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The effect of auditing assurance levels on accounting conservatism: evidence from Taiwan

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Abstract Because of the adoption of IFRSs, listed companies have been required to prepare second-quarter consolidated financial statements reviewed by auditors in Taiwan since 2013. This rule changes some companies' assurance levels from audit to review by auditors, and may have the effect on accounting conservatism. Our results indicate that the decision of voluntary upgrade auditing assurance level and accounting conservatism have a significant positive relationship in family-controlled firms. Meanwhile, It also has a significant negative relationship in professional managers controlled firms. Finally, we find that the accounting conservatism of consolidated financial statements has significantly decreased after the adoption of IFRSs. It means the disclosure and transparency of consolidated financial statements were improved after the adoption of IFRSs.

Keywords Voluntary upgrade auditing assurance level · Accounting conservatism · Information asymmetry · Consolidated financial statements

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1 Introduction

Auditing assurance of financial statements serve a vital economic purpose and serve the public interest by strengthening accountability and reinforcing confidence in financial reporting. Barton and Waymire (2004) indicate that independent audits are a critical policy mechanism for governments.

The two most essential auditing assurance levels are audits and reviews of financial statements. Auditors apply professional knowledge and spend extensive time performing the audit (including inspection, observation, confirmation, analysis, and comparison) and then issue a positive-assurance report for the client. Auditors often perform only analysis, comparison, and inquiries for a review and then issue a negative-assurance report for the client. An audit is always more rigorous than a review.

In Taiwan, listed companies were required before 2012 to prepare semiannual consolidated financial statements along with auditor reviews, but some listed companies still choose an audit voluntarily. We define this phenomenon as a voluntary to upgrade auditing assurance level (hereinafter, VUAL). VUAL is not voluntary audit which was indicated by Lennox and Pittman (2011). A voluntary audit means that a company choose an audit service for its financial statements, but the regulations did not require a company should do an audit or review. Both of VUAL and voluntary audit are of higher quality but signals more reliability of information than a review. Because of the mandatory adoption of International Financial Reporting Standards (hereinafter, IFRSs), listed companies have been required since 2013 to prepare second-quarter consolidated financial statements to be reviewed by auditors. This rule changed some auditing assurance levels from audit to

review and may have increased information asymmetry. Similarly, Li (2018) indicate that firms that opted to obtain external auditor reviews achieved higher rankings for information transparency, stronger corporate governance, and higher audit quality than firms that did not obtain such reviews.

In the field of economics and accounting, conservatism is a crucial accounting principle and refers to the prudent attitude that accountants must adopt when facing the risks of an operating environment and the uncertainties of a firm. A positive relationship exists between information asymmetry and conservatism (LaFond and Watts 2008). Conservatism is a useful mechanism of corporate governance and helps limit the degree of information asymmetry (Chi et al. 2009b). Therefore, accounting conservatism reduces information asymmetry directly and provides a compelling issue for our research.

There are two different types of agency problems. One arise from the separation of ownership and management for firms controlled by professional managers (hereinafter MCFs), defined as type I agency problem. Another arises from conflicts of interest between controlling and non-controlling shareholders for family-controlled firms (hereinafter FCFs), defined as type II agency problem.

Kao et al. (2011) indicate that conservative accounting reduces the moral hazard caused by managers' limited horizons, limited liability, and agency problems engendered by the deviation between control and cash-flow rights, and by the deviation conflicts between bondholders and shareholders. Their results also show that firms tend to use less conservative accounting when other governance mechanisms are in place to reduce agency conflicts. We predict that VUALs are likely to play a more crucial role in type I than in type II agency problems to reduce information asymmetry.

In a type I agency problem, to reduce the moral hazard caused by managers' limited horizons, MCFs are more likely to undertake a VUAL and decrease accounting conservatism. Managers are less likely to invest in a negative net present value (NPV) project when conservatism is greater (Watts 2003; Ball and Shivakumar 2005). In addition, managers usually make less risky acquisitions when subject to more conservative accounting (Kravet 2014). These might be attributed to accounting conservatism instead of information asymmetry.

In a type II agency problem, the controlling shareholders usually use pyramids to manage a corporation because they have power in excess of their cash-flow rights (La Porta et al. 1999). Additionally, more than half of companies in Asia are controlled by family groups (Claessens et al. 2000; Claessens et al. 2002). More ownership in FCFs and less board representation may reduce the conflict of interest between majority and minority shareholders (Yeh et al.

2001). Jabeen and Shah (2011) note that minority shareholders require independent directors and corporate disclosure to reduce the information asymmetry and entrenchment effects within FCFs. In addition, Kim et al. (2015) reveal that controlling shareholders may exhibit weak corporate governance and reduced conservatism. Therefore, we posit that FCFs are more likely to undertake a VUAL to increase accounting conservatism and reduce information asymmetry.

Our results indicate that VUAL and accounting conservatism have a significant positive relationship in FCFs. That is, when FCFs are more likely to implement a VUAL, they are also more likely to prepare more conservative consolidated financial statements to reduce information asymmetry. This suggests a complementary effect between VUAL and accounting conservatism for firms with more information asymmetry. Conversely, we find that VUAL and accounting conservatism have a significant negative relationship in MCFs. This signifies a substitution effect between VUAL and accounting conservatism for firms with less information asymmetry. Finally, the accounting conservatism of consolidated financial statements has decreased after the adoption of IFRSs in Taiwan. This implies improved disclosure and transparency of consolidated financial statements.

This study examines the relationship between VUAL and accounting conservatism based on holding structure (divided into FCFs and MCFs). The remainder of this paper is organized as follows: Sect. 2 reviews the relevant literature to establish our hypotheses. Section 3 discusses the research methodology. Section 4 provides the empirical results. The final section presents the conclusion.

