

Audit Committees and Financial Reporting Quality in Singapore

Yuanto Kusnadi¹ · Kwong Sin Leong¹ ·
Themis Suwardy¹ · Jiwei Wang¹

Received: 17 September 2014/Accepted: 21 April 2015/Published online: 9 May 2015
© Springer Science+Business Media Dordrecht 2015

Abstract We examine three characteristics (independence, expertise, and overlapping membership) of audit committees and their impact on the financial reporting quality for Singapore-listed companies. The main finding is that financial reporting quality will be higher if audit committees have mixed expertise in accounting, finance, and/or supervisory. In addition, we do not find evidence that incremental independence of audit committees enhances financial reporting quality because audit committees already consist of a majority of independent directors. Finally, we fail to find any impact of overlapping membership on audit and remuneration committees on financial reporting quality. Overall, the results have policy implications on improving corporate governance effectiveness in terms of financial reporting quality.

Keywords Corporate governance · Audit committee · Independence · Expertise · Overlapping membership · Financial reporting quality

JEL Classification G34 · M41

Introduction

This paper aims to examine the impact of audit committee on financial reporting quality in Singapore. Audit committee of corporate board of directors has

received broad-based support for many years as a key component of effective corporate governance. Audit committee's main duty is overseeing financial reporting process to ensure managers reporting their firm performance ethically. Opportunistic reporting of firm performance by manipulating financial numbers is detrimental to shareholders' value because shareholders will get false information which may result in higher information asymmetry and higher cost of capital. The effectiveness of corporate audit committee in overseeing the financial reporting process depends on the independence of audit committee members (Klein 2002), the expertise of audit committee members (Dhaliwal et al. 2010), and the overlapping membership on audit and remuneration committees (Chandar et al. 2012; Liao and Hsu 2013).

The composition of audit committee is less stringent in Singapore than other more developed economies such as the US. In December 1999, The NYSE and NASDAQ modified their requirements for audit committees in listed companies and mandated firms to have at least three audit committee members and all members must be independent who have no relationship to the company that may interfere with the exercise of their independence from management and the company (Klein 2002). Singapore's Companies Act has a similar mandatory requirement but it only requires the *majority* of audit committee members to be independent. In practice, audit committees in Singapore may contain executive directors (including the CEO) and non-independent non-executive (i.e., affiliated or grey) directors before 2001 (Bradbury et al. 2006). The Singapore Code of Corporate Governance in 2001 and subsequent revised versions in 2005 and 2012 require all audit committee members to be non-executive directors but it does not require all of them to be independent,

✉ Jiwei Wang
jwwang@smu.edu.sg

¹ School of Accountancy, Singapore Management University, 60 Stamford Road, Singapore 178900, Republic of Singapore

although the majority of audit committee members and the Chairman must be independent.¹ In addition, compliance with the Singapore Code of Corporate Governance is not compulsory, but listed companies are required to disclose any deviation from the Code in their annual reports.²

Although there are numerous studies in the existing literature on audit committee characteristics, to the best of our knowledge, Bradbury et al. (2006) is the only study to examine the impact of audit committee members' independence on financial reporting quality in Singapore. However, their data sample period is for the year 2000 which is before the Singapore Code of Corporate Governance was first issued in 2001 and it is interesting to examine this important issue using a more recent sample. In addition to audit committee members' independence, we contribute to the existing literature by examining another two important characteristics of audit committee, i.e., the expertise of audit committee members and overlapping membership on audit and remuneration committees, which have yet been examined in prior studies involving Singapore-listed companies.

We hand collect all the three audit committee characteristics data for 423 Singapore Exchange (SGX) listed companies in fiscal year 2010, which have financial information on COMPUSTAT Global database. We employ the Dechow and Dichev (2002) measure of accruals quality based on how precisely the current accruals map into past, present, and future cash flows, and use accruals quality as a proxy for the financial reporting quality of Singapore firms. The empirical findings are summarized as follows.

First, we do not find that audit committee members' incremental independence leads to higher financial reporting quality. Our explanation is that all audit committees of our sample firms consist of at least a majority of independent directors and marginal improvement in the audit committee independence will not result in higher financial reporting quality. This result is also consistent with Klein (2002) which finds that there is no statistical difference in financial reporting quality for audit committees with all independent directors compared with those with a majority only of independent directors. It may also indicate that audit committees with a majority of independent

directors should be independent enough to monitor companies' financial reporting process. Hence it might be unnecessary to mandate all audit committee members to be independent as what is required in the US and the UK currently.

Second, we find that financial reporting quality increases with the presence of accounting experts in audit committee, which highlights the important role that expertise plays in board monitoring and governance. In addition, we further decompose audit committee with accounting experts into several other components: those with accounting experts only; those with accounting and finance experts only; those with accounting and supervisory experts only; and those with all the three expertise. The findings reveal that financial reporting quality is not affected if audit committees are made up of only accounting experts. Instead, financial reporting quality is only improved when the audit committees also consist of members that possess other skill-set in terms of finance or supervisory expertise. Therefore, our empirical results lend further credence to the call for diversity of expertise in audit committees and extend that of Dhaliwal et al. (2010) for the US firms, who find that financial reporting quality is positively associated with the presence of accounting and finance (but not supervisory) experts in audit committee. We interpret our findings as suggesting that supervisory expertise gained through experience in supervising corporate operations is a good complement to the domain-specific expertise in accounting and finance. This is supportive of Goh (2009), who finds that the proportion of audit committee members with supervisory expertise, rather than accounting expertise, is positively associated with firms' timeliness in the remediation of internal control weaknesses in the US firms.

Third, we do not find that accounting experts with overlapping membership on audit and remuneration committees matters for financial reporting quality. The theory by Laux and Laux (2009) proposes that audit committee members sitting on remuneration committee shall know more on management's pay-for-performance compensation package and hence better able to identify management's incentives to manipulate financial reporting. Our result indicates that the overlapping membership does not contribute to the monitoring of financial reporting quality. There might be a dilution of efforts by overlapping membership directors and hence there is no improvement in monitoring financial reporting process. In fact, Liao and Hsu (2013) find that firms with overlapping membership have lower financial reporting quality.

Overall, the results from this study shed further light on the role that audit committee plays in listed companies and offers some policy implications to regulators in Singapore and other economies. First, whether audit committees

¹ Regulators have different requirements or recommendations on the independence of audit committee members. Although regulators in the US and the UK require all audit committee members to be independent, regulators in Australia, China, Hong Kong, Singapore and many other markets require only majority of audit committee members to be independent. Klein (2002) finds that there is no significant difference in financial reporting quality for audit committees with all independent directors compared to those with a majority only of independent directors.

² The Singapore Code is available at <http://www.mas.gov.sg/>.

should be fully independent or majority independent is still debatable. Unlike in the US whereby the regulator mandates that all audit committee members to be independent, the Singapore Code of Corporate Governance does not have such stringent requirement. The bottom line is that the majority of audit committee, including the Chairman of audit committee, must be independent.

Second, our results suggest that mixed expertise with accounting, finance, and/or supervisory is better than a single expertise in the audit committee. One important ethical implication is that regulators may consider making similar recommendations to public companies to further enhance the effectiveness of audit committees in Singapore and other economies. Having mixed expertise in audit committees helps to mitigate the incidence of fraudulent financial reporting, which in turn decreases the likelihood of firms receiving unclear opinion from external auditors such as qualified opinion, no opinion, adverse opinion, or unqualified opinion with explanatory language. This implies that audit committees are performing their monitoring role of the financial reporting process more effectively, which subsequently leads to improved firm performance.

Finally, we do not find any impact of the overlapping membership on audit and remuneration committees on financial reporting quality. However, we believe there is important knowledge transmission between sub-committees, and the impact on the effectiveness of board monitoring is still unknown. We leave this issue for future research.

The remainder of this study is organized as follows. In the next section, we provide a literature review on the studies on the effectiveness of audit committees and develop the hypotheses. We then outline the research design and provide the sample collection procedures and descriptive statistics of the main variables. We finally present the empirical results, followed by conclusions of our research findings.

Literature Review and Hypothesis Development

In this section, we review the literature and develop four hypotheses on the impact of audit committee independence, expertise of audit committee members, and overlapping membership on audit committee and remuneration committee on financial reporting quality.

Audit Committee Independence and Financial Reporting Quality

The primary duty of audit committee is to oversee the firm's financial reporting process, including the integrity of financial statements, the effectiveness of internal controls,

and the monitoring of both internal and external auditors. It enhances the board of directors (principal)'s capacity to act as a monitor of management (agent) by providing more detailed knowledge and understanding of financial statements of the company (Pincus et al. 1989). The audit committee is also expected to play a role as arbiter between management and external auditors since these two parties may have legitimate differences of opinion in how to best apply accounting standards (Klein 2002). Thus, the existence and independence of audit committee members may help them to balance divergent views of management and external auditors to produce ultimately a higher quality financial report.

