

Audit Committee Adoption and Effectiveness on Internal Control Weaknesses

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Abstract—This study applies Heckman two-stage approach to investigate whether the adoption of an audit committee and its effectiveness could mitigate the incidence of internal control weaknesses (hereafter ICWs) for firms listed in Taiwan. The empirical results reveal that the incidence of ICW problems could be depressed by adopting the audit committee voluntarily. The findings also show that effective audit committees result in greater depression of the likelihood of ICWs of Taiwanese firms.

Index Terms—Audit committee, audit committee effectiveness, internal control weaknesses, Heckman two-stage approach.

I. INTRODUCTION

Policy makers around the world have focused on the setup of audit committees to improve investor confidence in reported accounting information and intensify corporate governance practices since the Asian financial crisis and scandals in the United States [1]-[4]. Besides, new regulations have been adopted to improve audit committee effectiveness around the world. Prior literature has provided evidence in support of these regulations and indicates that audit committees are intended to monitor the financial reporting process, reduce corporate fraud, and depress the incidence of ICW problems [5]-[14]. Unlike those developed countries that mandate the setting up of the audit committee, currently, firms listed in Taiwan are not all required to appoint independent directors and form an audit committee.

Since 2006, Article 14-4 of the Securities and Exchange Act specifically provides that a public company that has issued stock in accordance with the Act shall establish either an audit committee or a supervisor. Generally speaking, the establishment of an audit committee is not compulsory, thus, the voluntary establishment of audit committee regime in Taiwan provides a unique setting to examine the associations between the audit committee adoption and its effectiveness on the likelihood of ICWs. Previous studies have primarily documented that certain audit committee characteristics are related to ICWs [15]-[18]. However, little prior attempt has been made to find a composite measure of the audit committee member characteristics. Thus, rather than

examining audit committee characteristics individually, this study incorporates six characteristics of the firm's audit committee members (size, convener, expertise, meeting, attendance and busyness) to establish an audit committee effectiveness index to investigate the effects of audit committee member characteristics on ICWs as a whole for firms listed in Taiwan.

The findings of this study contribute to the understanding of the role of an audit committee plays by demonstrating an association between the establishment of an audit committee and depressions in ICWs. Results from this study can inform policy makers as they consider the adequacy of current regulations for the non-mandatory of audit committees. The results have important implications for policy-makers in that they confirm that the effectiveness of audit committees in the incidence of ICWs is a function of comprehensively consider the effects of audit committee characteristics.

The remainder of this study is organized as follows. The second section reviews the literature and develops the hypotheses. The third section describes the research design. The fourth section presents the empirical results. Finally, the fifth section provides the concluding remarks.

II. HYPOTHESES DEVELOPMENT

The internal control systems of a public company encompass a set of rules, policies, and procedures an organization implements to strengthen effectiveness and efficiency of operations, the reliability and transparency of financial reporting, and enhance the confidence of the users of financial statements. Several recent studies have documented the relationship between audit committee characteristics and the disclosure of ICWs [15]-[18]. However, prior literature on the relationship between non-mandatory setting up of the audit committee and an ICW is limited.

Policy makers around the world have focused on the setting up and implementing of new regulations to improve audit committee effectiveness since the Asian financial crisis and scandals in the United States [1]. However, some concerns have been raised in regarding to the appropriateness of the Anglo-Saxon governance regime in other countries where legal environments, enforcement standards, investor protections and ownership structures are clearly different from those of Anglo-Saxon countries. For example, the study of Dallas and Scott [19] suggest that while voluntary corporate governance standards have important benefits of flexibility over more prescriptive approaches to governance regulation, investors must take responsibility and play an engaged role in making the “comply or explain” system a

Manuscript received May 10, 2017; revised July 12, 2017.

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credible alternative. Chen *et al.* [20] find that many Japanese firms may adopt audit committee as a fashionable “label” without embracing shareholder primacy.

