



# The impact of Sarbanes-Oxley on internal control remediation

The impact of Sarbanes-Oxley

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## Abstract

**Purpose** – The purpose of this paper is to examine the determinants of internal control weakness remediation revealed under Sarbanes-Oxley (SOX) section 404 reporting requirements.

**Design/methodology/approach** – Data on firms that reported internal control weaknesses for fiscal year 2004 are collected, and determined whether these weaknesses still existed in their 2005 filings. Logistic regression is used to examine the impact of corporate governance, resource, impediments (e.g. severity of weakness), and Big 4 auditor status on remediation completion.

**Findings** – Resources (e.g. size, ROA) were positively associated with remediation. Use of Big 4 auditor, more audit committee meetings, more business segments, and filing lag were negatively associated with remediation, as were number and type of internal control weaknesses.

**Research limitations/implications** – First, the paper sheds light on the individual firm factors that influence corporate response to the legal and social (e.g. public pressure) environment facing firms. Understanding this should better enable policy makers and regulators to foresee where potential lags in firm implementation of regulations may occur, and why. Second, it believes that the paper also sheds light on the relative value of different corporate governance structures in meeting investor concerns for proper stewardship of their investments. Finally, this paper provides information of use to other corporate governance researchers in that the results suggest the overwhelming importance of the legal and social environment in influencing corporate behavior. However, this paper does not address the contribution of national culture, financial and audit-related reporting requirements, and differences in firm resources, to corporate behavior.

**Originality/value** – The paper deepens the field's understanding of the determinants of internal control weakness remediation, furthering regulators' understanding of SOX's impact.

**Keywords** Corporate governance, Internal control, Financial reporting

**Paper type** Research paper

## 1. Introduction

In reaction to the many flaws that the Enron/Anderson scandal revealed in the workings of corporate governance and auditing in the USA, the US government passed the Sarbanes-Oxley (SOX) Act of 2002. The then head of PricewaterhouseCoopers, Dennis Nally, called SOX “the most significant change to the securities laws since they were put into effect in the mid-1930’s” (Nocera, 2005). As Nocera notes, SOX has had many critics, including those who state that it would not have prevented the very frauds that largely gave it life, i.e. those of Enron and Worldcom. Further, the change came at very high cost. It has been claimed that the change raised the cost of being a



public company by 233 percent (Nocera, 2005; Gupta and Nayar, 2007). Of the many sections of SOX, section 404 came under the most criticism because it mandates that firms assess their internal control systems, and that the auditors also now provide an opinion on those systems, annually. Given the importance of SOX in the post-Enron/Worldcomm corporate legal landscape, and given SOX's requirements for improved corporate governance, the impact of SOX's provisions for internal control review and remediation on the actual practice of corporations is an important research question.

This study explores the impact of the changed regulatory environment and firm characteristics on remediation of internal control weaknesses. Specifically, we examine whether or not:

- the mere passage of the SOX itself leads corporations to remediate their internal control weaknesses; or
- there are firm characteristics that affect the successful remediation of the internal control weaknesses.

Changes in corporate legal environments would impact corporate behavior. As Venard and Hanafi (2008, p. 482) note: "Various institutions shape organizations including social, cultural, economic, and political institutions (Scott, 1995)." Venard and Hanafi also note that legal structures and law enforcement are important parts of the environment, helping to determine the level of pressure that firms feel and react to in making a decision to comply with legal environmental pressures. Given that SOX has passed, it implies that all internal control issues would have been resolved upon the firms' realizations that they existed. Certainly the mandate for change is there. To the extent that firms realize that their behavior is observable, certainly true after the implementation of SOX, they have strong incentives to repair perceived defects in their internal control systems, irrespective of the level of financial expertise on their audit committees, etc.[1].

To achieve our objective, we examine a sample of accelerated filers subject to the internal control reporting provisions of section 404[2]. Thus, all firms that meet the definition of an accelerated filer face the same legal environment. The impact of the legal environment may differ among different firms in the sample if the organs through which the firms understand that environment differ. These differences may include the quality of their audit committees or the sophistication of their auditing firms. Even if the legal environment is understood correctly, the behavioral implications of that understanding may differ given different resources of the firms facing the problems of implementing the SOX mandated reforms. For example, larger and more profitable firms with more resources are more likely to fix their internal control problems. Accordingly, our study examines the contribution that corporate governance structures and firm characteristics make to the decision to remediate previously disclosed internal control weaknesses. Specifically, we examine factors that are associated with whether firms reporting material internal control weaknesses in 2004 under section 404 have successfully fixed the internal control weaknesses by the time the auditor opinions on internal controls were issued in 2005.