2 Literature review and hypothesis development

2.1 VUAL

Barton and Waymire (2004) indicate that the independent audit is a critical policy mechanism for governments. Financial statement audits give credibility to information used by investors and capital markets. Generally, auditors' assurance services can be categorized into four levels—audit, review, agreed-upon procedure, and compliance engagement—and each has a different degree of assurance. Lennox and Pittman (2011) find that companies implement voluntary audits receive upgrades to their credit rating, because they send positive signals by submitting to audits that are not legally mandatory. By contrast, companies that do not implement voluntary audit suffer downgrades to their ratings, because avoiding an audit sends a negative signal and removes its assurance value. Li (2018) indicate that firms opted to obtain external auditor reviews of their

first- and third-quarter consolidated financial statements achieved higher rankings for information transparency, stronger corporate governance, and higher audit quality than firms that did not obtain such reviews. Therefore, we posit that VUALs have higher audit quality and signal more reliable information than reviews. In Taiwan, listed companies were required before 2012 to prepare semiannual consolidated financial statements reviewed by auditors, but some listed companies still choose an audit. Because of the adoption of IFRSs, listed companies have been required since 2013 to prepare second-quarter consolidated financial statements to be reviewed by auditors. This rule changes some of auditing assurance levels from audit to review by auditors, and the information asymmetry may increase. LaFond and Watts (2008) investigated the relationship between accounting conservatism and information asymmetry. Our research try to discuss base on their results.

2.2 Accounting conservatism

Conservatism is a crucial accounting principle and refers to the prudent attitude that accountants must adopt when facing the risks of an operating environment and the uncertainties of a firm. Conservatism selects accounting methods that do not easily lead to overestimation of profit and assets. Thus, conservatism causes accountants to prefer a higher degree of verification for profit recognition. However, accountants tend to require a lower degree of verification for losses, causing asymmetries in the timeliness of profit and loss recognition (Basu 1997).

Watts (2003) reveals that external users of financial statements require accounting conservatism due to contracts, litigation, regulation, and taxation. Empirical evidence supports the fact that conservatism can reduce the agency problem between managers and stakeholders; improve contract efficiency (LaFond and Watts 2008; Zhang 2008); and reduce litigation costs (Ball et al. 2000; Qiang 2007), regulatory risks, (Ball and Shivakumar 2005), and tax burdens (Qiang 2007).

LaFond and Roychowdhury (2008) indicate that when the shareholding ratio of management is low, inconsistencies between the interests of shareholders and managers are likely. To reduce agency costs, managers tend toward conservative financial statements to improve contract efficiency. This shows the relationship between accounting conservatism and shareholding ratio. It means that the holding structure affects corporate governance.

2.3 VUAL and accounting conservatism

Dedman and Kausar (2012) find that despite reporting lower average profits, private firms in the United Kingdom

that retain voluntary audits (after regulatory relaxation) have significantly higher credit scores than those that do not. This indicates that companies not maintaining an audit of their financial statements tend to be less conservative.

A VUAL is different from a voluntary audit, as indicated by Lennox and Pittman (2011). With voluntary audits, a company chooses to have its financial statements audited despite relevant regulations not stating that the company is required to perform an audit or review. Both VUALs and voluntary audits are of higher quality and signal greater information reliability than reviews. VUALs are of higher audit quality than reviews, because auditing assurance level is more comprehensive. Auditors utilize professional knowledge and spend extensive time to produce a positive-assurance report. An audit of consolidated financial statements provides more reliable financial information than a review. We consider the choice of audit over review as an act of superior corporate governance and information transparency.

External equity investors may push to increase conservatism if they consider information asymmetry to be high (LaFond and Watts 2008). This signifies a negative relationship between accounting conservatism and information asymmetry; that is, accounting conservatism increases information transparency.

Chi et al. (2009a, b) report that conservatism is a useful mechanism of corporate governance and reduces information asymmetry. This signifies a negative relationship between accounting conservatism and corporate governance; that is, more accounting conservatism implies worse corporate governance and lower information transparency.

Accounting conservatism may reduce information asymmetry directly. We argue that different levels of conservatism can exist in MCFs and FCFs. Kao et al. (2011) report that conservative accounting reduces the moral hazard caused by managers' limited horizons, limited liability, and agency problems engendered by deviation between control and cash-flow rights and agency conflicts between bondholders and shareholders. Their results also show that firms tend to use less conservative accounting when other governance mechanisms are in place to reduce agency conflicts. We propose that the VUAL plays a crucial role in type I and type II agency problems to reduce information asymmetry.

We find the literature on the relationship between conservatism and information asymmetry to be inconclusive. The holding structure of governance may be a primary reason. Jabeen and Shah (2011) note that more supervision of independent directors and more corporate disclosure are required to reduce the information asymmetry and entrenchment effect in FCFs. In addition, Kim et al. (2015) reveal that controlling shareholders may exhibit weak corporate governance and low conservatism. Fan and

Wong (2002) suggest two main motivations for increasing conservatism to reduce agency conflict: appearing credible to external investors and preventing low earnings informativeness.

We consider VUAL to be a signal of sound corporate governance and the provision of reliable financial information to reduce information asymmetry. Additionally, we understand that concentrated ownership may create type II agency conflict. In Taiwan, concentrated ownership is typically found in FCFs. FCFs may undertake VUALs to decrease information asymmetry or strengthen corporate governance. Thus, we establish hypothesis 1 as follows:

Hypothesis 1 *Ceteris paribus*, a significant positive correlation exists between VUAL and accounting conservatism for FCFs.

Some characteristics are different between MCFs and FCFs. Managers are less likely to invest in a negative-NPV project when conservatism is higher (Watts 2003; Ball and Shivakumar 2005). In addition, managers usually make less risky acquisitions when under more conservative accounting (Kravet 2014). MCFs usually have more information transparency than FCFs. Additionally, Healy and Palepu (2001) note that firms volunteer information to gain media coverage. The management-relations hypothesis argues that analysts intentionally bias their forecasts to curry favors with management in order to gain access to information. We deduce that if MCFs implement VUALs, they may not need conservative accounting. Accordingly, we establish hypothesis 2 as follows:

Hypothesis 2 *Ceteris paribus*, a significant negative correlation exists between VUAL and accounting conservatism for MCFs.