Unlike those developed economics that mandate the setting up of the audit committee, currently, listed companies in Taiwan are not all required to appoint independent directors and form audit committees. Article 14-4 of the Securities and Exchange Act specifically provides that a public company that has issued stock in accordance with the Act shall establish either an audit committee or a supervisor since 2006. Thus, the voluntary adoption of audit committee regime in Taiwan provides a unique setting to examine the relationships between the adoption of audit committee and its effectiveness on the likelihood of ICWs. Therefore, inspired by the prior studies as mentioned above, this study first seeks to examine the relationship between non-mandatory setting up an audit committee and the incidence of ICWs and hypothesizes that:

H1: A firm that has set up a voluntary audit committee and the incidence of ICWs is related.

Audit committees are responsible for providing oversight over the financial reporting process, including the internal control system of internal controls. Prior research suggests that effective audit committee can strengthen financial reporting quality by reducing the incidence of fraudulent reporting, accounting irregularities, earnings management, and the incidence of ICWs [5]-[14]. Nevertheless, some prior studies provide evidence and argue that audit committee seems to be largely symbolic for listed firms and show that no significant association between the quality of an audit committee, the quality of financial reporting, and earnings management [1], [7], [12], [20].

As mentioned above, previous studies have primarily documented that certain audit committee characteristics are negatively related to ICWs. However, no prior attempt has been made to find a composite measure of the audit committee member characteristics. Thus, the second objective of this study is to incorporate six characteristics of the firm’s audit committee members (size, convener, expertise, meeting, attendance and busyness) to establish an audit committee effective index and investigate the effects of audit committee characteristics on ICWs as a whole for firms listed in Taiwan. Therefore, this study formulates the following hypothesis:

H2: The audit committee’s effectiveness and the incidence of ICWs is related.

III. RESEARCH DESIGN

A. Model Specification

Based on prior studies, this study employs the two-stage estimation approach in Heckman [21] to take the sample selection bias of the adopting of audit committee into consideration. In the first stage, this study runs the following probit model and obtained the inverse Mills ratio MILLS.

$$AC_{it} = \alpha_0 + \alpha_1 MHOLD_{it} + \alpha_2 DHOLD_{it} + \alpha_3 LEV_{it} + \alpha_4 INST_{it} + \alpha_5 BSIZE_{it} + \alpha_6 DUAL_{it} + \alpha_7 BINDP_{it} + \alpha_8 SIZE_{it} + \alpha_9 ROE_{it} + \alpha_{10} ELEC_{it} + \varepsilon_{it} \quad (1)$$

where, AC is a dummy variable that takes a value of one if the firm has set up an audit committee, and zero otherwise; MHOLD is the percentage of ownership held by the top-managers; DHOLD is the percentage of ownership held by the directors and supervisors; LEV is the total debt to total assets at the beginning of the year to control for leverage; INST is the percentage of ownership held by institutional investors; BSIZE is the number of board of directors to control for board size; DUAL is a dummy variable that takes a value of 1 if the chairman and CEO positions are held by the same person, and 0 otherwise; BINDP is the percentage of independent directors on the board; SIZE is the logarithm of total assets at the beginning of the year to control for firm size; ROE is the sum of profit after tax plus interest expense to total equity; and ELEC is a dummy variable that takes a value of one if the firm belongs to the electronics industry, and zero otherwise.

In the second stage, the inverse Mills ratio is introduced to the following probit model as an additional variable to correct for potential self-selection bias and to investigate the relationship between the setting up of audit AC and ICWs.

$$ICW_{it} = \alpha_0 + \alpha_1 AC_{it} + \alpha_2 SIZE_{it} + \alpha_3 AGE_{it} + \alpha_4 GROW_{it} + \alpha_5 ROA_{it} + \alpha_6 INST_{it} + \alpha_7 BIG4_{it} + \alpha_8 DUAL_{it} + \alpha_9 BINDP_{it} + \alpha_{10} MILLS_{it} + \varphi YEAR + \eta IND + \varepsilon_{it} \quad (2)$$

To investigate the hypothesis H2, this study builds on the prior studies and uses the following probit regression to test the relationship between audit committee effectiveness ACE and the likelihood of ICW problems. The specifications of the variables are shown in Table I.