We believe that this study makes several contributions to the literature. First, it sheds light on the individual firm factors that influence corporate response to the legal and social (e.g. public pressure) environment facing firms. Understanding this should

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better enable policy makers and regulators to foresee where potential lags in firm implementation of regulations may occur, and why. Second, we believe that our study also sheds light on the relative value of different corporate governance structures in meeting investor concerns for proper stewardship of their investments. Finally, our study provides information of use to other corporate governance researchers in that our results suggest the importance of the legal and social environment in influencing corporate behavior. The fact that not all firms have remediated their 2004 internal control weaknesses by the time these systems were examined in 2005, suggests additional research is needed as to the reason for that remediation failure.

Our findings show that out of 243 firms reported material internal control weaknesses under section 404 of SOX in 2004, only 72 percent of the firms have successfully remediated their internal control weaknesses by 2005. The other 28 percent of the firms continued to report material weaknesses in their 2005 section 404 reports. Thus, the passage of SOX by itself does not necessary ensure that internal control problems are fixed by firms. Liou and Yang (2008) show that the ability to detect fraudulent reporting in advance can improve the accuracy of business failure prediction models. Since Chan *et al.* (2008a) find that firms reporting ineffective internal controls under section 404 engage in earnings management, other researchers can incorporate that information in developing such models. We also find that firm characteristics such as firm size, return on assets, number of operating segments, filing lag in 2004, use of Big 4 auditors, number of audit committee meetings, and the number and type of internal control weaknesses are associated with the probability that the material weaknesses reported in 2004 were fixed in 2005.

The rest of this study is organized as follows. Section 2 provides a summary of the related studies and the research hypotheses. Section 3 presents the research design and Section 4 summarizes the research findings. Concluding remarks are provided in Section 5.

## 2. Related studies and research hypotheses

In conducting this study, we use many variables previously indicated as important in understanding corporate behavior with regard to internal control weaknesses revealed under section 302 and section 404 of SOX. Ashbaugh-Skaife *et al.* (2007) and Doyle *et al.* (2007) document that firms disclosing internal control deficiency under section 302 and section 404 of SOX tend to be smaller and less profitable since these firms would have less resources to be invested on their internal controls. In addition, firms reporting material weaknesses have more business segments compared to other firms. Given the additional audit work for section 404 review, Ettredge *et al.* (2006) report significant delay in firms' SEC filings for fiscal year 2004. Since company general internal control weaknesses are considered to be more serious problems than account specific weaknesses, the authors also find that the filing delay is longer for firms with company general internal control weaknesses. Li *et al.* (2008) also find that firms reported ineffective internal control under section 404 often have significant subsequent turnover in their chief financial officers. Chan *et al.* (2008b) argued, based on their summary of the literature that the following variables may be important in understanding why management and auditors fail to identify ineffective internal controls in their initial internal control review. These variables include the extent of the

control weaknesses, the size of the firm, the nature of the auditor (Big 4 or not), and the number of audit committee meetings.

We expect that the above firm characteristics are associated with the probability that firms would successfully fix their material internal control weaknesses. Larger and more profitable firms should be more likely to fix their internal control problems since these firms would have more financial resources. We sought also to understand the impact of the use of a Big 4 auditor on remediation. The literature has often regarded the use of a Big 4 auditor as a marker of the quality of the audit (Becker *et al.*, 1998). On one hand, firms with Big 4 auditors could be more likely to fix the internal control problems, given the possibility of receiving better advice from the auditors. On the other hand, Big 4 auditors could have higher thresholds before concluding that the internal control weaknesses have been remediated. We also expect firms with fewer internal control weaknesses or account specific weaknesses are more likely to have successful remediation since these firms have fewer, or less serious, internal control problems.