2.4 VUAL, IFRSs, and accounting conservatism

Leuz and Verrechia (2000) indicate that German firms that have switched from the German to an international reporting regime (International Accounting Standards or U.S. Generally Accepted Accounting Principles) commit themselves to increased levels of disclosure. Therefore, we believe that adoption of IFRSs increases disclosure and enhances information transparency for both FCFs and MCFs. Additionally, Aksu and Espahbodi (2016) show that corporate governance, voluntary disclosure, and mandatory adoption of IFRSs may all have significant positive effects on firms' transparency and disclosure scores. Furthermore, accounting conservatism may be a corporate governance mechanism. Accordingly, we establish hypothesis 3 as follows:

Hypothesis 3 *Ceteris paribus*, a significant negative correlation exists between the adoption of IFRSs and accounting conservatism.

3 Research design

3.1 Data sources and sample selection

We obtain VUAL data of audited or reviewed report of each semi-year of consolidated financial statements from the Market Observation Post System (MOPS) for Taiwanese listed firms from 2011 to 2014, but we exclude the firms in the finance and insurance industry. We checked the assurance report of each firm was audited or reviewed by auditors. The MOPS includes basic information on 7688 listed firms for the period 2011–2014. We choose these years because of the 2013 mandatory adoption of IFRSs in Taiwan. Then, we collect the remaining financial data used in our study from the *Taiwan Economic Journal* database.

We exclude any missing data for the variables (including *EARN, RET, SCALE, MTB, LEV,* and price per share less than NT\$1) used in the estimation of the conservatism score (*Cscore*, the definition is represented in next paragraph) and observations without auditor data or industry data, firms listed in emerging stock markets, a firm with audited semiannual consolidated financial statements after 2013, and firms less than 4 years old that were not required to prepare consolidated financial statements. These filters result to 4564 firm-year observations from 2011 to 2014 exhibited in Table 1.

3.2 Measuring of accounting conservatism

Basu (1997) has proposed the following model to measure the asymmetric timeliness of earnings:

$$EARN_t = \alpha_0 + \beta_1 D_t + \beta_2 RET_t + \beta_3 D_t \times RET_t + \varepsilon_t \qquad (1)$$

Here, *EARN* refers to net income with beginning-of-year market value of equity deflator, RET is the annual stock returns compounded from monthly returns beginning from the fourth month after the end of the fiscal year t (extrapolated one year forward from the announcement of annual consolidated financial statements on March 31), D is the dummy variable for the stock return during period t, 1 for firms with zero or negative stock return rates (meaning bad news) and 0 for firms the converse (meaning good news), and ε_t is the residual of period t.

Khan and Watts (2009) have indicated that the measure of accounting conservatism proposed by Basu (1997) assumes that the conservatism demonstrated by a firm over the course of one year is homogeneous and that the conservatism demonstrated by the financial statements of a

Table 1 Filters result of samples

Year	2011	2012	2013	2014	Total
Original samples	1955	1940	1908	1885	7688
Less: any missing data of the variables, include *EARN, RET, SCALE, MTB, LEV*, and price per share less than NT$1	563	471	354	268	1656
Less: no auditors, and industry data	31	51	71	86	239
Less: listed firms at emerging stock market	51	39	20	5	115
Less: a firm's semi-annual consolidated financial statements be audited after 2013	–	–	1	–	1
Less: firms discontinuous from 2011 to 2014, and needn't to prepare the consolidated financial statements	169	238	321	385	1113
Empirical samples	1141	1141	1141	1141	4564

firm does not change with time. Because these assumptions are limited, Khan and Watts (2009) rejected Basu's homogeneity assumption and estimated the conservatism score (hereafter, *Cscore*) of each firm over each year. We follow this approach and use the *Cscore* in this study.

The estimation method developed by Khan and Watts (2009) is also based on Basu's earnings asymmetrical timeliness model (1). The response of earnings towards positive returns (good news) is β_2 in model (1), whereas the response of earnings towards negative returns (bad news) is $\beta_2 + \beta_3$. Here, the difference between the response of earnings towards good and bad news, that is, accounting conservatism, is β_3. To calculate the response and timeliness of good news (hereinafter, *Gscore*) and *Cscore* of each individual firm in an estimated year, the *Cscore* is first defined as the function of three specific variables that describe the firm.

$$Gscore = \beta_2 = \mu_1 + \mu_2 SCALE + \mu_3 MTB + \mu_4 LEV \quad (2a)$$

$$Cscore = \beta_3 = \lambda_1 + \lambda_2 SCALE + \lambda_3 MTB + \lambda_4 LEV \quad (2b)$$

Here, we define *SCALE* as the natural logarithm of the year-end market value of equity. *MTB* is defined as the ratio of the market value to the book value, and *LEV* is defined as the long-term and short-term liability with the beginning-of-year market value of equity as a deflator. All firms have the same μ_{it} and λ_{it} in a given year, but the μ_{it} and λ_{it} of different years are allowed to differ. Model (2a) and Model (2b) are inserted into model (1) of Basu's (1997) model to obtain the following model (3):

$$
\begin{aligned}
EARN_{it} = \alpha_0 + \beta_1 \\
&+ \mu_1 RET_{it} + \mu_2 SCALE_{it} \times RET_{it} + \mu_3 MTB_{it} \\
&\times RET_{it} + \mu_4 LEV_{it} \times RET_{it} \\
&+ \lambda_1 D_{it} \times RET_{it} + \lambda_2 SCALE_{it} \times D_{it} \times RET_{it} \\
&+ \lambda_3 MTB_{it} \times D_{it} \times RET_{it} + \lambda_4 LEV_{it} \times D_{it} \times RET_{it} \\
&+ \delta_1 SCALE_{it} + \delta_2 MTB_{it} + \delta_3 LEV_{it} \\
&+ \delta_4 D_{it} \times SCALE_{it} + \delta_5 D_{it} \times MTB_{it} + \delta_6 D_{it} \\
&\times LEV_{it} + \varepsilon_{it}
\end{aligned}
$$

$$(3)$$

The empirical results of model (3) are as shown in Table 2. This study calculates the annual Cscore by bringing the coefficients in Table 2 into model (2) to use as a subsequent variable for the calculation of accounting conservatism. Here, high *Cscores* indicate high accounting conservatism. Wang, Pan, and Chi (2012) have verified the applicability of *Cscore* measures of accounting conservatism in Taiwan, thereby increasing the verifiability of the results of this study.