This stream of research is pioneered by DeFond and Jiambalvo (1991), who find that the existence of audit committee is more likely to prevent overstatement accounting errors. They examine the incidence of accounting errors revealed by prior period adjustments for 41 US listed firms and find that overstatements are less likely among firms that have audit committees. Similarly, Dechow et al. (1996) study US firms that were subject to accounting enforcement actions by the Securities and Exchange Commission (SEC) for alleged violations of accounting standards and report that firms manipulating earnings are less likely to have an audit committee. However, Beasley (1996) fails to find any significant association between the presence of audit committees and the likelihood of financial fraud by examining 75 US firms which were involved in financial fraud. His result was reasonable because audit committees were formed voluntarily in the early years and there was considerable anecdotal evidence that many, if not most, audit committees fell short of doing what are generally perceived as their fiduciary duties.

Klein (2002) is probably the first study that systematically examines the impact of audit committee independence on financial reporting quality. She hand-collected 692 firm-year observations with the data of composition of board from S&P 500 firms during the period 1992–1993. A negative relation is found between audit committee independence and abnormal accruals (which is a common measure of financial reporting quality). Carcello and Neal (2003) examine disclosure practice of a sample of 138 publicly held manufacturing companies experiencing financial distress during 1994 in the US. They find that there is a significant negative relation between the percentage of independent directors on audit committee and the optimism of the going-concern discussion in both the notes and the Management Discussion & Analysis (MD&A). Using hand-collected board data from 139 firms in Singapore and 113 firms in Malaysia, Bradbury et al. (2006) find that the relation between audit committee independence and higher financial reporting quality exists only when the abnormal accruals are income increasing.

Although empirical results suggest that audit committee independence plays an important role in reporting higher quality financial information and some countries such as the US and the UK require all audit committee members to be independent, Singapore and many other countries such as Australia and China have been only requiring the majority of audit committee members to be independent. Before the Singapore Code of Corporate Governance was first issued in 2001, Singapore Companies Act required firms to appoint an audit committee of at least three members, a majority of whom are independent directors. As reported by Bradbury et al. (2006), some of the audit committee members in 2000 were executive directors such as CEOs. In 2001, the Code further requires that all audit committee members must be non-executive and the majority including the Chairman should be independent. However, compliance with the Code is not mandatory and listed companies are required under the Singapore Exchange Listing Rules to disclose their corporate governance practices and give explanations for deviations from the Code in their annual reports.³

In sum, whether the audit committee independence in Singapore will be positively related to financial reporting quality or not is still an empirical question. We formally present the hypothesis in an alternative format as follows.

H1 The audit committee members' independence is positively associated with financial reporting quality.

Expertise of Audit Committee Members and Financial Reporting Quality

The financial expertise of audit committee members has gained the attention of regulators around the world in recent years. For example, in the US, Sect. 407 of Sarbanes–Oxley Act of 2002 requires the SEC to adopt rules mandating audit committee of public firms include at least one member who is a *financial expert* or disclose reasons for not adopting this requirement. The UK Corporate Governance Code 2010 issued by Financial Reporting Council also suggests that there be at least one member of audit committee who has recent and relevant *financial experience*. Corporate Governance Principles and Recommendations with 2010 Amendments issued by Australian Securities Exchange recommend Australian public firms that establish audit committees with members who have relevant *technical expertise*. It also clarifies that the committee should have at least one member with relevant qualifications and experience in financial or accounting matters. The Singapore Code of Corporate Governance

2012 issued by the Monetary Authority of Singapore and the Singapore Exchange puts more emphasis on *financial expertise* and it recommends public firms in Singapore have at least two members, including audit committee Chairman, to have recent and relevant accounting or related financial management expertise or experience. It infers that Singapore encourages companies to have mixed expertise. Although the definition of financial expertise varies from code to code, accounting-related expertise or experience is commonly accepted as the most important dimension of financial expertise.

As the primary duty of audit committee is to oversee the financial process of the company, it is reasonable to believe that audit committee members with financial expertise (especially accounting expertise) have more effective means to monitor management's financial reporting practices to produce higher quality financial reporting. Findings from the existing academic studies generally support the prediction and find that the presence of audit committee members with financial expertise is positively associated with financial reporting quality. For example, Carcello et al. (2006) find that independent audit committee members with accounting expertise and certain types of non-accounting financial expertise are most effective in mitigating earnings management. Using internal control weakness as a measure of financial reporting quality, Zhang et al. (2007) find that firms are more likely to be identified with an internal control weakness if their audit committees have less accounting financial expertise and non-accounting financial expertise. However, another two recent studies find contradicting results on the role of accounting expertise and non-accounting expertise. Examining the composition of audit committees for a sample of S&P 500 firms, Krishnan and Visvanathan (2008) find that only accounting financial expertise, rather than non-accounting financial expertise, is positively associated with conservatism, a fundamental property of financial statements. On the other hand, Goh (2009) finds that only non-accounting financial expertise, rather than accounting financial expertise, is positively associated with firms' timeliness in the remediation of material weakness in internal control.

In sum, the impact of accounting expertise on financial reporting quality is still an open question. We express the hypothesis in alternative format as follows.

H2 The audit committee members' accounting expertise is positively associated with financial reporting quality.

Although Krishnan and Visvanathan (2008) fail to find any significant impact of non-accounting financial expertise on financial reporting quality,⁴ existing theoretical and

³ We find no deviations in our sample firms, i.e., all audit committee members are non-executive directors and the majority of them are independent.

⁴ On the other hand, Goh (2009) fail to find any significant association between accounting financial expertise and the timeliness of remediation of internal control weaknesses.

empirical research suggest that a mix of accounting and non-accounting expertise may enhance audit committee's ability to monitor financial reporting process. Resource dependence theory argues that directors extract human capital resources from other directors to improve firm performance (Pfeffer 1972). Hence, both Cohen et al. (2008) and Hillman et al. (2000) argue that audit committee can benefit from a mix of accounting and non-accounting expertise, such as finance expertise and management/supervisory expertise. Using a sample of 770 firms during the period of 2004–2006, Dhaliwal et al. (2010) find that finance experts such as investment bankers and financial analysts can complement accounting experts to promote higher financial reporting quality as measured by accruals quality. They also find that supervisory experts such as CEOs or company presidents are *unable* to help accounting and finance experts to enhance financial reporting quality, which appears to contradict the findings in Goh (2009).

Whether or not non-accounting experts such as finance experts and supervisory experts will enhance financial reporting quality in Singapore is still an empirical question. We state the hypothesis in alternative format as follows.

H3 The audit committee members' mixed expertise with accounting, finance, and supervisory experts is positively associated with financial reporting quality.

Overlapping Memberships in the Audit and Remuneration Committees

A recent theoretical study by Laux and Laux (2009) argues that the presence of remuneration committee will increase the use of pay-for-performance CEO compensation such as stock-based payments in order to better incentivize the management. The usage of pay-for-performance compensation could motivate CEOs to influence the financial reporting process in order to report better performance for higher compensation. The higher monitoring cost associated with pay-for-performance compensation will be borne by the audit committee. Individuals that sit in both audit committee and remuneration committee may curb the increase of pay-for-performance, which results in lower monitoring cost and higher financial reporting quality. The overlapping membership enables them to understand management's incentive better because they know more about the pay-performance compensation contract, and hence results in higher financial reporting quality as well.

Recent empirical studies have found mixed evidence on the theory of Laux and Laux (2009). Chang et al. (2011), Hoitash and Hoitash (2009), and Zheng and Cullinan (2010) find that companies with less overlap among audit

and remuneration committees are more likely to employ incentive executive compensation such as stock options. Chandar et al. (2012) examine the impact of overlapping membership on financial reporting quality, using a sample of non-financial S&P 500 firms representing 1032 firm years over the period 2003–2005. They find that firms with overlapping audit and remuneration committees have higher financial reporting quality which is measured by accruals quality. On the contrary, using 4572 firm-year observations in the US during fiscal years 2004–2008, Liao and Hsu (2013) find that US firms with overlapping membership have poorer financial reporting quality and weaker CEO pay-performance sensitivity.

Whether overlapping membership in the audit and remuneration committees in Singapore firms will have any positive impact on financial reporting quality is still an open question. We state the hypothesis in an alternative below.

H4 Firms with overlapping membership on the audit and remuneration committees are more likely to have higher financial reporting quality.

Research Methodology

In this section, we describe the research methodologies that are designed to test the main hypotheses that we have developed in the previous section.