$$ICW_{it} = \alpha_0 + \alpha_1 ACE_{it} + \alpha_2 SIZE_{it} + \alpha_3 AGE_{it} + \alpha_4 GROW_{it} + \alpha_5 ROA_{it} + \alpha_6 INST_{it} + \alpha_7 BIG4_{it} + \alpha_8 DU \quad (3)$$

TABLE I: VARIABLE DEFINITIONS

Variable	Definitions
ICW	ICW is a dummy variable, which takes a value of one if the firm discloses internal control weaknesses, and zero otherwise
AC	AC is a dummy variable, which takes a value of one if the firm has set up an audit committee, and zero otherwise
ACE	ACE is an audit committee effectiveness index ranging from 0 to 6
SIZE	Natural logarithm of total assets
AGE	The number of years the firm has been established
GROW	Sales growth ratio, which is measured as sales revenue minus lagged sales revenue divided by lagged sales revenue
ROA	The sum of profit after tax plus interest expense to total assets
INST	The percentage of ownership held by institutional investors
BIG4	BIG4 is an auditor dummy variable, which takes a value of 1 if the firm’s auditor is among the top-4 auditing firms, and 0 otherwise
DUAL	DUAL is a dummy variable that takes a value of 1 if the chairman and CEO positions are held by the same person, and 0 otherwise
BINDP	The percentage of independent directors on the board
MILLS	Mills is obtained from Equation (1) to correct for the self-selection bias problems
YEAR	Year dummy variables
IND	Industry dummy variables

B. Dependent and Independent Variables

To investigate hypotheses H1 and H2, this study employs ICWs (ICW) as a dependent variable. ICW is a dummy variable, which takes a value of one if the firm disclosures internal control weaknesses in the initial public offerings and seasoned equity offerings prospectuses, and zero otherwise. To investigate hypotheses H1, this study employs audit committee adoption to examine its effect on ICWs. Audit committee adoption AC is a dummy variable, which takes a value of one if the firm has set up an audit committee, and zero otherwise.

To examine Hypothesis H2, this study incorporates six factors related to the audit committee characteristics (size, convener, expertise, meeting, attendance and busyness) to establish an audit committee effective index (ACE) and investigate the effects of audit committee characteristics on ICWs as a whole [15]-[18], [22]-[24]. Thus, ACE can range from zero to six, with ACE equal to seven six (zero) representing the firms with the best (worst) effective audit committee quality. Based on prior studies, the six factors of audit committee member characteristics can be measured as follows:

1. Size: The audit committee size is captured as a dummy variable and coded as 1 if the number of the audit committee members on the committee of a firm is larger than the median of the sample firms, and 0 otherwise.
2. Convener: A professional convener of the audit committee is captured as a dummy variable and coded as 1 if the convener in a company has accounting or financial expertise, and 0 otherwise.
3. Expertise: The audit committee member professionalism is coded as 1 if the members in a company have accounting or financial expertise, and 0 otherwise. The member expertise dummy variable is then defined as 1 if the proportion of the professional heterogeneity on the committee of a company is larger than the median of the sample firms, and 0 otherwise.
4. Meeting: The number of audit committee meeting is captured by a dummy variable and coded as 1 if the number of the audit committee meeting in a company is larger than the median of the sample firms, and 0 otherwise.
5. Attendance: The number of audit committee meeting attendance is captured by a dummy variable and coded as 1 if the average number of the meeting attendance of the audit committee in a company is larger than the median of the sample firms, and 0 otherwise. Finally, busyness is captured as a dummy variable and coded as 1 if the average number of seats that busy audit committee members hold in a company is smaller than the median of the sample firms, and 0 otherwise.

