

Auditor selection within a business group: evidence from Taiwan

Yan-Jie Yang · Jungpao Kang · Ruey-Ching Lin · Joshua Ronen

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Abstract Although auditor selection is well documented in the literature, it is unclear whether group characteristics affect firms' auditor selection decisions. Generally, a business group is the result of diversification by the core firm. Major decisions of the business group, such as auditor selection, are made by the core firm and influenced by the business group's characteristics. Using operational and ownership linkages perspectives, this study investigates the determinants of a business group's member firm engaging the same auditor as its core firm. We employ the input–output relationship of products along a supply chain to construct product vertical relatedness measures between member firms and the core firm, and establish logistic regression models to test our hypotheses. Using a sample of publicly listed business groups in Taiwan from 2000 to 2010, our results suggest that a member firm is more likely to engage the same auditor as its core firm when (1) the core firm engages a Big N auditor, (2) the core firm's auditor is an industry specialist for both the core firm and its member firm, (3) the degree of vertical relatedness increases, or (4) the controlling shareholders' deviation of voting rights from cash flow rights increases (hereafter deviation). On the other hand, the likelihood of a member firm engaging the same auditor as its core firm when induced by higher deviation could be offset by the influence of stronger business vertical linkages.

Y.-J. Yang (✉)

College of Management, Yuan Ze University, 135 Yuan-Tung Road, Taoyuan 32003, Taiwan, ROC
e-mail: yangjie@saturn.yzu.edu.tw

J. Kang

Department of Applied Finance, Singapore Management University, Singapore, Singapore
e-mail: kangnccu@gmail.com

R.-C. Lin

Department of Accounting, Fu Jen Catholic University, New Taipei, Taiwan, ROC
e-mail: 081515@mail.fju.edu.tw

J. Ronen

Department of Accounting, Stern School of Business, New York University, New York, USA
e-mail: jronen@stern.nyu.edu

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1 Introduction

Diversified business groups with interlocking ownership structures are a common organizational form in emerging economies (Kim et al. 2004; Claessens et al. 2006; Khanna and Yafeh 2007; Yiu et al. 2007). According to prior literature, diversification and complex ownership structures may lead to greater conflicts of interest and agency costs; corporate governance plays an important role in dealing with such agency problems (Choi and Wong 2004; Fan and Wong 2005). From a governance perspective, auditor selection reflects the credibility of financial reports; firms could signal the fairness of financial statements by engaging qualified auditors. These firms could benefit from a reduction of agency costs in order to improve their values. For group-affiliated firms, given the prevalence of interlocking ownership structure, controlling shareholders can control a group's management through operational¹ or ownership linkages. Thus, controlling shareholders in the group's core firm could, through these linkages, dominate a member² firm's decisions, including auditor selection (Davison et al. 1984). For a member firm, the choice of auditor may depend on its core firm and/or group characteristics rather than its own preference. Therefore, the determinants of auditor selection for group firms may differ from those of non-group firms.

Business groups are networks in which individual firms share resources and capabilities (Yiu et al. 2007). Via operational linkages, core firms could significantly control member firms through supply contracts for technology, intermediate components, or distribution of final outputs (Lorenzoni and Lipparini 1999). In Taiwan, a business group usually starts with a core firm and later develops one or more member firms to achieve its business strategies. Although auditor selection is well-documented in the literature, prior studies usually investigate the auditor selection process at the individual firm level. It is presently unclear whether core firms affect member firms' auditor selection and which group characteristics specifically determine the member firm's choice. Despite the prevalence of group firms in emerging markets, with auditors playing an important governance role, little attention has been paid to these questions. With their expansion in recent years, business groups have been playing a more important role in the development of Taiwan's economy. The operational linkages have enabled rapid growth, but little attention has been paid to the empirical relationship between operational linkages and auditor selection. Recently, Johnstone et al. (2011) investigate the determining factors of upstream and downstream companies along a supply chain engaging the same auditor. Their results show that the likelihood of engaging the same auditor increases with the operational relationship between the upstream and downstream companies. Moreover, engaging a common auditor in turn leads to higher audit quality. In the context of business groups, the decision making process is controlled by the core firm, and strategic objectives are achieved through

¹ Yiu, et al. (2007) argue that a core owner elite (i.e., controlling shareholder) could influence an individual member firm's decisions through its control of strategic resources (such as technology, distribution, production, etc.) that are critical to operations of other member firms. In our study, we call such ties "operational linkages."