Dependent Variable: Financial Reporting Quality

Consistent with numerous recent studies (e.g., Francis et al. 2005; Bharath et al. 2008; Dhaliwal et al. 2010), we employ accruals quality as a proxy for financial reporting quality. Audit committee members' fiduciary duties are to provide effective monitoring of financial reporting process of the company and ensure that the management provides high quality financial reporting to reflect true firm performance. In this way, any incidence of unethical performance manipulation by managers will be detected early. Managers manipulate firm performance mainly through manipulation of accounting numbers (i.e., accruals), hence we employ accruals quality in our study as primary measure of financial reporting quality. There is no universally accepted measure for accruals quality and we adopt the Dechow and Dichev (2002) model. The basic Dechow and Dichev model assumes that accruals quality depends on how precisely the current accruals map into past, present, and future cash flows. High precision on the mapping of current accruals and cash flows indicate high financial reporting quality. The model is presented as follows:

$$\Delta WC_t = a_0 + a_1 CFO_{t-1} + a_2 CFO_t + a_3 CFO_{t+1} + \text{Industry} + \varepsilon_t \quad (1)$$

where ΔWC_t is the change in working capital accruals of firm i (we omit the subscript i for model simplicity) in year t , measured as the increase in accounts receivable plus the increase in inventory plus the decrease in accounts payable and accrued liabilities plus decrease in taxes accrued plus the increase (decrease) in other assets (liabilities), scaled by average assets; CFO_t is the cash flow from operations in year t scaled by average assets; *Industry* is the industry dummies.

Following the argument by Bradbury et al. (2006), due to the relatively small number of firms within each industry in Singapore and the short-time period, we estimate Eq. (1) by using a pooled ordinary least-squares (OLS) regression methodology which controls for effect of industries (using the industry classification from Fama and French (1997)) instead of estimating industry-specific or firm-specific regressions. Dhaliwal et al. (2010) estimate firm-specific regressions for their US sample, however, others have argued that industry-specific regressions are more appropriate for estimating accruals quality [see the survey by Dechow et al. (2010)]. For example, Subramanyam (1996) reports that cross-sectional model generates a larger sample and increases the precision of the estimates. We also require sample firms to have at least five consecutive years' of non-missing data on the control variables to estimate the pooled sample regression. Our measure of accruals quality (*FRQ*) is based on the standard deviation of residuals from the pooled sample. We multiply the standard deviation by (−1) to calculate *FRQ*. Therefore, a higher value of *FRQ* indicates higher accruals quality and higher financial reporting quality.

Independent Variables: Characteristics of Audit Committee

Panel B of Appendix Table 9 defines our independent variables about the characteristics of audit committee. We adopt the definition of independent director as recommended by the Singapore Code of Corporate Governance 2012 (Guideline 2.3), whereby an independent director is “one who has no relationship with the company, its related corporations, its major shareholders (those who owns a 10 % or more stake in the company), or its officers that could interfere, or be reasonably perceived to interfere, with the exercise of the director’s independent business judgement with a view to the best interests of the company.” The Code also requires the board of directors of a company to identify in its annual report each director that it considers to be independent. It is the sole responsibility of the board of directors to determine “whether the director is

independent in character and judgement and whether there are relationships or circumstances which are likely to affect, or could appear to affect, the director’s judgement.” We hand-collected the independence status of audit committee members from the annual reports as disclosed by companies and we have no information to judge whether audit committee members are truly independent or not. This limitation of data applies to all research which requires independence status of corporate directors.

Following Klein (2002), we use two definitions of audit committee members’ independence. The basic independence measure is the percentage of independent directors on audit committees (*AC_IND*). The other measure is a dichotomous variable which takes a value of 1 if all (100 % rule) audit committee members are independent from management (*AC_IND_100*).⁵

Financial expertise is another important characteristic of audit committees. The Singapore Code of Corporate Governance (Guideline 12.2) recommends that at least two audit committee members, including the Chairman of audit committee, have recent and relevant accounting or related financial management expertise or experience. Although financial expertise is required by the Code, there is a call for mixed expertise in the Guidebook for Audit Committees in Singapore jointly issued by Accounting and Corporate Regulatory Authority, Monetary Authority of Singapore and Singapore Exchange.⁶ The Guidebook interprets financial expertise as having some or all of the following abilities or experience: understand and assess the quality of financial reporting process including internal controls (mainly accounting expertise); understand risk factors relevant to the company’s operations including those relating to treasury operations, investment activities, and financing activities (mainly finance expertise); and experience gained through executive responsibility for a sizeable business including having or having had responsibility for the finance function, such as being or having been a CEO, CFO, or other senior officer with financial oversight responsibilities (mainly supervisory expertise). The Guidebook also recommends that “the combination of skills within the AC should reflect broad experience and knowledge relevant in assisting the AC in discharging its responsibilities.”

Accordingly, in our study we classify financial expertise into accounting expertise, finance expertise and supervisory

⁵ We do not use the 51 % rule, i.e., whether or not more than half audit committee members are independent, in the study because almost all (98 %) of our sample firms satisfy the 51 % rule and the rest (2 %) of our sample firms have exactly 50 % independent audit committee members. Descriptive statistics of the variables are reported in Table 2.

⁶ The Guidebook is available at <https://www.acra.gov.sg/Publications/Guides/>.

expertise. The classification system of audit committee members' financial expertise closely follows that which has been widely used in the existing literature (such as DeFond and Jiambalvo 1991; Krishnan and Visvanathan 2008; Dhaliwal et al. 2010). We first classify audit committee members to two different groups: *accounting* financial experts and *non-accounting* financial experts. *Accounting financial experts (ACCT)* are classified as audit committee members who are certified public accountants (CPAs) or with prior work experience as chief financial officers (CFO), vice president of finance, financial controllers, or any other major accounting positions. *Non-accounting financial experts* comprise of finance and supervisory experts. *Finance experts (FINA)* are classified as audit committee members with prior work experience as investment bankers, chief investment officers, financial analysts, or any other corporate finance role. Finally, *supervisory experts (SUPER)* are the second-type of non-accounting financial experts and they are classified as audit committee members with prior work experience in supervisory roles such as chief executive officers (CEO) or company presidents. Essentially, all the three expertise examined in this study refer to different types of financial expertise recommended in the Singapore Code of Corporate Governance.⁷

The basic measure of overlapping membership on audit and remuneration committees is a dichotomous variable (*OVERLAP*) which takes a value of 1 if at least one audit committee member sits on the remuneration committee and 0 otherwise. We also control for the overlapping member's independence and accounting expertise because independent accounting experts are more experienced in performance measurement which enables them to better write top management's compensation contract and monitor financial reporting process. We define a dichotomous variable (*OVERLAP_ACCT*) which takes a value of 1 if there is at least one independent accounting expert sitting on both the audit and remuneration committees.

Control Variables

Panel C of Appendix Table 9 defines the control variables used in this study which may affect financial reporting quality according to the existing literature. We control for other characteristics of audit committees: the number of audit committee members (*AC_SIZE*), the proportion of

total shares held by all audit committee members (*AC_SHARE*), the mean number of boards audit committee members serve on (*AC_MULTB*), the mean tenure of audit committee members (*AC_TENURE*), and the number of audit committee meetings (*AC_MEET*) held in a financial year. In addition to the attributes of audit committee members, we also control for the attributes of corporate boards: the number of non-audit committee directors sitting on the board (*BD_SIZE*), the proportion of total outstanding shares held by the non-audit committee directors (*BD_SHARE*), and the CEO-board chairman duality (*DUALITY*). The quality of external auditors is measured by whether or not the firm is audited by one of the Big Four accounting firms (*BIG4*).⁸ Other firm characteristics, such as whether or not the firm is a family firm (*FAMILY*), government-linked firm (*GLC*), or Singapore-listed Chinese firms (*SCHIPS*), are also controlled in the regressions.

Finally, we also control for all the innate factors identified by Francis et al. (2004) and Dechow and Dichev (2002) which find that accruals quality is (a) related to the standard deviation of cash flow from operations (*STDCFO*), the frequency of reporting negative earnings (*NEG EARN*), the standard deviation of sales revenue (*STDSALES*), the log of the operating cycle (*OPCYCLE*), and the ratio of total intangibles to total sales (*INTSALES*) and (b) positively related to the log of total assets (*ASSETS*), the absence of reported intangibles (*INTDUM*), and the ratio of net property, plant, and equipment to average total assets (*PPE*). Appendix Table 9 provides the detailed definition of all the variables used in the study.

Research Design

We employ cross-sectional regression analysis to test the impact of audit committee characteristics on financial reporting quality in Singapore. The basic model is presented in Eq. (2) as follows:

$$FRQ_i = \beta_0 + \sum \beta_k \times \text{Independent variables}_i + \sum \beta_j \times \text{Control variables}_i + \varepsilon_i \quad (2)$$

Note that larger *FRQ* values indicate higher accruals quality and financial reporting quality, hence significant positive coefficient estimates of independent variables imply positive impact of the underlying factor on financial reporting quality.

We first introduce audit committee independence measures into the regression model, followed by measures of audit committee members' expertise and overlapping membership on audit and remuneration committee, to test

⁷ Moreover, we allow an audit committee member to have more than one expertise, if they have the relevant experience and qualifications. For example, if an individual audit committee member is a CPA and at the same time is a CEO of another company, we will classify him to be both an accounting and a supervisory expert. We believe that our measures of expertise capture the full mix of expertise of audit committee members in Singapore.