Further, we examine the impact of corporate governance on the probability that internal control weaknesses were fixed. Krishnan (2005) shows that audit committee independence and financial expertise are highly associated with the absence of internal control problems for sample firms that changed auditors. Anderson *et al.* (2004) document that audit committee size and meeting frequency are negatively related to firm's cost of debt. Since one of the primary duties of an audit committee is to monitor the firm's internal controls, a higher quality and more active audit committee is more likely to contribute to the remediation of internal control problems. However, it is also possible that the number of audit committee meetings could be negatively related to the remediation of internal control weaknesses since the number of audit committee meetings could be related to the severity of the internal control problems. Finally, the amount of time available to fix the ineffective internal controls in 2005 would also impact the likelihood that the internal control problems are fixed in 2005. A delay in the issuance of an audit report for 2004 would indicate less time to remediate internal control weaknesses by the time of issuance of the 2005 audit report. The following section describes our sample and the empirical models used in investigating the impact of these factors on the probability that firms would successfully remediate their ineffective internal controls.

### 3. Sample selection and empirical models

Initial sample firms with material internal control weaknesses (i.e. ICW firms) in 2004 and 2005 are identified by searching the Audit Analytics database. Duplicate firms were excluded. Firms that are subsidiaries of other parent corporations are eliminated, as are Canadian and other foreign firms. This provides a subtotal of 362 and 393 ICW firms in 2004 and 2005, respectively. We also identified and collected 3,276 firms without material internal control weaknesses (i.e. non-ICW firms) in 2005 from Audit Analytics by following the same sample attrition procedure. The 214 remediated firms are further identified by comparing the above 362 ICW firms in 2004 and 3,276 non-ICW firms in 2005. After deleting firms with missing audit committee data and financial data, the number of remediated firms is 174. Among the 174 remedied firms, 32 firms have missing business segment data from Compustat. Moreover, the 93 non-remedied firms are further identified by comparing the above 362 ICW firms in

2004 and 393 ICW firms in 2005. After excluding firms without sufficient audit committee data and financial data, the number of non-remedied firms is 69. Among 69 remedied firms, 17 firms have missing business segment data from Compustat. Table I summarizes our sampling procedures.

Further, the number of internal control weaknesses is collected from Audit Analytics. We also read the auditor's section 404 report in order to classify a firm as having general or account specific weaknesses. Ettredge *et al.* (2006) state that general weaknesses include problems such as personnel training and the general control environment. Ettredge *et al.* (2006) cite revenue recognition and accruals as examples of account specific weaknesses. If a firm has both types of internal control weaknesses, a firm is considered as having a general weakness. Table II shows the industry distribution of the final sample, while Table III provides descriptive statistics on the overall sample as well as the sub-samples of firms that have or have not remediated their internal control weaknesses.

Our main objective is to examine the factors associated with the probability of firms remedying material internal control weaknesses in their 2004 SOX 404 reports. Either all the internal control weaknesses reported in 2004 were remediated or they were not. We found that 174 firms that had reportable internal control weaknesses in 2004 had

Firms with material ICW in 2004 in Audit Analytics	474
<i>Less</i>	
Repeated firm cases	(88)
Firms that are subsidiaries of other parent corporations	(6)
Listed as Canadian or foreign firms in Audit Analytics	(18)
Subtotal	362
Firms without material ICW in 2005 in Audit Analytics <sup>a</sup>	3,489
<i>Less</i>	
Repeated firm cases due to amended ICW opinion	(7)
Firms that are subsidiaries of other parent corporations	(114)
Listed as Canadian or foreign firms in Audit Analytics	(92)
Subtotal	3,276
Firms with material ICW in 2005 in Audit Analytics <sup>a</sup>	464
<i>Less</i>	
Repeated firm cases	(49)
Firms that are subsidiaries of other parent corporations	(10)
Listed as Canadian or foreign firms in Audit Analytics	(12)
Subtotal	393
Identifying remedied firms by comparing above 362 ICW firms in 2004 and 3,276 non-ICW firms in 2005	214
<i>Less</i> : firms with insufficient audit committee data	(31)
<i>Less</i> : firms with insufficient financial data	(9)
Remedied ICW firm <sup>b</sup>	174
Identifying non-remedied firms by comparing above 362 ICW firms in 2004 and 393 ICW firms in 2005	93
<i>Less</i> : firms with insufficient audit committee data	(17)
<i>Less</i> : firms with insufficient financial data	(7)
Non-remedied ICW firm <sup>b</sup>	69