3.3 Empirical model and variables

Differences between companies that do and do not implement a VUAL of semiannual consolidated financial statements potentially cause differences in accounting conservatism. For instance, if firms decide to implement a VUAL to reduce information asymmetry or enhance information transparency, a firm's choice of VUAL is endogenous. To control it, we employ Heckman's (1979) two-stage model. Firstly, we estimate a probit model that includes whether to undertake a VUAL as the dependent variable and the independent control variables (show in Table 3) as follows:

$$
\begin{aligned}
Probit\,(VUAL_i\_Y/N) &= \theta_0 + \theta_1 IDErating_i + \theta_2 VAC_i \\
&+ \theta_3 MGRH_i + \theta_4 ODP_i + \theta_5 INSH_i \\
&+ \theta_6 GM3C_i + \theta_7 DEV_i + \theta_8 CDIV_i + \theta_9 LLIAB_i \\
&+ \theta_{10} SCALE_i + \theta_{11} DOrank_i + \theta_{12} BIG4_i \\
&+ \theta_{13} HITE_i + \theta_{14} Y2011_i + \tau_i
\end{aligned}
$$

$$(4)$$

Secondly, we substitute the inverse Mill's ratio (Mills) calculated in the first stage into the model for estimating accounting conservatism to correct for the sample selection bias that is likely to arise. Additionally, we include a dummy variable (*VUAL*) in the model to capture the incremental effect of VUAL. We also employ the ordinary least squares (OLS) regression model to analyze the relationship between VUAL and accounting conservatism. The second stage of the OLS regression model is as follows:

Table 2 Mean coefficients from estimation regression (dependent variable: *EARN*)

Independent variables	Pred. sign	Our paper				Khan and Watts (2009)	
		Coeff.	z-stat.	Coeff.	z-stat.	Coeff.	z-stat.
Constant		0.056**	5.154	− 0.156*	− 2.436	0.083***	7.530
D		− 0.008	− 1.379	− 0.045	− 0.415	− 0.024***	− 3.560
RET		0.024	2.210	− 0.171	− 1.775	0.031	1.840
RETxSCALE				0.017**	3.396	0.005*	2.250
RETxMTB				− 0.022	− 1.831	− 0.006	− 2.000
RETxLEV				0.021	1.155	0.005	0.770
DxRET	+	0.308***	12.380	0.862**	3.623	0.237***	10.780
DxRETxSCALE	−			− 0.050**	− 3.710	− 0.033***	− 7.420
DxRETxMTB	+			− 0.013	− 1.048	− 0.007	− 0.930
DxRETxLEV	+			0.092**	3.211	0.003	1.860
SCALE				0.014**	3.739	0.005***	4.830
MTB				− 0.002	− 0.601	− 0.017***	− 7.930
LEV				− 0.011	− 1.190	− 0.008**	− 3.610
DxSCALE				0.002	0.276	0.003**	3.450
DxMTB				0.004	0.674	− 0.001	− 0.420
DxLEV				0.002	0.403	− 0.002	− 0.880
N		4564		4564		115,516	
Avg. R²		0.176		0.312		0.240	
F value		73.84***		6.41***			

p values in parentheses *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

EARN = Net income with beginning-of-year market value of equity deflator

RET = The annual stock returns compounded from monthly returns beginning from the forth month after the end of the fiscal year t (extrapolated one year forward from the announcement of annual consolidated financial statements on March 31)

D = The dummy variable for the stock return during period t, 1 for firms with zero or negative stock return rates and 0 for firms the converse

SCALE = The year-end market value of equity taking natural logarithm

MTB = The ratio of market value to book value

LEV = The long-term and short-term liabilities with beginning-of-year market value of equity deflator

$$Cscore_i = \gamma_0 + \gamma_1 VUAL_i + \gamma_2 IDErating_i + \gamma_3 INSH_i$$
$$+ \gamma_4 GM3C_i + \gamma_5 DEV_i + \gamma_6 CDIV_i + \gamma_7 LLIAB_i$$
$$+ \gamma_8 DOrank_i + \gamma_9 HITE_i + \gamma_{10} Y2011_i$$
$$+ \gamma_{11} Mills_i + v_i$$

(5)

Furthermore, to verify the relationship between IFRSs and accounting conservatism, we establish the OLS regression model as follows:

$$Cscore_i = \sigma_0 + \sigma_1 IFRSs_i + \sigma_2 IDErating_i + \sigma_3 INSH_i$$
$$+ \sigma_4 GM3C_i + \sigma_5 DEV_i + \sigma_6 CDIV_i + \sigma_7 LLIAB_i$$
$$+ \sigma_8 DOrank_i + \sigma_9 HITE_i + \eta_i$$

(6)

The definitions of all variables are presented in Table 3.