⁸ The Big Four accounting firms are Deloitte, Ernst & Young, KPMG and PricewaterhouseCoopers.

the impact of each of the three audit committee characteristics on the financial reporting quality and examine which characteristic exert a dominant role in monitoring the financial reporting process.

Sample and Data Description

Table 1 outlines the sample selection procedure. Our initial sample comprises all the 782 firms listed on Singapore Exchange as of 31 December 2010. We manage to extract 539 non-financial firms with accounting data in fiscal year 2010 from the COMPUSTAT Global database. We exclude 101 firms without at least 5 years of consecutive financial data available for computing accruals quality for the fiscal year 2010 and another 15 firms with missing values on control variables for the subsequent regression analyses. We then manually collect the data on board of directors and audit committees for the remaining 423 non-financial companies from their respective annual reports for the fiscal year 2010. Our final sample consists of 423 firms with complete financial data as well as board and audit committee characteristics data for the fiscal year 2010, which is much larger than the 139 sample firms used in Bradbury et al. (2006).

Table 2 presents the descriptive statistics for the accruals quality (*FRQ*), audit committee and board characteristics, and other relevant control variables. For the fiscal year 2010, Singapore firms have a mean *FRQ* value of -0.107 (median = -0.089), with a minimum value of -0.419 and a maximum value of -0.009 . The average proportion of independent directors in audit committees (*AC_IND*) is about 87 %, with a minimum value of 50 % (i.e., all sample firms have at least half of independent audit committee members). Unreported data indicate that 98 % of sample firms have a majority (i.e., more than half) of independent directors sitting on audit committees. Moreover, 59 % of audit committees are made up of entirely independent directors (*AC_IND_100*). The mean value of independent director proportion (*AC_IND*) for the year 2010 is relatively higher compared to 70 % for the year 2000 as compiled by Bradbury et al. (2006), indicating that the independence of audit committees in Singapore has been improved from 2000 to 2010. However, the proportion of independent director in audit committees is relatively lower compared to 93 % for the period 2004–2006 for 770 US firms in Dhaliwal et al. (2010), indicating that Singapore firms are still behind their counterparts in the US in terms of audit committee independence.⁹

⁹ It is anticipated because Singapore regulator does not require all audit committee members to be independent.

In terms of expertise in audit committees, we observe that on average, 80, 64, and 97 % of audit committees are represented by at least one director who is an accounting expert (*ACCT*), finance expert (*FINA*), and supervisory expert (*SUPER*), respectively. The mean number of audit committee members (*AC_SIZE*) is 3.24 (median = 3), with a minimum value of 2 and a maximum value of 6. The size of audit committees in Singapore is relatively smaller compared to the mean of 3.72 for US firms in Dhaliwal et al. (2010). In addition, the average values for *AC_SHARE*, *AC_MULTB*, *AC_TENURE*, and *AC_MEET* are 0.9 %, 1.3 board, 3.0 years, and 3.8 meetings (with median values of 0 %, 1.0 board, 1.6 years, and 3 meetings), respectively. It is interesting to note that Singapore audit committee members hold more shares in listed companies than their counterparts in the US (0.9 vs. 0.2 % as reported in Dhaliwal et al. 2010). However, Singapore audit committee members are less busy (1.3 board vs. 2.7 boards), with shorter tenure (3.0 vs. 8.0 years) and meet less frequently (3.8 meetings vs. 9.0 meetings). The corresponding mean values for *BD_IND* and *BD_SHARE* are 10 and 6 percent (with median values of 0 and 5 %), respectively. Compared to the US firms reported in Dhaliwal et al. (2010), Singapore boards excluding audit committee members are less independent (10 vs. 50 %) and Singapore board members excluding audit committee members have higher ownership in their listed companies (6.4 vs. 1.4 %). A relatively high 34 % of Singapore firms have the same person serving as the Chairman as well as CEO, but it is still relatively lower compared to 51 % in the US. About 65 % of Singapore companies are audited by the Big Four accounting firms, whereas in the US the figure is relatively higher at 94.2 % for the 770 firms reported in Dhaliwal et al. (2010). About 7 % of Singapore firms received unclear auditor's opinion including qualified opinion, no opinion, adverse opinion, or unqualified opinion with explanatory language. Family firms make up about 36 % of the sample, while government-linked and Singapore-listed Chinese firms make up about 4 and 10 % of the sample firms, respectively.

In terms of the firm-specific financial data, the mean values for *ASSETS*, *STDCFO*, *STDSALE*, *OPCYCLE*, *INTSALES*, and *PPE* are 5.3, 0.09, 0.25, 5.03, 0.09, and 0.26 (with median values of 5.0, 0.07, 0.16, 0.20, 5.04, 0.01, and 0.22), respectively. Compared to the 770 US firms in Dhaliwal et al. (2010), Singapore firms are much smaller but with higher variations in cash flows and sale. The mean values for *NEGEARN* and *INTDUM* are 0.20 and 0.25, respectively.

We also report the Pearson's correlation coefficients in Table 3. We observe that audit committee expertise variables (*ACCT*, *FINA*, and *SUPER*) are negatively but not significantly correlated with *FRQ*; which are contrary to

Table 1 Sample selection

Number of SGX listed companies as of 31 December 2010	782
Number of companies with financial data available at COMPUSTAT for fiscal year 2010	539
Minus	
Companies without 5 years of consecutive financial data for computing accruals quality in fiscal year 2010	(101)
Companies with missing values on control variables in fiscal year 2010	(15)
Final sample in fiscal year 2010	423
The sample consists of 423 firms listed on Singapore Exchange (SGX) as of 31 December 2010	

Table 2 Descriptive statistics

Variable	Mean	SD	Min	Q1	Median	Q3	Max
<i>FRQ</i>	-0.107	0.069	-0.419	-0.142	-0.089	-0.055	-0.009
<i>AC_IND</i>	0.867	0.163	0.500	0.667	1.000	1.000	1.000
<i>AC_IND_100</i>	0.586	0.493	0.000	0.000	1.000	1.000	1.000
<i>ACCT</i>	0.799	0.401	0.000	1.000	1.000	1.000	1.000
<i>FINA</i>	0.636	0.482	0.000	1.000	1.000	1.000	1.000
<i>SUPER</i>	0.967	0.179	0.000	1.000	1.000	1.000	1.000
<i>AC_SIZE</i>	3.241	0.532	2.000	3.000	3.000	3.000	6.000
<i>AC_SHARE</i>	0.009	0.025	0.000	0.000	0.000	0.001	0.174
<i>AC_MULTB</i>	1.254	0.954	0.000	0.600	1.000	1.714	8.167
<i>AC_TENURE</i>	3.030	1.970	0.333	1.600	2.625	4.000	13.750
<i>AC_MEET</i>	3.764	1.209	0.000	3.000	4.000	4.000	10.000
<i>BD_IND</i>	0.103	0.200	0.000	0.000	0.000	0.167	1.000
<i>BD_SHARE</i>	0.064	0.066	0.000	0.014	0.052	0.088	0.395
<i>DUALITY</i>	0.338	0.474	0.000	0.000	0.000	1.000	1.000
<i>BIG4</i>	0.645	0.479	0.000	0.000	1.000	1.000	1.000
<i>FAMILY</i>	0.362	0.481	0.000	0.000	0.000	1.000	1.000
<i>GLC</i>	0.043	0.202	0.000	0.000	0.000	0.000	1.000
<i>SCHIPS</i>	0.097	0.296	0.000	0.000	0.000	0.000	1.000
<i>ASSETS</i>	5.266	1.580	1.718	4.183	4.961	6.193	10.063
<i>STDCFO</i>	0.089	0.064	0.007	0.045	0.070	0.113	0.403
<i>STDSALE</i>	0.249	0.284	0.007	0.092	0.160	0.284	1.744
<i>NEGARN</i>	0.203	0.254	0.000	0.000	0.200	0.400	1.000
<i>OPCYCLE</i>	5.025	0.792	2.769	4.624	5.037	5.416	7.612
<i>INTSALES</i>	0.087	0.247	0.000	0.000	0.009	0.055	1.789
<i>INTDUM</i>	0.248	0.432	0.000	0.000	0.000	0.000	1.000
<i>PPE</i>	0.262	0.211	0.003	0.091	0.218	0.385	0.918
<i>AUDOP</i>	0.069	0.253	0.000	0.000	0.000	0.000	1.000
<i>ROA</i>	0.031	0.128	-0.750	0.012	0.053	0.092	0.257
<i>ROE</i>	0.052	0.264	-1.422	0.018	0.094	0.157	0.618

This table presents the descriptive statistics for financial reporting quality, audit committee characteristics, and other variables used in this study. The sample consists of 423 firms for the fiscal year 2010. Variable definitions are provided in Appendix Table 9

our predictions. Nevertheless, formal tests will be conducted using multivariate regression analysis in the next section. In addition, we examine the variance inflation factor (VIF) of each independent variable in the estimation

of the main regression model and find that the VIFs of all the independent variables are small (<3) and the mean VIF is only 1.39 which is much lower than the common rule of 10 as a sign of severe or serious multicollinearity. This