C. Control Variables

Based on the existing literature [25]-[30], a number of firm-specific control variables are included in the models. Specifically, this study uses firm size, age, growth, the ratio of the return on assets, institutional ownership, big4 auditor, CEO duality, independent directors ratio, and firm year as control variables. Firm size is defined as the natural logarithm of the firm's total assets. Firm age is measured as the number of years the firm has been established. Firm growth is measured as sales revenue minus lagged sales revenue divided by lagged sales revenue. The return on assets ratio is measured as the sum of profit after tax plus interest

expenses divided by total assets. Institutional ownership is the percentage of ownership held by institutional investors, which includes domestic and foreign financial institutions and trust funds. Big4 auditor is a dummy variable that takes a value of one if the firm's auditor is among the top-4, and zero otherwise. CEO duality is a dummy variable that takes a value of one if the chairman and CEO positions are held by the same person, and zero otherwise. The ratio of independent directors is the percentage of independent directors on the board. Finally, this study adds year and industry dummy variables to account for the unobserved variation.

D. Sample Selection

The data used in this study are obtained from different sources. Data on ICWs information are obtained from the IPO and SEO prospectuses for the period from 2007 to 2014. The sample period begins with the year 2007 because the data regarding the adoption of audit committee and audit committee characteristics are only available from the Taiwan Economic Journal (TEJ) database since 2007. IPO and SEO prospectuses are retrieved from the websites of the Market Observation Post System (MOPS) of Taiwan Stock Exchange (TSE) since the data are not available from any publicly compiled database in Taiwan. Data on the financial information are also collected from the TEJ database.

This study drops the finance and insurance industries due to the unique nature of their regulations and requirements. In addition, the finance and insurance industries in Taiwan are required to establish an audit committee by the FSC since 2013. This study also deletes firms with non-calendar. After deleting firms with missing data and observations used in the process of estimating variables, the final sample comprises a total of 2,869 firm-year observations of which 726 are related to voluntary adopting of audit committees and 2,143 to non-adoption are included in this study to examine the first hypothesis. After deleting audit committee firm-year observations with missing data, only 645 adopting firm-year observations are remained to test the relationship between audit committee effectiveness and the incidence of ICWs.

IV. EMPIRICAL ANALYSIS

Table II reports the descriptive statistics of the sample to test the hypotheses H1 and H2, respectively. Panel A of Table II indicates that the mean of the incidence of ICWs ICW is 13.2%. On average, 24.7% of the listed firms have set up audit committees AC. The mean of the total assets SIZE is 6.637. The mean value of the firm age AGE is 19.743 years. The mean value of the firm growth ratio GROW is 13.024%. On average, the return on total assets ROA is 1.162%. The mean value of the institutional ownership INST is 13.531%. On average, 92.1% of the listed firms are audited by a big4 auditor BIG4 and 28.6% of the listed firms have a CEO duality structure DUAL. Finally, the mean value of the percentage of independent directors on the board INST is 34.7%. In Panel B of Table II, the mean of the audit committee effectiveness index ACE is 4.015. The results of the rest of the other variables are almost the same that described in detail in Panel A of Table II.

TABLE II: DESCRIPTIVE STATISTICS

Panel A: Model 2 (N=2,689)					
Variable	Mean	Median	St. Dev.	Mini.	Max.
ICW	0.132	0.000	0.339	0.000	1.000
AC	0.247	0.000	0.431	0.000	1.000
SIZE	6.637	6.485	0.663	4.966	9.174
AGE	19.743	18.000	0.193	2.000	65.000
GROW	13.024	6.565	46.258	-84.850	680.140
ROA	1.162	0.745	8.542	-47.570	78.570
INST	13.531	5.735	18.695	0.000	99.210
BIG4	0.921	1.000	0.269	0.000	1.000
DUAL	0.286	0.000	0.452	0.000	1.000
BINDP	0.347	0.333	0.103	0.067	0.750
Panel B: Model 3 (N=645)					
Variable	Mean	Median	St. Dev.	Mini.	Max.
ICW	0.122	0.000	0.328	0.000	1.000
ACE	4.015	4.000	0.581	0.000	6.000
SIZE	6.778	6.635	0.726	5.117	9.175
AGE	14.803	13.000	9.927	2.000	58.000
GROW	12.263	7.110	37.358	-63.840	296.610
ROA	1.295	0.860	10.162	-44.670	74.630
INST	22.177	8.420	26.417	0.000	99.210
BIG4	0.936	1.000	0.009	0.000	1.000
DUAL	0.258	0.000	0.437	0.000	1.000
BINDP	0.385	0.375	0.083	0.200	0.667

Notes: All variables are as defined in Table I.