**Notes:** <sup>a</sup>17 of the 69 firms had insufficient business segment data; <sup>b</sup>32 of the 174 firms had insufficient business segment data

**Table I.**  
Sample selection  
summary

remedied the internal control weaknesses by the end of their 2005 fiscal year. We follow Audit Analytic's practice for defining the end of a fiscal year. It considers fiscal years that end up through 15 days into the new calendar year to have ended with December 31 of the immediately preceding calendar year. Under this definition, if a firm's fiscal year ended on January 15, 2006; the firm's fiscal year would be considered to have ended in 2005. We chose firms whose fiscal years fell into the time frame of November 15, 2005 through January 15, 2006; for our 2005 fiscal year sample. We used a similar procedure for choosing firms with a 2004 fiscal year end. Sixty-nine firms that had reportable internal control weaknesses in 2004 did not completely remedy these weaknesses by the end of their 2005 fiscal year. We used logistic regression analysis to examine those factors. All variables were winsorized with the cutoffs set at the 1 and 99 percent levels. We next present the variables that are to be examined. The main empirical model in this study is presented:

$$\begin{aligned} \text{Prob}(\text{REM} = 1) = & \text{CEOCHG} + \text{CFOCHG} + \text{SIZE} + \text{BIG4} + \text{ICW\_NUM} + \text{ROA} \\ & + \text{UTILITIES} + \text{FINANCIALS} + \text{AC\_SIZE} + \text{FINEXPERT} \quad (1) \\ & + \text{MEETING} + \text{FILING\_LAG}. \end{aligned}$$

Summary of variables used:

- REM – 1 if the internal control status has been changed from ineffective to effective from 2004 to 2005; and 0 otherwise.
- CEOCHG – 1 if there was a change in CEO from 2004 to 2005; 0 otherwise.
- CFOCHG – 1 if there was a change in CEO from 2004 to 2005; 0 otherwise.
- SIZE – natural log of total assets at the end of 2005 fiscal year.
- BIG4 – 1 if a firm employs a Big 4 auditor in 2005; and 0 otherwise.
- ICW\_NUM – number of material internal control weaknesses reported in 2004.
- ROA – 2005 earnings/total assets in 2004.
- UTILITIES – 1 if a firm's 2-digit SIC code is 49; and 0 otherwise.
- FINANCIAL – 1 if a firm's 1-digit SIC code is 6; and 0 otherwise.
- AC\_SIZE – number of audit committee members in 2005 as reported in the proxy filed in 2006.

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1000-1999 Natural resources	16
2000-2999 Consumer manufacturing	26
3000-3999 Industrial manufacturing	56
4000-4999 Transportation/public utilities	24
5000-5999 Merchandising	21
6000-6999 Financial services	44
7000-7999 Business/personal services	44
8000-8999 Health/legal/educational/social/other services	12
Total	243

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**Table II.**  
A sample distribution  
of RMD\_ICW firms  
by industry

	Mean	Median	Minimum	Maximum
<i>ALL (243 firms)</i>				
CEOCHG	0.136	0	0	1
CFOCHG	0.313	0	0	1
SIZE	20.212	19.985	16.506	24.873
BIG4	0.667	1.000	0	1.000
ICW_NUM	2.284	2.000	1.000	10.000
ROA	-0.011	0.013	-0.601	0.245
AC_SIZE	3.605	3.000	3.000	6.000
FINEXPERT	1.481	1.000	0	4.000
MEETING	11.255	10.000	4.000	31.000
FILING_LAG	98.082	88.000	-281.000	455.000
<i>RMD_ICW (174 firms)</i>				
CEOCHG	0.132	0	0	1
CFOCHG	0.299	0	0	1
SIZE	20.305	20.236	16.506	24.873
BIG4	0.655	1.000	0	1.000
ICW_NUM	1.902	1.000	1.000	9.000
ROA	-0.001	0.015	-0.601	0.245
AC_SIZE	3.632	3.000	3.000	6.000
FINEXPERT	1.460	1.000	0	4.000
MEETING	10.425	10.000	4.000	31.000
FILING_LAG	86.851	84.000	-281.000	213.000
<i>NON_RMD_ICW (69 firms)</i>				
CEOCHG	0.145	0	0	1
CFOCHG	0.348	0	0	1
SIZE	19.977	19.634	16.506	24.873
BIG4	0.696	1.000	0	1.000
ICW_NUM	3.246	2.000	1.000	10.000
ROA	-0.038	0.008	-0.601	0.245
AC_SIZE	3.536	3.000	3.000	5.000
FINEXPERT	1.536	1.000	0	4.000
MEETING	13.348	11.000	4.000	31.000
FILING_LAG	126.406	110.000	42.000	455.000