Table 3 Correlation matrix

	FRQ	AC_IND	FINA	ACCT	SUPER	AC_SIZE	AC_SHARE	AC_MULTB	AC_TENURE	AC_MEET	BD_IND	BD_SHARE	DUALITY
AC_IND	-0.012	1.000											
FINA	-0.051	-0.024	1.000										
ACCT	-0.006	0.003	0.050	1.000									
SUPER	-0.026	-0.023	0.107*	-0.027	1.000								
AC_SIZE	0.024	-0.115*	0.140*	0.106*	0.059	1.000							
AC_SHARE	0.041	-0.379*	-0.042	-0.101*	-0.021	-0.004	1.000						
AC_MULTB	0.107*	0.078	-0.006	0.006	0.0048	0.154*	-0.042	1.000					
AC_TENURE	0.174*	-0.163*	-0.156*	-0.062	-0.017	0.082*	0.332*	0.107*	1.000				
AC_MEET	0.018	0.110*	0.047	0.034	-0.036	0.177*	-0.155*	0.089*	-0.009	1.000			
BD_IND	0.074	-0.017	0.019	0.016	0.002	0.166*	-0.041	0.080	-0.060	0.073	1.000		
BD_SHARE	-0.004	0.084*	0.030	0.051	-0.001	-0.175*	-0.010	-0.004	0.086*	-0.069	-0.197*	1.000	
DUALITY	0.015	0.087*	0.032	0.009	-0.035	-0.080	-0.012	-0.020	0.083*	-0.0836*	-0.108*	0.166*	1.000

This table presents the Pearson's correlation analysis between financial reporting quality (FRQ) and audit committee characteristics. The sample consists of 423 firms for the fiscal year 2010. Variable definitions are provided in Appendix Table 9
 * denote statistical significance at least at the 10 % level

indicates that none of the correlations are large enough to raise concern related to multicollinearity.

Empirical Results

Audit Committee Independence and Financial Reporting Quality

We use the two alternative measures of audit committee independence (AC_IND and AC_IND_100) as independent variables and estimate Eq. (2) using OLS. The control variables are as follows: AC_SIZE, AC_SHARE, AC_MULTB, AC_TENURE, AC_MEET, BD_IND, BD_SHARE, DUALITY, BIG4, FAMILY, GLC, SCHIPS, ASSETS, STDCFO, STDSALE, NEGEARN, OPCYCLE, INTSALES, INTDUM, and PPE. The definitions of the two alternative independent variables and control variables are defined in Appendix Table 9.

The regression results are presented in Models (1) to (2) of Table 4. The first hypothesis (H1) predicts that independent audit committee members should enhance the financial reporting quality, i.e., the estimated coefficient on the audit committee independence measure should be positive. However, the findings from both Model (1) and Model (2) do not support H1. For example, the estimated coefficient of AC_IND is negative but insignificant, indicating that the proportion of independent audit committee members is not statistically associated with financial reporting quality.

Although we fail to find any statistical impact of audit committee independence on financial reporting quality, we do not claim that audit committee member's independence will not enhance financial reporting quality in Singapore. We believe that the insignificance of our results is due to the fact that almost all of our sample firms (98 %) have a majority of independent audit committee members. If audit committees with a majority of independent directors are independent enough to monitor financial reporting process, we should not observe any incremental impact on financial reporting quality even if audit committees consist of more independent directors. Our result is consistent with Klein (2002) which finds that there is no significant difference in financial reporting quality for audit committees with all independent directors compared with those with a majority only of independent directors.

We also find that AC_SIZE is negatively associated with FRQ, which suggests that increasing the size of audit committee may be detrimental to financial reporting quality. In terms of the other firm-specific control variables, we find that while STDCFO, STDSALE, NEGEARN, and OPCYCLE are also negatively related to FRQ, INTSALES, INTDUM, and PPE are positively related to FRQ. These

Table 4 Audit committee independence and financial reporting quality

Independent variables	(1)		(2)	
	Coefficient estimate	<i>p</i> value	Coefficient estimate	<i>p</i> value
<i>AC_IND</i>	-0.013	0.448		
<i>AC_IND_100</i>			-0.004	0.539
<i>AC_SIZE</i>	-0.010*	0.052	-0.010*	0.050
<i>AC_SHARE</i>	-0.001	0.993	0.004	0.976
<i>AC_MULTB</i>	0.002	0.570	0.002	0.583
<i>AC_TENURE</i>	0.001	0.333	0.001	0.327
<i>AC_MEET</i>	-0.000	0.861	-0.000	0.862
<i>BD_IND</i>	0.012	0.436	0.012	0.428
<i>BD_SHARE</i>	-0.053	0.282	-0.053	0.279
<i>DUALITY</i>	0.001	0.850	0.001	0.861
<i>BIG4</i>	0.000	0.996	0.000	0.990
<i>FAMILY</i>	0.010	0.113	0.010	0.114
<i>GLC</i>	-0.008	0.619	-0.008	0.622
<i>SCHIPS</i>	-0.000	0.976	-0.000	0.987
<i>ASSETS</i>	0.000	0.851	0.000	0.879
<i>STDCFO</i>	-0.235***	0.000	-0.235***	0.000
<i>STDSALE</i>	-0.063***	0.000	-0.063***	0.000
<i>NEGEARN</i>	-0.052***	0.000	-0.052***	0.000
<i>OPCYCLE</i>	-0.018***	0.000	-0.018***	0.000
<i>INTSALES</i>	0.021**	0.029	0.021**	0.027
<i>INTDUM</i>	0.012*	0.052	0.012*	0.052
<i>PPE</i>	0.064***	0.000	0.064***	0.000
<i>INTERCEPT</i>	0.041	0.241	0.032	0.314
<i>Adjusted R-Square</i>	0.383		0.379	

This table presents the cross-sectional regression test of financial reporting quality on audit committee independence and other control variables. The sample consists of 423 firms for the fiscal year 2010. Variable definitions are provided in Appendix Table 9. *p* values are based on two-tailed test
 ***, **, and * denote statistical significance at the 1, 5 and 10 % levels, respectively

findings are largely consistent with the earlier findings by Dechow and Dichev (2002), Francis et al. (2004), and Dhaliwal et al. (2010).

Audit Committee Expertise and Financial Reporting Quality

Besides the main audit committee members’ independence measure (*AC_IND*), we include the three types of audit committee members’ expertise measures (*ACCT*, *FINA*, and *SUPER*) in the basic Eq. (2) using OLS. The regression results are presented in Table 5.

Models (1) to (3) of Table 5 show the results of regressing *FRQ* on each expertise and other control variables. The second hypothesis (H2) predicts that audit committee members’ accounting expertise should be positively associated with financial reporting quality, i.e., the estimated coefficient on *ACCT* should be positive. The empirical results suggest that accounting expertise does matter in enhancing financial reporting quality, with the estimated

coefficient of *ACCT* being positive (magnitude = 0.017, *p* value = 0.04) and statistically significant at least at the 5 % level in Model (1). Models (2) and (3) reveal that finance expertise (*FINA*) or supervisory expertise (*SUPER*) is not related to *FRQ* given that both estimated coefficients are negative and insignificant.

Model (4) presents the results when all three types of expertise are included in the regression. Out of the three coefficients, only the estimated coefficient of *ACCT* is positive and significant with magnitude of 0.016 and *p* value of 0.04, relatively similar to that obtained in Model (1). The inferences for the other control variables are also unchanged both quantitatively and qualitatively, in comparison to that obtained in Table 4. In particular, we still find that there is no significant statistical relation between financial reporting quality and audit committee independence.