4 Results

4.1 Descriptive statistics

To control for the effects of extreme values, this study follows the literature and winsorizes all observed continuous variables smaller than 1% or greater than 99% of the values (Chi et al. 2009a). Table 4 lists the descriptive statistics of the primary variables. The mean and median *Cscore* values are 0.165 and 0.161, respectively, indicating no skewed distribution. These results are similar to the mean and median values of 0.192 and 0.170 calculated by Wang et al. (2012), thereby extending the applicability of *Cscore* in Taiwan. The mean (median) *VUAL* value is 0.120 (0), indicating that 12.2% of our sample is required to implement a VUAL. Table 5 and Fig. 1 demonstrate that, if we distinguish between VUAL firms and non-VUAL firms, the average *Cscore* VUAL value

Table 3 Definition for variables

Variable	Definition	Reference (literatures or sources)	Predicted sign
Dependent variable			
Cscore	Follow the calculation of Khan and Watts (2009)	Khan and Watts (2009)	NA
Independent variables for our research			
VUAL	A dummy variable. A firm was assigned 1 if it engaged in VR and 0 otherwise	Lennox and Pittman (2011)	±
IFRSs	A dummy variable. Year 2013 and 2014 were assigned 1 and 2011 and 2012 were assigned 0		−
Independent control variables: (1) Variables for corporation governance			
IDErating	The information disclosure evaluation rating. Firms with IDE rankings of A++, A+, A, A−, B, C, and C− were assigned 7, 6, 5, 4, 3, 2, and 1, respectively. If firms had not get the rating, they will be assigned 0	Chang and Fang (2006)	−
VAC	A dummy variable. A firm was assigned 1 if it had an audit committee and 0 otherwise. This definition refers to	Chi et al. (2009a, b)	A determinant of VR decision
(2) Variables for holding structure and board characteristics			
MGRH	The percentage of shares held by managements	Chi et al. (2009a, b)	A determinant of VR decision
ODP	The number of seat on the board held by outside directors. This definition refers to	Ahmed and Duellman (2007), Chi et al. (2009a, b)	A determinant of VR decision
INSH	A dummy variable. A firm was assigned 1 if it had a institution shareholder and 0 otherwise	Ahmed and Duellman (2007), Chi et al. (2009a, b)	−
(3) Variables for agency problem			
GM3C	Number of times the general manager has been replaced within the last three years	Kao et al. (2011)	+
DEV	Deviation of cash-flow rights. The data is collected from TEJ database	Kao et al. (2011) and La Porta et al. (1999)	+
CDIV	Cash dividend rate. This definition refers to	Kao et al. (2011)	−
LLIAB	Ratio of long-term liabilities to total assets	Kao et al. (2011), and Chang and Fang (2006) also used this variable.	+
(4) Variables for firm-specific characteristics and risk			
SCALE	The natural logarithm of year-end market value of equity	Chang and Fang (2006) and Wynn (2008)	A determinant of VR decision
DOrank	1 if a firm's total D&O liability insurance coverage in the fiscal year is above or equal to median, and 0 otherwise. also used this variable	Chung and Wynn (2008), Lin et al. (2011), and Lin et al. (2013)	−
(5) Variable for audit quality			
BIG4	A dummy variable. A firm was assigned 1 if the firm was audited by a Big Four accounting firm and 0 otherwise	Chi et al. (2009a, b)	A determinant of VR decision
(6) Variables for industry and year			
HITE	A dummy variable. Firms in the high-tech sector were assigned 1 and firms in other sectors were assigned 0. In this paper, our definitions of high-technology industries include Biotechnology & Medical Care, Semiconductor, Optoelectronic, Communications and Internet, and Information Service	Chung and Wynn (2008) and Wynn (2008)	−
Y2011	A dummy variable. Data from 2011 was assigned 1 and data from other years was assigned 0. This is to assess the effect of the year		?
τ, ν, η	Residuals		

demonstrates a decreasing trend for both VUAL and non-VUAL firms. These initial results demonstrate that greater *Cscore* values exist in VUAL of FCF and in non-VUAL of MCF.

4.2 Correlation coefficients

Table 6 presents the Pearson correlation coefficient test. All of our independent variables are significantly correlated

Table 4 Description statistics (N = 4564)

Variables	Mean	Std. dev.	Min.	p25	p50	p75	Max.
Cscore	0.165	0.121	− 0.124	0.090	0.161	0.227	0.577
VUAL	0.120	0.325	0.000	0.000	0.000	0.000	1.000
IDErating	3.460	1.543	0.000	3.000	4.000	4.000	7.000
VAC	0.072	0.259	0.000	0.000	0.000	0.000	1.000
MGRH	0.014	0.021	0.000	0.001	0.005	0.017	0.108
ODP	0.422	0.215	0.000	0.286	0.429	0.571	0.857
INSH	0.367	0.223	0.009	0.185	0.337	0.529	0.893
GM3C	0.444	0.759	0.000	0.000	0.000	1.000	6.000
CDIV	0.031	0.030	0.000	0.000	0.029	0.053	0.112
DEV	5.832	10.252	0.000	0.270	1.400	5.770	51.290
LLIAB	0.070	0.092	0.000	0.000	0.028	0.116	0.404
DOrank	0.505	0.500	0.000	0.000	1.000	1.000	1.000
BIG4	0.860	0.347	0.000	1.000	1.000	1.000	1.000
HITE	0.285	0.451	0.000	0.000	0.000	1.000	1.000
SCALE	15.022	1.450	12.245	13.949	14.863	15.874	19.518
MTB	1.506	1.083	0.400	0.830	1.190	1.760	6.630
LEV	0.865	0.899	0.031	0.264	0.578	1.139	5.149

Cscore = Follow the calculation of Khan and Watts (2009)

VUAL = A dummy variable. A firm was assigned 1 if it engaged in VR and 0 otherwise

The others definitions for variables please refer to Table 3

Table 5 Mean *Cscore* and VUAL of each empirical year

Year	2011		2012		2013		2014	
Items	N	Mean *Cscore*	N	Mean *Cscore*	N	Mean *Cscore*	N	Mean *Cscore*
Mean *Cscore* of each year	1141	0.185	1141	0.175	1141	0.153	1141	0.147
VUAL								
(1) The family-controlled	171	0.199	172	0.193	173	0.168	173	0.164
(2) The professional managers-controlled	70	0.153	69	0.143	68	0.124	68	0.117
(3) Both the family and professional managers controlled	26	0.202	26	0.184	26	0.156	26	0.161
(4) Government-controlled	6	0.033	6	0.029	6	0.035	6	0.036
All of voluntary audit firms	273	0.183	273	0.176	273	0.153	273	0.150
Non-VUAL (i.e. review) firms								
(1) The family-controlled	548	0.189	548	0.180	555	0.158	555	0.154
(2) The professional managers-controlled	207	0.186	210	0.170	200	0.151	199	0.135
(3) Both the family and professional managers-controlled	99	0.183	96	0.170	99	0.133	100	0.128
(4) Government-controlled	14	0.081	14	0.076	14	0.083	14	0.089
All of non-voluntary audit firms	868	0.186	868	0.175	868	0.152	868	0.146

with accounting conservatism (*Cscore*); these results support our research and those in the literature.

