. (2013) examine the efficiency of firm investments, such as property, plant, and equipment and research and development, in the presence of ineffective internal controls in financial reporting, and their findings note managers of firms with ineffective internal controls in financial reporting make poorer investments.

Total asset turnover is another variable utilized in this study. In firms that report material weaknesses in internal control, we anticipate higher total asset turnover ratios, if they are in a growth mode. Cheng et al. (2013) found evidence that in the year prior to the disclosure, and relative to control firms, internal control weakness firms over-invest (underinvest) when they operate in settings more prone to over-investment (under-investment). Auditor opinion (AUOP) is utilized as a measure of the corporate governance model (Li et al. 2005). It is expected that there will be more unqualified audit opinions MWIC firms based on the premise that they may be aggressive in disclosing internal control problems.

Tobin's Q is utilized in this study as a growth measure. It is a measure of the firms market value versus replacement cost computed as {Total Assets + (Market Value of Equity – Book Value of Equity)} / Total Assets. This measure is an alternative for the valuation added by the company's operations and management (see Hirschey and Connolly, 2005 and Adams, 2012).

In this study, we anticipate firm size will be negatively associated with material weakness in internal control deficiency disclosures. There is some uncertainty in firm size results as Rice and Weber (2012) found that larger firms are less likely to report existing weaknesses when control weaknesses exist as their evidence brought out the points that there are detection and disclosure incentives that play a role in whether existing material weaknesses are reported. This has implications for the effectiveness of SOX 404 in providing investors with advance warning of potential accounting problems.

Capital intensity ratio states the capital expenditure as a percentage to property, plant and equipment. The ratio is a measure of the inclination of firms to undertake capital expenditures during the year. Consistent with Cheng et al. (2013), we anticipate that firms disclosing material weaknesses in internal control will have a lower ratio of capital expenditures to property, plant and equipment and essentially poorer investments.

DATA AND METHODOLOGY

A sample of 395 MWIC firms was selected from a population of companies that had publicly disclosed Material Weaknesses in Internal Control as mandated by SOX (2002). MWIC firms were identified from Doyle, Ge and McVay (2007). Data from COMPUSTAT (Research Insight) for one year before the MWIC disclosure on several operating and financial ratios such as total asset turnover, Tobin's Q, profitability (gross margin), capital intensity, size (natural logarithm of sales), current ratio, auditor opinion (governance measure), and operating performance (return on equity) were obtained for these firms. A control sample of another 395 firms (matched by industry) that had not disclosed MWIC was randomly selected using the Yahoo Finance website. Financial ratios for the control sample were also obtained from the COMPUSTAT (Research Insight) data base. Hirschey and Connolly (2005) use Tobin's Q as a measure of firm value. Tobin's Q is viewed as a market-based approximation of firm valuation. Support for using these specific independent variables is found in earlier research described in the prior research section.

TABLE 1
DESCRIPTIVE STATISTICS

Variables	Firm Code	N	Mean	Std. Deviation	T-statistic
Current Ratio	1	395	2.62	2.26	
	0	395	2.40	2.09	1.438
Total Assets TO	1	395	1.20	0.93	
	0	395	1.06	0.77	2.215 [b]
GM	1	395	-0.22	9.63	
	0	395	0.32	1.13	-1.117
Tobin's Q	1	395	2.29	3.78	
	0	395	1.96	0.97	1.665 [c]
CapInt	1	395	0.13	0.11	
	0	395	0.10	0.07	3.742 [a]
LNsales	1	395	5.60	1.92	
	0	395	7.70	2.02	-15.016 [a]
Audit Opinion	1	395	2.53	1.50	
	0	395	2.70	1.49	-1.571

Firm code: 1 = MWIC firm; 0 = control firm
[a] two-tailed significance at < 0.01 level
[b] two-tailed significance at < 0.05 level
[c] two-tailed significance at < 0.10 level

CR   = Current ratio
TATO   = Total Asset Turnover
GM   = Gross Margin ratio
Tobin's Q = [TA + Market Value of EQ – Book Value of EQ] / TA
CapInt   = Capital Intensity (Capital expenditure/PPE)
LNsales   = Natural logarithm of Sales
AUOP   = Auditor opinion

A summary of descriptive statistics is provided in Table 1. For both MWIC firms and control firms, this table reports the mean, the standard deviation, and T-statistics for variables used in this study separately. Mean values for total asset turnover ratio, Tobin's Q, capital intensity ratio, and current ratio are higher for the MWIC firms when compared to control firms. However, the control firms have higher mean gross margins and size measures than MWIC firms. In addition, a higher number of clean audit opinions were issued for MWIC firms. The univariate test (t-test for mean differences) indicates that the MWIC firms have lower returns on equity, have lower gross margins and are significantly smaller, when compared to a set of control firms matched by industry. The t-test results also indicate that the mean total asset turnover ratio, capital intensity ratio, and current ratio are significantly higher for the MWIC firms when compared to the control firms.