In general, the results in Table 5 complement that of Dhaliwal et al. (2010) and imply that the presence of accounting experts (rather than finance or supervisory experts) in audit committee will provide better monitoring of

Table 5 Audit committee expertise and financial reporting quality

Independent variables	(1)		(2)		(3)		(4)	
	Coefficient estimate	<i>p</i> value	Coefficient estimate	<i>p</i> value	Coefficient estimate	<i>p</i> value	Coefficient estimate	<i>p</i> value
<i>ACCT</i>	0.017**	0.043					0.016**	0.044
<i>FINA</i>			-0.002	0.721			-0.002	0.749
<i>SUPER</i>					-0.015	0.357	-0.014	0.390
<i>AC_IND</i>	-0.012	0.479	-0.013	0.441	-0.014	0.428	-0.017	0.342
<i>AC_SIZE</i>	-0.011**	0.025	-0.009*	0.062	-0.009*	0.057	-0.013**	0.017
<i>AC_SHARE</i>	0.026	0.820	-0.002	0.988	-0.006	0.961	0.025	0.832
<i>AC_MULTB</i>	0.002	0.578	0.002	0.572	0.002	0.537	0.002	0.419
<i>AC_TENURE</i>	0.001	0.336	0.001	0.373	0.001	0.332	0.002	0.253
<i>C_MEET</i>	-0.001	0.835	-0.000	0.871	-0.001	0.801	-0.001	0.784
<i>BD_IND</i>	0.012	0.429	0.012	0.440	0.012	0.454	0.010	0.536
<i>BD_SHARE</i>	-0.060	0.238	-0.052	0.296	-0.052	0.293	-0.048	0.358
<i>DUALITY</i>	0.001	0.854	0.001	0.834	0.001	0.882	0.002	0.761
<i>BIG4</i>	0.001	0.830	-0.000	0.976	0.000	0.995	0.000	0.949
<i>FAMILY</i>	0.010	0.130	0.010	0.114	0.010	0.120	0.009	0.186
<i>GLC</i>	-0.010	0.497	-0.007	0.632	-0.007	0.639	-0.011	0.457
<i>SCHIPS</i>	-0.000	0.998	-0.000	0.988	-0.000	0.994	0.002	0.831
<i>ASSETS</i>	0.000	0.857	0.000	0.837	0.000	0.838	-0.000	0.891
<i>STDCFO</i>	-0.234***	0.000	-0.235***	0.000	-0.231***	0.000	-0.226***	0.000
<i>STDSALE</i>	-0.065***	0.000	-0.063***	0.000	-0.063***	0.000	-0.064***	0.000
<i>NEGEARN</i>	-0.053***	0.000	-0.052***	0.000	-0.052***	0.000	-0.052***	0.000
<i>OPCYCLE</i>	-0.019***	0.000	-0.018***	0.000	-0.018***	0.000	-0.018***	0.000
<i>INTSALES</i>	0.023**	0.024	0.021**	0.030	0.022**	0.024	0.023**	0.024
<i>INTDUM</i>	0.014**	0.034	0.013**	0.049	0.012*	0.052	0.014**	0.029
<i>PPE</i>	0.065***	0.000	0.063***	0.000	0.065***	0.000	0.067***	0.000
<i>INTERCEPT</i>	0.036	0.298	0.042	0.230	0.054	0.146	0.046	0.228
<i>Adjusted R-Square</i>	0.392		0.383		0.384		0.395	

This table presents the cross-sectional regression tests of financial reporting quality on accounting, finance, and supervisory expertise of audit committee, and other control variables. The sample consists of 423 firms for the fiscal year 2010. Variable definitions are provided in Appendix Table 9. *p* values are based on two-tailed test

***, **, and * denote statistical significance at the 1, 5, and 10 % levels, respectively

the financial reporting process, which subsequently leads to higher financial reporting quality.¹⁰

To test the impact of mixed expertise of audit committees on financial reporting quality (the third hypothesis), we decompose those audit committees with at least one accounting expert into four groups: those with accounting experts only and without other expertise (*ACCT_ONLY*), those with accounting and finance expertise only but without supervisory expertise (*ACCT_FINA*), those with accounting and supervisory expertise only but without finance expertise (*ACCT_SUPER*), and those with all three

types of expertise (*ALL_EXPERTS*). We replace audit committee members' expertise with the four variables as described above and estimate the modified Eq. (2) using OLS. The results are presented in Table 6.

Interestingly, we find that audit committees containing members with accounting experts only do not seem to influence financial reporting quality as the estimated coefficient of *ACCT_ONLY* is positive but insignificant. However, the estimated coefficients of the other three variables (*ACCT_FINA*, *ACCT_SUPER*, and *ALL_EXPERTS*) are all positive and marginally significant at least at the 10 % significance level. These results are consistent with the third hypothesis and lend further credence to the importance of having an individual in the audit committee who possess another skill-set (in finance or supervisory role) other than accounting in order for financial reporting quality to be

¹⁰ As a robustness test, we also include only *ACCT* and *FINA* in the estimation of Eq. (2) and once again, we find that only the estimated coefficient of *ACCT* is positive (magnitude = 0.017) and statistically significant at the 5 % level (*p* value = 0.04).

Table 6 Audit committee mixed expertise and financial reporting quality

Independent variables	(1)	
	Coefficient estimate	<i>p</i> value
<i>ACCT_ONLY</i>	0.020	0.413
<i>ACCT_FINA</i>	0.043***	0.000
<i>ACCT_SUPER</i>	0.018*	0.055
<i>ALL_EXPERT</i>	0.015*	0.081
<i>AC_IND</i>	-0.013	0.466
<i>AC_SIZE</i>	-0.011**	0.033
<i>AC_SHARE</i>	0.021	0.858
<i>AC_MULTB</i>	0.002	0.554
<i>AC_TENURE</i>	0.001	0.338
<i>AC_MEET</i>	-0.001	0.757
<i>BD_IND</i>	0.013	0.415
<i>BD_SHARE</i>	-0.057	0.266
<i>DUALITY</i>	0.001	0.863
<i>BIG4</i>	0.001	0.906
<i>FAMILY</i>	0.010	0.136
<i>GLC</i>	-0.010	0.510
<i>SCHIPS</i>	0.000	0.999
<i>ASSETS</i>	0.001	0.802
<i>STDCFO</i>	-0.233***	0.000
<i>STDSALE</i>	-0.065***	0.000
<i>NEGEARN</i>	-0.053***	0.000
<i>OPCYCLE</i>	-0.019***	0.000
<i>INTSALES</i>	0.023**	0.022
<i>INTDUM</i>	0.014**	0.040
<i>PPE</i>	0.066***	0.000
<i>INTERCEPT</i>	0.036	0.304
<i>Adjusted R-Square</i>	0.393	

This table presents the cross-sectional regression tests of financial reporting quality on mix of expertise in audit committees and other control variables. The sample consists of 423 firms for the fiscal year 2010. Variable definitions are provided in Appendix 1. *p* values are based on two-tailed test

***, **, and * denote statistical significance at the 1, 5, and 10 % levels, respectively

improved. Therefore, our paper contributes to the existing literature by highlighting that having a diversity of expertise is paramount for audit committees in Singapore-listed firms to play positive roles in the financial reporting process. Moreover, the finding of this paper also identifies the positive input made by audit committee members with supervisory skill-set (in addition to accounting expertise) to the financial reporting process, which is not documented by Dhaliwal et al. (2010). However, the finding is consistent with Goh (2009) which finds that audit committee members with supervisory expertise (i.e., expertise gained through experience supervising employees with financial reporting responsibilities and overseeing the performance of

companies) are positively associated with firms’ timeliness in the remediation of internal control deficiencies. This could be attributed to these individuals’ know-how and work experience as prior (current) CEOs or company presidents and directors of other companies.

Overlapping of Membership and Financial Reporting Quality

We further include two dichotomous variables representing overlapping membership in audit committee and remuneration committee (*OVERLAP*) as well as if the overlapping member is also an accounting expert (*OVERLAP_ACCT*) and estimate the Eq. (2) using OLS. The results are presented in Models (1) and (2) of Table 7. Although both the estimated coefficients of *OVERLAP* and *OVERLAP_ACCT* are positive, they are statistically insignificant. Therefore, the findings are not supportive of the fourth hypothesis and there is no statistical evidence to suggest that overlapping membership is relevant for financial reporting quality in Singapore. Unlike Chandar et al. (2012) which find positive impact of overlapping membership and Liao and Hsu (2013) which find the opposite, we find that overlapping audit and remuneration committees have no significant impact on financial reporting quality. One possible explanation is that high degree of committee overlap likely leads to the dilution of efforts because of multi-accountability, which might not result in better monitoring of financial reporting process and higher financial reporting quality. However, in theory we do agree with Laux and Laux (2009) which propose that overlapping membership with the remuneration committee potentially results in knowledge spillover that is useful to the audit committee’s financial reporting monitoring role. Hence whether or not overlapping of membership has positive impact on financial reporting quality in Singapore is still an open question.

Robustness Tests: Effect on Audit Opinion and Firm Performance

Our main focus is in examining the relationship between audit committee characteristics and effectiveness of monitoring by audit committee members which is measured by financial reporting quality. Effective monitoring by audit committee members will result in better corporate governance and eventually better external auditor’s opinion and better firm performance. Thus, we conduct two further robustness tests to examine the implication of financial reporting quality on external auditor’s opinion and firm performance.¹¹ Specifically, we estimate a two-stage regression model, whereby the first-stage regression is Eq. (2), with all the three variables (*AC_IND*; *ACCT*; and

¹¹ We thank an anonymous reviewer for making this suggestion.