**Table III.**  
Descriptive statistics

- FINEXPERT – number of audit committee financial experts in 2005 as reported in the proxy filed in 2006.
- MEETING – number of audit committee meetings in 2005 as reported in the proxy filed in 2006.
- FILING\_LAG – number of calendar days from the 2004 fiscal year to the filing of SOX 404 report for fiscal year of 2004 in 2005.
- ICW\_TYPE – has the value of 1 if the firm had only account specific weaknesses. It has the value of 0 if the firm had only general control weaknesses or had both general control and account specific weaknesses.
- BUS\_SEG – the number of reportable business segments that the firm has.

Understanding the determinants of internal control weakness remediation is the heart of our study. REM serves as the marker of that remediation. It equals 0 if there has been no remediation, and 1 otherwise. We examine the impact of personnel change on the remediation effort.

Accordingly, we created variables to determine the impact of a change in the firm's CEO (CEOCHG) and a change in the firm's CFO (CFOCHG) on remediation. If there was a change in CEO from 2004 to 2005, then CEOCHG equals 1, else it equals zero. The same held true for CFOCHG. SIZE is defined as the natural log of total assets at the end of fiscal year 2005 and ROA is defined as 2005 earnings divided by total assets at the end of the 2004 fiscal year. SIZE and ROA represent the availability of resources for the remediation effort. We sought also to understand the impact of the use of a Big 4 auditor on remediation. The literature has often regarded the use of a Big 4 auditor as a marker of the quality of the audit (Becker *et al.*, 1998). If firms used a Big 4 auditor in 2005, the BIG 4 auditor was coded as 1. Otherwise, it has the value of zero. If SIZE or ROA could be considered illustrative of resources available to perform remediation, we felt it was also important to consider the challenge of remediation. To that end, we created a variable denoted as ICW\_NUM. This captured the number of material internal control weaknesses that the firm had in 2004. Both utilities and financial institutions are regulated industries. Given that these firms are subject to regulation beyond that typically experienced by firms in the United States, we created an indicator variable for each. If a firm in our sample had an SIC code of 49 for utilities, we assigned a value of 1 to the UTILITIES variable. Otherwise, UTILITIES was assigned a value of zero. We similarly constructed the FINANCIALS variable.

Our ROA and SIZE variables were constructed to capture the effect of two financial resource variables. Other resources are available to the firms. To measure these, we constructed a variable to capture the impact of audit committee size on the firms (AC\_SIZE). This was calculated as the number of members of the audit committee in 2005. Similarly, we sought to determine the impact on remediation of having a financial expert on the audit committee. The FINEXPERT variable is a simple count of the number of financial experts on the audit committee during 2005. In this regard, we also decided to investigate the impact of the number of audit committee meetings held in 2005, as reported in the proxy statement filed in 2006. To this end, we constructed a variable denoted as MEETING. Audit committee meeting frequency and audit committee size have been found to contribute to a lower cost of debt (Anderson *et al.*, 2004) and thus may be considered perceivable indicators of audit committee quality. Time to remediate from the audit opinion for 2004 to the audit opinion to 2005 is another resource. Since a delay in the issuance of an audit report for 2004 would indicate less time to remediate internal control weaknesses by the time of the 2005 audit report issuance, we included a FILING\_LAG variable. This was measured as the length of time between the filing of the 2004 report to the filing of the 2005 report.