A summary of Pearson correlation coefficients for the explanatory variables is provided in Table 2. There are not many strong correlations among the independent variables. Total asset turnover ratio is positively correlated with size (logarithm of sales). Tobin's Q is positively correlated with capital intensity and negatively correlated with size. There is a strong negative relationship between current ratio and firm size. Current ratio is negatively correlated with total asset turnover ratio and audit opinion and positively correlated with current ratio. Capital intensity is negatively correlated with firm size and gross margin. Gross margin is positively correlated to firm size.

TABLE 2
PEARSON CORRELATION COEFFICIENTS

	CR	TATO	GM	Tobin's Q	CapInt	LNsales	AUOP
CR	1.000						
TATO	-.205	1.000					
GM	-.044	.052	1.000				
Tobin's Q	.093	-.003	-.152	1.000			
CapInt	.148	.111	-.186	.247	1.000		
LNsales	-.366	.209	.189	-.217	-.183	1.000	
AUOP	-.169	-.012	-.033	-.055	-.106	.236	1.000

Even though some of these relationships among independent variables are significant at conventional levels, none of the correlations are greater than 0.247 except one. There is one large correlation at -0.366 among 21 correlations among independent variables. According to Judge, Griffiths, Hill and Lee (1985), multicollinearity problems arise only when the correlations among explanatory variables are higher than 0.8. Hence, the degree of collinearity present among independent variables appears to be too small to invalidate estimation results. Of the seven variance inflation factor (VIF) values, 1.327 is the highest VIF. This indicates that there is no multicollinearity problem.

MULTIVARIATE TESTS – LOGISTIC REGRESSION (LOGIT) RESULTS

Using the independent variables in a multivariate context, however, allows one to examine their relative explanatory power. Multivariate models can yield better predictions since the information contained in the cross-correlations among variables is utilized. A primary objective of many multivariate statistical techniques is to classify entries correctly into mutually exclusive groups. Multiple discriminant analysis and logistic regression (Logit) are examples of such multivariate models.

In this study, the following logistic regression (Logit) model is proposed:

$$Pr (Y=1|X) = F (\beta_0 + \beta_1 x_1 + \beta_2 x_2 +.....+ \beta_K x_k)$$

The dependent variable Y is a dichotomous (0, 1) variable representing the two groups, MWIC firms (Y=1) and control firms in the same industry (Y=0). The independent variables X_1, X_2, ... X_K include current ratio, total assets turnover ratio, gross margin, Tobin's Q, capital intensity, size, and audit opinion that were described in the previous section. Specifically these explanatory variables are:

    CR   = Current ratio
    TATO   = Total Asset Turnover
    GM   = Gross Margin ratio
    Tobin's Q = [TA + Market Value of EQ – Book Value of EQ] / TA
    CapInt   = Capital Intensity (Capital expenditure/PPE)
    LNsales   = Natural logarithm of Sales
    AUOP   = Auditor opinion

It is assumed that no exact linear dependencies exist among X's across k, and that the relationship between Y's and X's are non-linear or logistic (i.e., $P(Y =1|X) = exp(\Sigma\beta_K X_K) / [1 + exp(\Sigma\beta_K X_K)]$). The null hypotheses would be: $H_0 : \beta_k = 0$, where k = 1,...7;

LOGIT results appear in Table 3. Model I has seven explanatory variables and the expanded model II has two additional variables as a robustness check. The logistic regression model I had a decent Nagelkerke R square of 0.367. This statistic is referred to as a "pseudo-R" statistic and gives some information about the goodness of fit for the model. Of the seven explanatory variables, four were statistically significant at conventional levels and they are discussed here.

TABLE 3
LOGIT ANALYSIS RESULTS TO TEST FOR DIFFERENCES IN FINANCIAL CHARACTERISTICS OF MWIC FIRMS VS CONTROL FIRMS

$$P(Y=1|X) = \beta_0 + \beta_1 CR_i + \beta_2 TATO_i + \beta_3 GM_i + \beta_4 TobinsQ_i + \beta_5 CapInt_i + \beta_6 LNsales Q_i + \beta_7 AUOP_i \quad (1)$$

VARIABLE	MODEL I COEFFICIENT (CHI-SQUARE)	MODEL II COEFFICIENT (CHI-SQUARE)
INTER	4.022 (79.111)[a]	4.076 (75.689)[a]
CR	-0.148 (12.888)[a]	-0.148 (12.452)[a]
TATO	0.559 (23.510)[a]	0.553 (22.282)[a]
GM	0.021 (0.834)	0.021 (0.943)
Tobin's Q	-0.058 (2.863)[c]	-0.060 (3.669)[c]
CapInt	1.745 (2.727)[c]	1.787 (2.774)[c]
LNsales	-0.705 (155.52)[a]	-0.713 (147.85)[a]
AUOP	0.127 (4.635)[b]	0.125 (4.321)[b]
ROE	---------	0.000 (1.052)
P/E ratio	----------	0.000 (0.262)

[a] two-tailed significance at < 0.01 level
[b] two-tailed significance at < 0.05 level
[c] two-tailed significance at < 0.10 level