Table 7 Overlapping membership and financial reporting quality

Independent variables	(1)		(2)	
	Coefficient estimate	<i>p</i> value	Coefficient estimate	<i>p</i> value
<i>OVERLAP</i>	-0.002	0.923		
<i>OVERLAP_ACCT</i>			0.005	0.417
<i>AC_IND</i>	-0.013	0.452	-0.015	0.402
<i>AC_SIZE</i>	-0.010*	0.058	-0.010*	0.050
<i>AC_SHARE</i>	-0.003	0.977	0.003	0.980
<i>AC_MULTB</i>	0.002	0.571	0.002	0.578
<i>AC_TENURE</i>	0.001	0.332	0.001	0.337
<i>AC_MEET</i>	-0.000	0.861	-0.000	0.856
<i>BD_IND</i>	0.012	0.443	0.013	0.391
<i>BD_SHARE</i>	-0.053	0.282	-0.054	0.279
<i>DUALITY</i>	0.001	0.852	0.001	0.863
<i>BIG4</i>	-0.000	0.996	0.001	0.916
<i>FAMILY</i>	0.010	0.113	0.010	0.116
<i>GLC</i>	-0.008	0.621	-0.007	0.633
<i>SCHIPS</i>	-0.000	0.976	-0.000	0.969
<i>ASSETS</i>	0.000	0.848	0.001	0.823
<i>STDCFO</i>	-0.235***	0.000	-0.234***	0.000
<i>STDSALE</i>	-0.063***	0.000	-0.064***	0.000
<i>NEGearn</i>	-0.052***	0.000	-0.052***	0.000
<i>OPCYCLE</i>	-0.018***	0.000	-0.018***	0.000
<i>INTSALES</i>	0.021**	0.029	0.021**	0.028
<i>INTDUM</i>	0.012*	0.053	0.013**	0.049
<i>PPE</i>	0.064***	0.000	0.064***	0.000
<i>INTERCEPT</i>	0.042	0.275	0.040	0.252
<i>Adjusted R-Squared</i>	0.383		0.384	

This table presents the cross-sectional regression test of financial reporting quality on overlapping membership on audit committee and remuneration committee, accounting expertise and other control variables. The sample consists of 423 firms for the fiscal year 2010. Variable definitions are provided in Appendix Table 9. *p* values are based on two-tailed test

***, **, and * denote statistical significance at the 1, 5, and 10 % levels, respectively

OVERLAP) representing the audit committee characteristics and other control variables as the explanatory variables (results are presented in Model (1) of Table 8). Then, we use the predicted value of the financial reporting quality (*PFRQ*) estimated from the first-stage regression as an explanatory variable in the second-stage logistic regression model:

$$AUDOP_i = \beta_0 + \beta_1 PRRQ_i + \sum \beta_k \times \text{Independent variables}_i + \sum \beta_j \times \text{Control variables}_i + \varepsilon_i, \quad (3)$$

where *AUDOP* is external auditor's opinion which equals one if the firm receives unclean auditor's opinion including qualified, no opinion, adverse, or unqualified opinion with explanatory language; and 0 otherwise.

The result of the estimation of Eq. (3) is presented in Model (2) of Table 8. The estimated coefficient of *PFRQ* is

negative (magnitude = -13.141) and statistically significant at the 1 % level. This implies that firms with higher financial reporting quality tend to have lower likelihood of receiving qualified opinion, no opinion, adverse opinion, or unqualified opinion with explanatory language from external auditors.

We also employ the predicted value of the financial reporting quality (*PFRQ*) estimated from the first-stage regression as an explanatory variable in the following second-stage OLS regression model:

$$PERF_i = \beta_0 + \beta_1 FRQ_i + \sum \beta_k \times \text{Independent variables}_i + \sum \beta_j \times \text{Control variables}_i + \varepsilon_i \quad (4)$$

where *PERF* is firm performance, measured either in return on assets (*ROA*) or return on equity (*ROE*). The definition of variables is also reported in Appendix Table 9.

Table 8 Effect on auditor’s opinion and firm performance

Dependent variables	First stage		Second stage					
	(1)		(2)		(3)		(4)	
Independent variables	Coefficient estimate	<i>p</i> value	Coefficient estimate	<i>p</i> value	Coefficient estimate	<i>p</i> value	Coefficient estimate	<i>p</i> value
<i>ACCT</i>	0.017**	0.041						
<i>AC_IND</i>	−0.012	0.491						
<i>OVERLAP</i>	−0.005	0.805						
<i>PFRQ</i>			−13.141***	0.000	0.657***	0.000	0.927***	0.003
<i>AC_SIZE</i>	−0.011**	0.030	−0.193	0.724	0.023**	0.025	0.021	0.363
<i>AC_SHARE</i>	0.021	0.853	4.605	0.617	0.100	0.640	0.348	0.395
<i>AC_MULTB</i>	0.002	0.580	−0.487	0.131	−0.008	0.124	−0.025*	0.090
<i>AC_TENURE</i>	0.001	0.333	−0.170*	0.066	0.003	0.364	0.003	0.570
<i>AC_MEET</i>	−0.001	0.834	0.069	0.670	−0.004	0.376	−0.001	0.917
<i>BD_IND</i>	0.012	0.447	−0.062	0.955	−0.027	0.504	0.065	0.342
<i>BD_SHARE</i>	−0.060	0.235	1.027	0.759	0.092	0.329	0.009	0.962
<i>DUALITY</i>	0.001	0.859	0.219	0.614	0.004	0.731	0.039	0.145
<i>BIG4</i>	0.001	0.850	−0.301	0.503	0.002	0.884	0.039	0.178
<i>FAMILY</i>	0.010	0.131	−0.072	0.893	0.010	0.407	0.034	0.171
<i>ASSETS</i>	0.000	0.850	−0.136	0.447	0.020***	0.000	0.035***	0.002
<i>INTERCEPT</i>	0.040	0.294	−2.214	0.274	−0.071*	0.095	−0.135	0.143
<i>Pseudo or Adjusted R-Squared</i>	0.392		0.133		0.148		0.121	

This table presents the cross-sectional regression tests of external auditor’s opinion and firm performance on predicted financial reporting quality and other control variables. *PFRQ* is the predicted value from the regression of *FRQ* on audit committee characteristics (*AC_IND*; *ACCT* and *OVERLAP*) and other control variables (the first-stage regression which is reported in Model (1) in this table). The dependent variables in the second-stage regressions are *AUDOP* in Model (2), *ROA* in Model (3), and *ROE* in Model (4), respectively. The sample consists of 423 firms for the fiscal year 2010. Variable definitions are provided in Appendix Table 9. *p* values are based on two-tailed test

***, **, and * denote statistical significance at the 1, 5, and 10 % levels, respectively

Models (3) and (4) of Table 8 display the estimation results of Eq. (4) when the dependent variable is *ROA* and *ROE*, respectively. There are strong evidences that higher financial reporting quality is associated with higher *ROA* and *ROE*, as the estimated coefficient of *PFRQ* is positive and highly significant in both models.

Therefore, the robustness test results reported in Table 8 suggest that higher financial reporting quality will benefit the firm in terms of more clean opinion received from external auditors and higher firm performance measured by return on assets or return on equity. Hence the effectiveness of audit committees is essential in improving financial reporting quality and firm performance.

Conclusions

This paper explores how the three audit committee characteristics (independence, expertise, and overlapping membership) influence financial reporting quality for Singapore-listed companies in the fiscal year 2010. We find

that more than 98 % of the sample firms have audit committees with a majority of independent directors and any incremental independence of audit committees has no significant impact on firms’ financial reporting quality. Our results cast doubt on the necessity of mandating all audit committee members independent like what the Sarbanes–Oxley Act does in the US.

The other important finding that we uncover is that while financial reporting quality is positively and significantly associated with the presence of accounting expertise in audit committee, it is not associated with the presence of finance or supervisory expertise alone in audit committee. These findings complement the earlier findings by Dhaliwal et al. (2010) for the US firms and signal the benefit and importance of having an audit committee member with accounting expertise (rather than finance or supervisory expertise) in overseeing the financial reporting process. Additional findings reveal that audit committees with accounting expertise only have no significant impact on financial reporting quality. Instead, audit committees with mix of accounting, finance, and/or supervisory

expertise enhance financial reporting quality. Although we fail to find any relationship between financial reporting quality and overlapping membership in audit and remuneration committees (or overlapping independent accounting expert), we strongly believe that there should be knowledge spillover resulting from overlapping membership that is useful to the audit committee's financial reporting monitoring role. The costs and benefits tradeoff of overlapping membership on financial reporting quality is still an open question that we leave for future research.

The most relevant and notable contribution of this paper is that we find empirical evidence which supports calls for a diversity of expertise in audit committees, which is consistent with the recommendation in the Guidebook for Audit Committees in Singapore. In other words, it is more rewarding for Singapore-listed firms to

have audit committees that consist not just merely of accounting experts but also those with finance or supervisory expertise, so that he/she can provide improved board/audit committee monitoring, leading to the firm producing higher quality financial reports. We believe the results have policy implications to regulator in Singapore as well as regulators in other markets.

Acknowledgments The authors acknowledge the comments from Thomas Clarke (Section Editor), Goh Beng Wee, two anonymous reviewers, and the Singapore Ministry of Education AcRF Tier 1 funding support (Grant Approval Number: 12-C206-SMU-002).