#### 4. Empirical findings

The results of the logistic analysis for model (1) are shown in the column (1) of Table IV. It seems that use of a Big 4 auditor leaves the client firm less likely to remediate its internal control weaknesses. Greater numbers of internal control weaknesses also led to a lower probability of 2004 internal control weaknesses being remediated by 2005. The positive coefficient on ROA indicates that greater returns on assets led to a higher

Variables	Expected signs	Models			
		(1) Coefficient estimates	(2) Coefficient estimates	(3) Coefficient estimates	(4) Coefficient estimates
Intercept		3.2632	2.4703	-0.5934	-1.3143
CEOCHG	+	0.2813	0.2247	0.3881	0.3306
CFOCHG	+	0.1425	0.1983	0.2001	0.2291
SIZE	+	0.0027	0.0136	0.2051*	0.2145*
BIG4	±	-0.5380*	-0.5050	-0.5654*	-0.5436
ICW_NUM	-	-0.1436*		-0.1251	
ICW_TYPE	+		0.7489**		0.7568*
ROA	+	1.8089*	1.7509*	1.4561	1.3113
UTILITIES	±	0.7891	0.9039	0.8941	0.9851
FINANCIALS	±	0.8218*	0.8044*	-0.1092	-0.1067
AC_SIZE	+	0.1171	0.0704	0.1326	0.0711
FINEXPERT	+	-0.0861	-0.1080	-0.1784	-0.1881
MEETING	±	-0.0497**	-0.0523**	-0.0492**	-0.0513*
FILING_LAG	-	-0.0156***	-0.0173***	-0.0104*	-0.0119*
SEGMENTS	-			-0.2414**	-0.2386*
Sample size		243	243	194	194
Likelihood ratio		48.8829	49.9238	19.55	20.79

Notes: Significant at the \*10, \*\*5 and \*\*\*1 percent levels, respectively

**Table IV.**  
Analysis of differences between RMD\_ICW and NON\_RMD\_ICW firms

likelihood of internal control weakness remediation. The number of audit committee meetings (MEETING) was negatively associated with remediation. Finally, remediation of 2004 internal control weaknesses was associated with a shorter filing lag. The other variables (CEOCHG, CFOCHG, SIZE, ICW\_NUM, UTILITIES, AC\_SIZE, and FINEXPERT) were not significant.

We also perform several sensitivity analyses. In model (2) of Table IV, we asked whether the type of internal control weakness impacted the sample firms' remediation of 2004 internal control weaknesses by the end of the 2005 fiscal year. All the other variables are the same as in model (1), except that ICW\_TYPE instead of ICW\_NUM is used here. ICW\_TYPE was set to 1 if the material weaknesses were account specific weaknesses and was set to 0 otherwise. If the firm had both general control weaknesses and account specific weaknesses, the variable was coded as 0. We expected the coefficient to be positive, that is account specific weaknesses were more likely to be remediated by the end of fiscal year 2005 than were general control weaknesses (Ettredge *et al.*, 2006; Doyle *et al.*, 2007). The results for model (2) are shown in the column (2) of Table IV. Consistent with our expectations, ICW\_TYPE was positive, indicating that account specific weaknesses in 2004 were more likely to be remediated by fiscal year end 2005, than were general control weaknesses.

Given that internal control systems may vary in complexity with the complexity of the business entity, we examine whether greater business segmentation would be indicative of greater control system complexity. The latter should make it more difficult to repair internal control weaknesses. Accordingly, we added a business segmentation variable to model (1) and denoted it as model (3) in Table IV. All variables in model (3) are same as those of the previous models, except a new variable BUS\_SEG is added. The new variable, denoted BUS\_SEG, is the number of business

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segments reported in Compustat. The coefficient is expected to be negative as a company that has more segments has more complex operations. The results are shown in the column (3) of Table IV. With the new data element BUS\_SEG, our sample size dropped to 194 firms due to missing data for the BUS\_SEG variable. Fifty-two of the 194 firms failed to remediate their 2004 internal control weaknesses, while 142 firms succeeded. Again using a one-tailed test for significance, we found several variables were significant. Thus, business complexity makes it less likely that firms will remediate their internal control weaknesses. Finally, we decided to look at the conjoint effect of internal control error type and business segmentation on internal control remediation. We reran our logistic regression equations including ICW\_TYPE and BUS\_SEG, and denoted it as model (4). As with model (3), our sample size consisted of 194 firms. These results of model (4) are shown in the column (4) of Table IV. Using one-tailed tests, we found that the SIZE variable was positively and significantly related to remediation, as was ICW\_TYPE and BUS\_SEG.