The results of the effect of setting up an audit committee and the incidence of ICWs are provided in Table III. The audit committee adopting dummy variable (AC) coefficient in Table III is -1.129 and strongly negative and significant at the 1% level. The empirical results provide evidence in support of the hypothesis H1. The results are consistent with prior studies and show that firms have set up an audit committee can depress the incidence of ICWs [15], [16], [18]. As for the control variables, collectively, younger firms, firms with lower sales revenue growth and audited by BIG4 auditors demonstrate a better internal control quality. In addition, the MILLS coefficient in Table III is 0.130 and strongly positive and significant at the 5% level. The findings show that the sample self-selection bias has been corrected in the study by employing the Heckman two-stage approach.

TABLE III: REGRESSION ANALYSES OF AUDIT COMMITTEE ADOPTION AND ICWS (N=2,689)

Variable	Predicted Sign	Coefficient	P-Value
Intercept	?	-1.686	0.093*
AC	-	-1.129	0.000***
SIZE	-	0.103	0.417
AGE	+	0.010	0.095*
GROW	+	0.001	0.011*
ROA	-	-0.001	0.929
INST	-	-0.001	0.223
BIG4	-	-1.473	0.000***
DUAL	+	0.081	0.560
BINDP	-	1.317	0.180
MILLS	?	0.130	0.018**
YEAR		YES	
IND		YES	
Adj-R ²		0.127	

Notes: The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are as defined in Table I.

Table IV provides the results of the effect of audit committee effectiveness on ICWs. The audit committee effectiveness proxy ACE coefficient in Table IV is -1.621 and negative and significant at the 1% level. The results in Table IV provide evidence in support of the hypothesis H2. The results are consistent with prior studies [15]-[18], [29]-[30] and show that firms with a more effective audit committee can mitigate the likelihood of ICWs. In regard to

the control variables, the results in Table IV are generally in the predicted directions and are similar to the results of Table III. The results are consistent with the prior literature. Collectively, younger firms, firms with higher institutional ownership and more independent directors, and do not have CEO duality are less likely to disclose ICWs.

TABLE IV: REGRESSION ANALYSES OF AUDIT COMMITTEE EFFECTIVENESS AND ICWS (N=645)

Variable	Predicted Sign	Coefficient	P-Value
Intercept	?	7.757	0.001***
ACE	-	-1.621	0.001***
SIZE	-	-0.237	0.334
AGE	+	0.028	0.043**
GROW	+	0.002	0.562
ROA	-	-0.001	0.927
INST	-	-0.021	0.011**
BIG4	-	-0.446	0.323
DUAL	+	1.079	0.001***
BINDP	-	-5.074	0.011***
YEAR		YES	
IND		YES	
Adj-R ²		0.237	

Notes: The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are as defined in Table I.

V. CONCLUSION

This study aims to examine the relationships between the non-mandatory establishment of an audit committee and its effectiveness on ICWs. The findings reveal that the incidence of ICW problems could be depressed by the voluntary establishment of audit committees. In addition, the results show that effective audit committees could result in greater depression of the likelihood of ICWs. A further exploration using longer sample periods to examine the endogeneity problems in the empirical analysis of ICWs would be worthwhile. Moreover, the financial institutions and listed firms with paid-in capital in excess of NT\$ 100 billion observations are not included in the regression models. Future studies could incorporate these observations into the models to examine the impacts of the mandatory establishment of an audit committee on the incidence of ICWs.

ACKNOWLEDGMENT

The authors would like to thank three anonymous referees, the editorial board and participants at the 2017 International Conference on E-Business and Internet for their insightful comments and suggestions. Any remaining errors are the authors' responsibility.

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