Appendix

See Table 9.

Table 9 Definition of variables

Variable name	Variable definition
Dependent variable	
<i>FRQ</i>	The standard deviation of residuals from cross-sectional regressions of Eq. (1) based on Dechow and Dichev (2002), multiplying by (−1). A higher <i>FRQ</i> value indicates higher accruals quality and higher financial reporting quality
Independent variables	
<i>AC_IND</i>	The proportion of independent audit committee members
<i>AC_IND_100</i>	1 if all audit committee members are independent directors and 0 otherwise
<i>ACCT</i>	1 if the audit committee includes at least one accounting expert in and 0 otherwise
<i>FINA</i>	1 if the audit committee includes at least one finance expert in and 0 otherwise
<i>SUPER</i>	1 if the audit committee includes at least one supervisory expert in and 0 otherwise
<i>ACCT_ONLY</i>	1 if the audit committee includes at least one accounting expert but no finance or supervisory experts in, and 0 otherwise
<i>FINA_ONLY</i>	1 if the audit committee includes at least one finance expert but no accounting or supervisory experts in, and 0 otherwise
<i>SUPER_ONLY</i>	1 if the audit committee includes at least one supervisory expert but no accounting or finance experts in, and 0 otherwise
<i>ACCT_FINA</i>	1 if the audit committee includes at least one accounting expert and at least one finance expert but no supervisory experts in, and 0 otherwise.
<i>ACCT_SUPER</i>	1 if the audit committee includes at least one accounting expert and at least one supervisory expert but no finance experts in, and 0 otherwise
<i>ALL_EXPERT</i>	1 if the audit committee includes at least one accounting expert, at least one finance expert, and at least one supervisory expert in, and 0 otherwise
<i>OVERLAP</i>	1 if there is at least one audit committee member sitting on the remuneration committee, and 0 otherwise
<i>OVERLAP_ACCT</i>	1 if there is at least one independent audit committee member with accounting expertise sitting on the remuneration committee, and 0 otherwise
Control variables	
<i>AC_SIZE</i>	The number of audit committee members
<i>AC_SHARE</i>	The proportion of total outstanding shares held by the audit committee members
<i>AC_MULB</i>	The number of boards in which the audit committee members serve
<i>AC_TENURE</i>	The number of years the audit committee members have served as directors of the firm
<i>AC_MEET</i>	The number of audit committee meetings held in 1 year
<i>BD_SHARE</i>	The proportion of total outstanding shares held by the non-audit committee members
<i>BD_SIZE</i>	The number of non-audit committee members sitting on the board
<i>DUALITY</i>	1 if the CEO and board chairman positions are held by the same individual and 0 otherwise
<i>BIG4</i>	1 if the external auditor is one of the Big Four auditors and 0 otherwise.
<i>FAMILY</i>	1 if the firm is controlled by a family and 0 otherwise
<i>GLC</i>	1 if the firm is a Singapore government-linked company and 0 otherwise

Table 9 continued

Variable name	Variable definition
<i>SCHIPS</i>	1 if the firm is a Chinese company (S-chips) and 0 otherwise.
<i>STDCFO</i>	Standard deviation of cash flow from operations over the prior 5 years
<i>NEG EARN</i>	Proportion of years where firms report losses over the prior 5 years
<i>STDSALES</i>	Standard deviation of sales revenue over the prior 5 years
<i>OPCYCLE</i>	Natural logarithm of the length of operating cycle measured as the sum of average days of account receivable and average days of inventory
<i>ASSETS</i>	Natural logarithm of the ending total assets
<i>INTSALES</i>	Ratio of the reported intangibles to total sales revenue
<i>INTDUM</i>	1 if <i>INTSALES</i> = 0, and 0 otherwise
<i>PPE</i>	Ratio of ending net property, plant, and equipment to average total assets
Variables used in robustness tests	
<i>AUDOP</i>	1 if auditor gives a qualified opinion, no opinion, adverse opinion or unqualified opinion with explanatory language; and 0 otherwise
<i>ROA</i>	Ratio of profit before interest to average total assets
<i>ROE</i>	Ratio of net profit to average total shareholders' equity

All variables are calculated based on company's information in fiscal year 2010, except for these explicitly stated in the definition

References

- Beasley, M. S. (1996). An empirical analysis of the relation between the board of director composition and financial statement fraud. *The Accounting Review*, 71, 443–465.
- Bharath, S. T., Sunder, J., & Sunder, S. V. (2008). Accounting quality and debt contracting. *The Accounting Review*, 83, 1–28.
- Bradbury, M., Mak, Y. T., & Tan, S. M. (2006). Board characteristics, audit committee characteristics and abnormal accruals. *Pacific Accounting Review*, 18, 47–68.
- Carcello, J. V., Hollingsworth, C. W., Klein, A., & Neal, T. L. (2006). Audit committee financial expertise, competing corporate governance mechanisms, and earnings management. *Working Paper*.
- Carcello, J. V., & Neal, T. L. (2003). Audit committee independence and disclosure: Choice for financially distressed firms. *Corporate Governance: An International Review*, 11, 289–299.
- Chandar, N., Chang, H., & Zheng, X. (2012). Does overlapping membership on audit and compensation committees improve a firm's financial reporting quality? *Review of Accounting and Finance*, 11, 141–165.
- Chang, J. C., Mi, L., & Sun, H. L. (2011). The impact of independent and overlapping board structures on CEO compensation, pay-performance sensitivity and accruals management. *Quarterly Journal of Finance & Accounting*, 50, 54–84.
- Cohen, J. R., Krishnamoorthy, G., & Wright, A. M. (2008). Form versus substance: The implications for auditing practice and research of alternative perspectives on corporate governance. *Auditing: A Journal of Practice & Theory*, 27, 181–198.
- Dechow, P. M., & Dichev, I. D. (2002). The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review*, 77, 35–59.
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1996). Causes and consequences of earnings manipulation: an analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research*, 13, 1–36.
- DeFond, M. L., & Jiambalvo, J. (1991). Incidence and Circumstances of Accounting Errors. *The Accounting Review*, 66, 643–655.
- Dhaliwal, D. A. N., Naiker, V. I. C., & Navissi, F. (2010). The association between accruals quality and the characteristics of accounting experts and mix of expertise on audit committees. *Contemporary Accounting Research*, 27, 787–827.
- Fama, E. F., & French, K. R. (1997). Industry costs of equity. *Journal of Financial Economics*, 43, 153–193.
- Francis, J., LaFond, R., Olsson, P. M., & Schipper, K. (2004). Costs of equity and earnings attributes. *The Accounting Review*, 79, 967–1010.
- Francis, J., LaFond, R., Olsson, P., & Schipper, K. (2005). The market pricing of accruals quality. *Journal of Accounting and Economics*, 39, 295–327.
- Goh, B. W. (2009). Audit committees, boards of directors, and remediation of material weaknesses in internal control. *Contemporary Accounting Research*, 26, 549–579.
- Hillman, A. J., Cannella, A. A., & Paetzold, R. L. (2000). The resource dependence role of corporate directors: Strategic adaptation of board composition in response to environmental change. *Journal of Management Studies*, 37, 235–256.
- Hoitash, U., & Hoitash, R. (2009). conflicting objectives within the board: Evidence from overlapping audit and compensation committee members. *Group Decision and Negotiation*, 18, 57–73.
- Klein, A. (2002). Audit committee, board of director characteristics, and earnings management. *Journal of Accounting and Economics*, 33, 375–400.
- Krishnan, G. V., & Visvanathan, G. (2008). Does the SOX definition of an accounting expert matter? The association between audit committee directors' accounting expertise and accounting conservatism. *Contemporary Accounting Research*, 25, 827–858.
- Laux, C., & Laux, V. (2009). Board committees, CEO compensation, and earnings management. *The Accounting Review*, 84, 869–891.
- Liao, C.-H., & Hsu, A. W.-H. (2013). Common membership and effective corporate governance: Evidence from audit and compensation committees. *Corporate Governance: An International Review*, 21, 79–92.
- Pfeffer, J. (1972). Size and composition of corporate boards of directors: The organization and its environment. *Administrative Science Quarterly*, 17, 218–228.
- Pincus, K., Rusbarsky, M., & Wong, J. (1989). Voluntary formation of corporate audit committees among NASDAQ firms. *Journal of Accounting and Public Policy*, 8, 239–265.

- Subramanyam, K. R. (1996). The pricing of discretionary accruals. *Journal of Accounting and Economics*, 22, 249–281.
- Zhang, Y., Zhou, J., & Zhou, N. (2007). Audit committee quality, auditor independence, and internal control weaknesses. *Journal of Accounting and Public Policy*, 26, 300–327.
- Zheng, X., & Cullinan, C. P. (2010). Compensation/audit committee overlap and the design of compensation systems. *International Journal of Disclosure and Governance*, 7, 136–152.