The significant correlation coefficient between the institutional shareholding (*INSH*) and the deviation of cash-flow rights (*DEV*) is 0.367. We attribute this to institutional shareholders protecting themselves and often requiring more holdings when *DEV* is higher. Because the correlation coefficients between other independent variables are all lower than 0.3, there are few collinearity problems in the empirical model of this study.

Fig. 1 Mean Cscore of the firms' controlled type
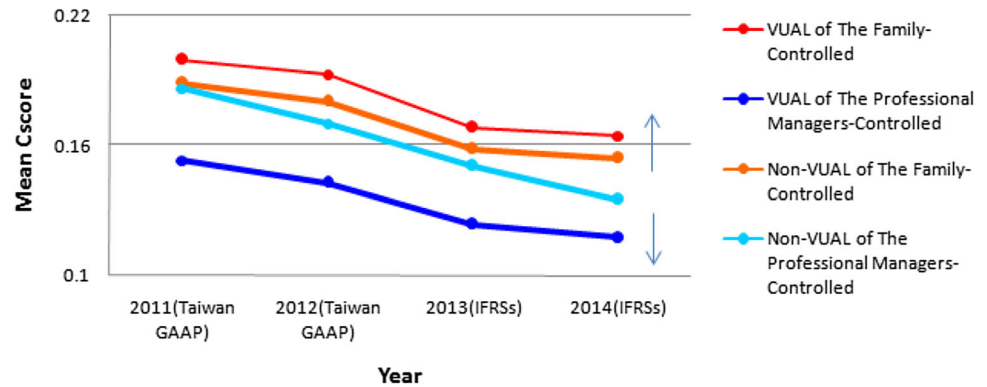
4.3 Regression analysis

The board of directors or management often decides whether a company implements a VUAL. As shown in Table 7, results of the first stage of the probit regression model (4) suggest that a number of factors affect the decision to implement a VUAL. Both the percentage of shares held by management (*MGRH*) and the number of seats on the board held by outside directors (*ODP*) exhibit positive significant relationships with *VUAL* across our samples. This means more shares held by managers and more outside directors would increase the likelihood of VUAL. These results are consistent with those of LaFond and Roychowdhury (2008), Ahmed and Duellman (2007), and Chi et al. (2009a, b). We also note that firms that set an audit committee voluntarily (*VAC*), firm scale (*SCALE*), and audit by a Big Four accounting firm (*BIG4*) have no significant relationship with *VUAL* in all of our samples. Normally, an audit committee requires the management to implement the VUAL, although the rule only requires that semi-year consolidated financial statements must be reviewed by auditors. This may explain why firms that set an audit committee voluntarily account for only 7.2% (as shown in Table 4). Additionally, larger firms usually have greater ability to perform a VUAL, because audit fees are higher than review fees. This may not be a primary factor of VUALs. Moreover, we predict that larger accounting firms push a company to implement a VUAL. This is based on communication between the company (including board and management) and the accounting firm. Consequently, we conclude that a VUAL is affected by critical insiders. This provides an area for further research.

The results of the model (5) in the second stage are presented in Table 8. The coefficients for the inverse Mill's ratio are significant, indicating that the probability of undertaking a VUAL influences accounting conservatism. After controlling for selection bias, we observe that companies that undertake a VUAL (*VUAL* = 1) exhibit no significant correlation between VUAL and *Cscore* in all of our samples. When we distinguish among family-controlled, professionally controlled, and other firms, we find a significant positive coefficient for VUAL (0.014, $p < 0.05$), indicating the significant positive relationship between *VUAL* and *Cscore* with in FCFs samples. This supports hypothesis 1. It means that may have a complementary effect between VUAL and accounting conservatism for firms with more information asymmetry base on FCFs. We also find a significant negative coefficient for VUAL (-0.017, $p < 0.05$), indicating the significant negative relationship between *VUAL* and *Cscore* within MCFs. This supports hypothesis 2. It means that may have a substitution effect between VUAL and accounting conservatism for firms with less information asymmetry base on MCFs.

In the past research, there are inconsistency about the relationship between information asymmetry and accounting conservatism such as LaFond and Watts (2008) and Chi et al. (2009a, b). Our research provide the evidence to explain one of the reasons about this inconsistency. These findings suggest that a VUAL is a useful function of corporate governance in different control structures.

The deviation of cash-flow rights (*DEV*) and ratio of long-term liabilities to total assets (*LLIAB*) are significantly positively correlated with accounting conservatism (*Cscore*), suggesting that more *DEV* and higher *LLIAB* can replace accounting conservatism. These results are consistent with those of Kao et al. (2011).

A higher information disclosure evaluation rating (*IDErating*), more institutional shareholding (*INSH*), a higher cash dividend rate (*CDIV*), greater director and officer liability insurance coverage (*DOrank*), and high-tech sector (*HITE*) firms are significantly negatively correlated with accounting conservatism (*Cscore*). These results are consistent with those of Ahmed and Duellman (2007), Chi et al. (2009a, b), and Kao et al. (2011).

The number of manager replacements within 3 years (*GM3C*) is nonsignificantly correlated with accounting conservatism (*Cscore*). This result is inconsistent with that of Kao et al. (2011). We assume a connection with the performance evaluation of general managers.