### 5. Discussion and conclusion

Our study studied the determinants of internal control weakness remediation success at 243 firms in the USA. We found that changes in the occupancy of the CEO and CFO offices did not impact the probability that the firm will remediate its internal control weaknesses. The lack of such an impact suggests that the decision, or ability, to remediate internal control weaknesses was not “personnel-related.” Additional evidence for the lack of importance of individuals and their individual skills in successful remediation of internal control weakness is that the number of financial experts sitting on the audit committee did not have an impact either. There were a similar number of financial experts on the remediated firms’ audit committees as there were on the audit committees of the non-remediated firms. Another issue, that ties institutional choices to individual activity, concerns the size of the audit committee (AC\_SIZE) and the number of meetings (MEETING) that the committees held. We found that audit committee size was not associated with successful internal control remediation efforts. This may be a social loafing phenomenon, that is, the tendency of individuals within a group to do less work than they would do if working alone (Social Loafing, 2009). As such, it may be related to motivational issues or constraints on the time that audit committee members had available to work on problems related to their firm. It is not examined here, but future research may examine the effects of multiple commitments by audit committee members on the extent of their participation on any particular board they serve. Interestingly, we found that holding more audit committee meetings was negatively related to successful remediation of 2004 internal control weaknesses. This finding may be indicative of the severity of the internal control problems that the firms faced. Given that there is little difference between the financial expertise representation of the firms that remedied their internal control weaknesses and those that did not, we doubt that the explanation is that audit committees with less financial experts had to meet more often to overcome this lack. To us, the severity of the problem issue seems the most likely explanation.

Remedial resources available to the firm were a consistent indicator of remediation. We found that higher rates of return on assets were positively associated with remediation. In the two logit regression runs that included business segment data, models (3) and (4), we found that firm size was a positive predictor of remediation.

While size and returns on assets were two indicators of resources available, another resource was time between the filing of the 2004 audit report and the end of the firm's 2005 fiscal year. Using time (i.e. filing lag) as a time resource available indicator shows that shorter periods of time between the 2004 filing and the 2005 fiscal year end led to a lower probability of remediation than did longer periods of time. Thus, smaller amounts of financial and time resources led to less remediation. Resources, of course, cannot be measured adequately in isolation from the drains on those resources. One obvious drain comes from the greater business complexity that arises when a firm has many reportable segments. We examined this and found, as expected, that firms with greater business segmentation were less likely to remediate their internal control weaknesses than others. These results suggest that for more segmented firms, there may have been too many or too complex a set of control weaknesses to be resolved within the one year remediation time frame (end of 2004-2005) employed in this study. These findings are consistent with the evidence in Ashbaugh-Skaife *et al.* (2007) and Doyle *et al.* (2007) that larger and more profitable firms with less business segments are less likely to have internal control problems.

Other, obvious, indicators of challenges to a curative regime, lies in the number and nature of the internal control weaknesses present. To examine this, we included one variable (ICW\_NUM) measuring the number of internal control weaknesses reported, and a second variable (ICW\_TYPE) measuring the kind (general or account specific) of internal control problem(s) present. Greater numbers of internal control weaknesses and more serious (i.e. general as opposed to specific) internal control weaknesses presaged fewer firms having success in remediating their 2004 problems. This is consistent with the findings in Ettredge *et al.* (2006) that account specific weaknesses are less serious than company general weaknesses. Finally, we found that the presence of a Big 4 auditor was negatively associated with remediation of 2004 internal control weaknesses of our sample firms. Given that prior literature, in general, suggests that Big 4 auditors represent the highest quality audit services purchasable, one would not expect these results. However, Petroni and Beasley (1996) do not find larger auditors are associated with more accurate accounting estimate of outstanding claim losses of their clients. It is also possible that the Big 4 auditors were associated with clients who had the most difficult remediation problems or Big 4 auditors have higher standards in judging whether or not the internal control weaknesses are fixed. It is also true that it is not the external auditor's job to design internal control systems for clients.

## Notes

1. The concept of observability has long played an important part in the literature on auditor behavior, with various modelers of the auditor-client relationship (see Kleinman *et al.*, 1998; Kleinman and Palmon, 2000, 2001, for comprehensive literature reviews) noting that inappropriate auditor behavior is less likely to occur when circumstances dictate that the relationship between the auditor and client is more visible to stakeholders.
2. According to the SEC's release (2006), "Approximately, 44 percent of domestic companies filing periodic reports are non-accelerated filers, and an estimated 38 percent of the foreign private issuers subject to Exchange Act reporting are non-accelerated filers."

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