NAGELKERKE R SQUARE = 0.367; 0.366
MODEL LOG LIKELIHOOD = 840.67; 806.35
PERCENT CORRECTLY CLASSIFIED = 74.3; 74.9

CR   = Current ratio
TATO   = Total Asset Turnover
GM   = Gross Margin ratio
Tobin's Q = [TA + Market Value of EQ – Book Value of EQ] / TA
CapInt   = Capital Intensity (Capital expenditure/PPE)
LNsales   = Natural logarithm of Sales
AUOP   = Auditor opinion
H_1 (null) suggests there is no statistically significant difference in current ratios (CR) between MWIC

firms and the control firms. The coefficient estimate for CR is -0.148 and is statistically significant at the 0.01 level. Current ratios were significantly different between the MWIC firms and the control firms. H_2 (null) suggests there is no statistically significant difference in total asset turnover ratios (TATO) between MWIC firms and the control firms. The coefficient estimate for TATO is 0.559 and is statistically significant at the 0.01 level. TATO ratios, on average, were larger for the MWIC firms than the control firms. This indicates that MWIC firms were more adept in generating sales from their total assets than control firms. MWIC firms were in a growth mode and this growth trajectory can explain this result.

H_6 (null) suggests that there is no statistically significant difference in size as measured by logarithm of sales between MWIC firms and the control firms. The coefficient estimate for LNsales is -0.705 and is statistically significant at the 0.01 level. This suggests that the logarithm of sales is different between the two groups. MWIC firms were, on average, smaller (as measured by LNsales) than control firms, even though they were in the same industry as MWIC firms. Smaller firms have less sophisticated accounting departments and are perhaps more prone to gaps and weaknesses in internal control. Null hypothesis 7 (H_7) suggests that there is no statistically significant difference in audit opinions between MWIC firms and the control firms. The coefficient estimate for this variable is 0.127 and is statistically significant at the five percent level. This suggests that the audit opinion is different between the MWIC firms and the control firms. This could also imply that MWIC firms are better governed and they report internal control weaknesses promptly. Tobin's Q and capital intensity ratios were only weakly significant at the ten percent level. The Logit results suggests that Tobin's Q and capital intensity were different between MWIC firms and control firms only at the ten percent level. Still it is interesting to note that MWIC firms had higher Tobin's Q ratios than control firms. Tobin's Q ratios have been used a proxies for growth (Hirschey and Connolly, 2005) in prior research and this fits the concern of COSO that growing firms may have inadequate internal controls.

Logit model II is a robustness test and has two additional independent variables suggested by prior research: Return on equity (a profitability measure) and Price/Earnings ratio (a valuation and growth measure). Logit model II results are reported in Table 3, column 2. The model I results are confirmed and the same variables as in Logit model I are statistically significant. The two new explanatory variables are statistically insignificant.

CONCLUSION

Internal controls failed spectacularly at Wells Fargo when they did not prevent bank employees from opening two million dummy accounts (Rapoport, 2016). This paper examines a sample of 395 MWIC firms that was selected from a population of companies that had publicly disclosed Material Weaknesses in Internal Control as mandated by SOX (2002). MWIC firms were identified from Doyle, Ge, and McVay (2007a). Data from COMPUSTAT (Research Insight) for one year before the MWIC disclosure on several operating and financial ratios such as total asset turnover, Tobin's Q, profitability (gross margin), capital intensity, size (natural logarithm of sales), current ratio, auditor opinion (governance measure), and operating performance (return on equity) were obtained for these firms. A control sample of another 395 firms (matched by industry) that had not disclosed MWIC was randomly selected using the Yahoo Finance website.

An objective of this paper is to analyze the financial characteristics of companies that reported Material Weaknesses in Internal Control (MWIC firms). The univariate test (t-test for mean differences) results indicate that the MWIC firms have significantly lower gross margins and are smaller when compared to a set of control firms matched by industry. Fen et.al (2015) reported a significant relationship between gross margins and the material weaknesses in internal controls related to inventory. This paper extends that result by finding a negative relationship between gross margins and MWIC of all types. The t-test results also indicate that the mean total asset turnover ratio and Tobin's Q ratio are higher for MWIC firms when compared to the control firms. This is a new result and an important contribution of this paper. MWIC firms appear to be in the growth mode as indicated by higher Tobin's Q ratios for them. Total asset turnover ratios are higher for MWIC firms contrary to our expectations. When combined with the results for the audit opinion variable which indicates good corporate governance for

MWIC firms, this result may not be surprising. Better governed firms are aggressive in reporting internal control weaknesses and also good at managing their assets.

The logistic regression (a multivariate test) results indicate that the total assets turnover ratios, current ratios and size measures are significantly different between the MWIC firms and control firms and confirm univariate test results. Tobin's Q, audit opinion, and capital intensity measures are marginally different between the two groups in the multivariate test results. Since the sample of MWIC firms examined in this study is only 395, caution is warranted in generalizing the results. Control firms could have MWIC but might have failed to disclose them. Accounting regulators, external auditors, investors, and financial analysts could find the results of this study useful.

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