Table 6 Correlation matrix (N = 4564)

Variables	Cscore	VUAL	IDErating	VAC	MGRH	ODP	INSH	GM3C	CDIV	DEV
Cscore	1.000									
VUAL	0.044***	1.000								
IDErating	− 0.367***	− 0.017	1.000							
VAC	− 0.065***	− 0.001	0.089***	1.000						
MGRH	0.056***	0.036**	− 0.031**	− 0.009	1.000					
ODP	0.071***	0.042***	− 0.058***	0.174***	0.030**	1.000				
INSH	− 0.344***	0.023	0.049***	0.122***	− 0.182***	− 0.204***	1.000			
GM3C	0.051***	− 0.001	− 0.044***	0.016	− 0.071***	0.035**	0.017	1.000		
CDIV	− 0.297***	0.019	0.201***	− 0.017	0.100***	− 0.009	0.111***	− 0.149***	1.000	
DEV	− 0.032*	0.000	0.037*	0.148***	0.172***	− 0.108***	0.367***	0.027*	0.013	1.000
LLIAB	0.132***	0.029**	0.010	− 0.004	− 0.163***	− 0.072***	0.087***	0.034**	− 0.161***	− 0.003
DOrank	− 0.148***	0.030**	0.282***	0.156***	0.058***	0.167***	0.020	0.042***	0.073***	0.062***
BIG4	− 0.092***	0.007	0.076***	0.030**	0.052***	0.075***	0.101***	− 0.050***	0.055***	0.109***
HITE	− 0.028*	0.056***	− 0.035***	0.161***	0.084***	0.205***	− 0.089***	− 0.028*	− 0.089***	0.015
SCALE	− 0.714***	− 0.018	0.386***	0.117***	− 0.145***	− 0.169***	0.499***	− 0.064***	0.256***	0.078***
MTB	− 0.586***	− 0.032**	0.116***	0.023	0.019	0.043***	0.238***	0.002	0.078***	0.003
LEV	0.771***	0.043***	− 0.194***	0.009	− 0.038***	− 0.037**	− 0.034**	0.017	− 0.204***	0.020

Variables	LLIAB	DOrank	BIG4	HITE	SCALE	MTB	LEV
Cscore							
VUAL							
IDErating							
VAC							
MGRH							
ODP							
INSH							
GM3C							
CDIV							
DEV							
LLIAB	1.000						
DOrank	0.026*	1.000					
BIG4	0.053***	0.167***	1.000				
HITE	− 0.060***	0.138***	0.055***	1.000			
SCALE	0.180***	0.204***	0.140***	− 0.046***	1.000		
MTB	− 0.061***	0.053***	0.030**	0.035**	0.385***	1.000	
LEV	0.345***	− 0.032**	− 0.012	− 0.076***	− 0.119***	− 0.368***	1.000

p values in parentheses *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

Table 5 shows mean of annual cross-sectional correlations for 4564 firm-years between 2011 and 2014. This triangle of the matrix shows Pearson correlations. The definitions for variables please refer to Table 3

Table 7 First-stage: probit regression, model (4) (dependant variable: *VUAL*)

Independent variables	Pred. sign	Family-controlled		Professional managers-controlled		Others-controlled		All samples	
		Coeff.	z-stat.	Coeff.	z-stat.	Coeff.	z-stat.	Coeff.	z-stat.
Constant		− 1.130**	− 2.476	− 1.461**	− 1.976	− 0.172	− 0.152	− 1.017***	− 2.852
IDErating	+	0.032	1.101	0.066	1.431	− 0.054	− 0.778	0.035	1.531
VAC	+	0.001	0.002	0.429**	2.292	− 0.470	− 1.016	0.161	1.234
MGRH	+	4.758**	2.453	2.909	1.104	8.520*	1.767	3.805***	2.640
ODP	+	0.664***	3.603	0.782**	2.479	− 0.181	− 0.401	0.556***	3.822
INSH	+	0.636***	2.995	0.763**	2.057	1.279**	2.520	0.712***	4.174
GM3C	−	− 0.013	− 0.258	− 0.011	− 0.124	0.030	0.266	− 0.007	− 0.180
DEV	−	− 0.008*	− 1.885	− 0.002	− 0.340	− 0.016**	− 2.013	− 0.007**	− 2.065
CDIV	+	0.432	0.326	1.402	0.696	2.514	0.751	0.617	0.596
LLIAB	+	0.942**	2.360	0.598	0.820	0.229	0.216	0.826**	2.517
SCALE	−	− 0.017	− 0.518	− 0.042	− 0.771	− 0.084	− 0.933	− 0.030	− 1.133
DOrank	−	− 0.051	− 0.648	0.093	0.620	0.522***	2.733	0.029	0.463
BIG4	+	− 0.063	− 0.618	0.207	0.816	− 0.140	− 0.521	− 0.046	− 0.522
HITE	+	0.230**	2.566	0.077	0.637	0.685***	3.236	0.204***	3.113
Y2011		− 0.017	− 0.230	0.101	0.851	− 0.047	− 0.269	0.011	0.194
N		1439		556		287		2282	
Wald $\chi^2(14)$		36.33***		25.57**		26.01**		55.60***	
Period		2011–2012							

p values in parentheses *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

The definitions for variables please refer to Table 3

Table 9 demonstrates the regression analysis results of model (6). We find a significant negative (− 0.022, $p < 0.01$) relationship between IFRSs and *Cscore* in all of our samples, both family-controlled and professionally controlled firms. This supports hypothesis 3; adoption of IFRSs reduces accounting conservatism because information transparency is improved.

5 Conclusion

Our empirical results suggest the following:

1. VUAL decisions and accounting conservatism exhibit a significant positive relationship in FCFs base on the result of family control column, Table 8. That is, FCFs more likely to implement a VUAL are also likely to prepare more conservative consolidated financial statements to reduce the information asymmetry. This signifies a complementary effect between VUAL and accounting conservatism for firms with more information asymmetry.
2. VUAL decisions and accounting conservatism exhibit a significant negative relationship in MCFs base on the result of professional manager control column,

Table 8, suggesting a substitution effect between VUAL and accounting conservatism for firms with less information asymmetry.

3. The accounting conservatism of consolidated financial statements has decreased after the mandatory adoption of IFRSs in Taiwan; the disclosure and transparency of consolidated financial statements have been improved.

In the past research, there are inconsistency about the relationship between information asymmetry and accounting conservatism such as LaFond and Watts (2008) and Chi et al. (2009a, b). Our research provide the evidence to explain one of the reasons about this inconsistency. We believe this is the first study to investigate the relationship between VUAL and conservatism based on holding structure. We confirm that a firm undertaking a VUAL can reduce information asymmetry or increase information transparency. After mandatory adoption of IFRSs, we also find a consistent difference in accounting conservatism between FCFs and MCFs. Our findings suggest that a VUAL is a signal of credibility for investors or potential investors. We remind users of consolidated financial statements to research whether firms implement VUALs before making related decisions, because the information asymmetry of FCF is higher than the others, and the

Table 8 Second-stage:OLS regression, model (5) (dependent variable: *Cscore*)

Independent variable	Pred. sign	Family-controlled		Professional managers controlled		Others controlled		All samples	
		Coeff.	z-stat.	Coeff.	z-stat.	Coeff.	z-stat.	Coeff.	z-stat.
Constant		0.532***	15.613	0.441***	10.216	0.726***	10.223	0.626***	20.738
VUAL	±	0.014**	1.984	− 0.017**	− 2.059	− 0.002	− 0.176	0.004	0.878
IDErating	−	− 0.027***	− 11.232	− 0.022***	− 6.324	− 0.010***	− 2.640	− 0.026***	− 14.771
INSH	−	− 0.238***	− 15.637	− 0.264***	− 13.211	− 0.365***	− 11.425	− 0.271***	− 22.276
GM3C	+	0.001	0.204	0.026***	4.467	− 0.015**	− 2.334	0.004*	1.649
DEV	+	0.002***	4.769	0.002***	5.520	0.003***	5.168	0.002***	7.675
CDIV	−	− 1.043***	− 11.182	− 0.568***	− 4.475	− 1.135***	− 5.081	− 0.950***	− 13.199
LLIAB	+	0.069**	2.058	0.272***	5.205	0.224***	4.132	0.093***	3.468
DOrank	−	− 0.002	− 0.265	− 0.025***	− 2.665	− 0.083***	− 5.218	− 0.016***	− 3.582
HITE	−	− 0.049***	− 5.965	− 0.034***	− 4.311	− 0.113***	− 5.870	− 0.057***	− 9.849
Y2011	+	0.012**	2.045	0.004	0.569	0.019*	1.755	0.010**	2.300
Mills		− 0.118***	− 5.387	− 0.067***	− 2.934	− 0.222***	− 5.811	− 0.177***	− 9.628
N		1439		556		287		2282	
F value		61.18***		29.36***		26.88***		108.6***	
Adj R^2		0.3119		0.4228		0.4651		0.3489	
Mean VIF		1.27		1.24		1.84		1.32	
Period		2011–2012							

p values in parentheses *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

The definitions for variables please refer to Table 3

Table 9 OLS regression result of IFRSs and accounting conservatism, model (6) (dependent variable: *Cscore*)

Independent variables	Pred. sign	VUAL group		Non-VUAL (review) group		All samples	
		Coeff.	z-stat.	Coeff.	z-stat.	Coeff.	z-stat.
Constant		0.369***	35.972	0.337***	52.585	0.344***	63.626
IFRS	−	− 0.022***	− 3.407	− 0.021***	− 6.305	− 0.021***	− 7.110
IDErating	−	− 0.024***	− 11.000	− 0.023***	− 15.891	− 0.024***	− 19.338
INSH	−	− 0.236***	− 16.211	− 0.188***	− 22.360	− 0.200***	− 27.487
GM3C	+	0.001	0.283	0.001	0.482	0.001	0.679
DEV	+	0.002***	5.516	0.001***	6.180	0.001***	8.162
CDIV	−	− 0.634***	− 5.492	− 0.776***	− 13.627	− 0.743***	− 14.469
LLIAB	+	0.173***	5.036	0.176***	8.547	0.176***	9.915
DOrank	−	− 0.014**	− 2.123	− 0.010***	− 2.912	− 0.011***	− 3.355
HITE	−	− 0.042***	− 6.284	− 0.012***	− 3.031	− 0.020***	− 6.022
N		1092		3472		4564	
F value		78.81***		156.5***		225.1***	
Adj R^2		0.3599		0.3178		0.3246	
Mean VIF		1.11		1.11		1.10	
Period		2011–2014					

p values in parentheses *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

The definitions for variables please refer to Table 3

information transparency is higher in FCF that implement VUALs.

The limitations of this study are as follows:

1. All determinants of VUAL may not be included in our study. Gender, age and country-specific management culture may change the likelihood of a VUAL. In the future, researchers can control for the gender, age, and country-specific management culture of internal decision-makers to obtain further results on the basis of our current conclusions.

2. Although Taiwan adopted IFRSs in 2013, the standards are continually modified. A 2010 version (adopted 2013–2014), 2013 version (adopted 2015–2017), 2017 version, and 2018 version have been announced by Financial Supervisory Commission. This may change the accounting conservatism of listed firms after 2015. If scholars can control for the changes in the IFRSs in Taiwan, they may obtain more detailed results on the basis of our current conclusions.

3. The effect of VUALs on accounting conservatism is an inside effect of corporations. Further research could identify the effects of VUALs outside of corporations, such as the effect of VUALs on the credit rating or the capital cost or the interest ratio of loans from banks. In future research, scholars can tests the effect of auditing assurance on credit rating or capital cost.

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