² This term refers to other group-affiliated (component) firms, excluding the core firm.

diversification. Given the close supply chain, upstream and downstream relationship between a member firm and its core firm, engaging the same auditor could yield cost reduction in communication and improve the auditor's understanding of sales and purchases transactions between the group-affiliated firms. Taiwan plays a crucial manufacturing role in the global supply chain, especially in the high tech industry. In addition, business groups are commonly found in Taiwan's capital market. These situations provide a good setting to investigate the role of operational linkages in the auditor-selection process in business groups.

To proxy for operational linkages, we construct measures for vertical relatedness³ between a member firm and its core firm. Vertical relatedness, a complicated measure, is a key factor in our study. Researchers generally consider two businesses to be related if they share the same two-, three-, or four-digit SIC code. However, Fan and Lang (2000) argue that the SIC-based measures of relatedness are unsatisfactory in several aspects.⁴ Following Fan and Lang (2000) and Fan and Goyal (2006), we employ commodity flow data in Taiwan input–output(IO) tables⁵ and construct IO-based measures for inter-industry and inter-firm (within a business group) vertical relatedness.

This study examines the determinants of auditor selection in Taiwanese business groups. The sample of this study is based on the Taiwanese public companies for the period of 2000–2010. Specifically, our empirical results have three implications. First, prior literature on auditor selection focuses primarily on the individual company level, which merely considers individual firm characteristics. This study differs from prior literature in its attempt to examine the effect of a business group's core firm on the auditor selection of its member firms through group characteristics (i.e. the extent of operational and ownership linkages). With respect to operational linkages, the empirical results show that the higher the degree of supply chain vertical relatedness, the more likely the core and member firms are to engage the same auditor, considering synergy costs and audit efficiency. In addition, in terms of ownership linkages, the greater the deviation between control rights and cash flow right, the more likely the core and member firms are to engage the same auditor, considering higher demand of audit quality to mitigate agency problems. Second, this study provides evidence to support the relationship between the core firm's auditor selection and the engagement of the same auditor by member firms. Additionally, our results document further justification for the phenomenon of auditor concentration. Based on the pursuit of higher audit quality for signaling better financial reporting credibility considerations, we find that the core firm is more likely to dominate the member firm's decision to engage the same auditor if the core firm engages a Big N auditor, or if the auditor of the core firm is also an industry specialist. These results indicate that the investment in brand reputation and industry specialists by audit firms provides benefits in terms of client attainment and

³ Specifically, two businesses are vertically related if one can employ the other's products or services as input for its own production or supply output as the other's input.

⁴ Fan and Lang (2000) point out that the SIC-based measures of relatedness are unsatisfactory in several aspects: (1) they do not reveal relatedness types, (2) they are discrete and hence do not measure the degree of relatedness, (3) they are subject to classification errors. For example, the oil-refining (SIC 29) and chemical (SIC 28) businesses are classified as unrelated according to the two-digit SIC code classifications, when in fact they are vertically related.

⁵ The "IO Tables" is a matrix containing the value of commodity flows between each pair of roughly 166 industrial sectors, intermediate IO industries. Taiwan Directorate-General of Budget, Accounting and Statistics updates the table every 2–3 years.

business expansion. Finally, the International Standards on Auditing (ISA) 600⁶ requires that when auditing group financial statements, the group engagement partner shall not refer to a component auditor in the auditor's report unless required by law or regulation to include such a reference, meaning the group engagement partner would not share audit responsibility with any component auditor. This may result in the prevalence of engaging the same auditor within a business group. Apart from investigating the effects of group characteristics and core firms' auditor preferences on the auditor selection in member firms, our study also predicts the practical application of ISA 600 in business groups.

The remainder of this article is organized as follows: Sect. 2 reviews the literature on business groups and auditor selection, Sect. 3 develops our hypotheses, Sect. 4 describes the sample and methodology, Sect. 5 reports the results, and Sect. 6 concludes.

2 Literature review

2.1 Business groups

Recent studies show that diversified business groups are important and prevalent in many emerging economies. Khanna and Yafeh (2007) point out that the literature on business groups focuses on two themes. The first research stream studies the relationship between group diversification and corporate finance. This stream of literature investigates the relationship between diversification and shareholder value (performance) in different economies. Since Rumelt's (1974)⁷ measurement of diversification strategies, scholars have studied how different types of diversification affect firm performance. Early evidence suggests diversification leads to a loss of firm value in the United States, a so-called "diversification discount." Research reveals two possible causes of diversification discount: either diversified firms are inefficient in their allocation of internally generated funds (Rajan et al. 2000), or diversification is driven by management's self-interest to increase managerial benefits—that is, the classic agency problem (Henderson and Fredrickson 1996; Denis et al. 1997; Rajan et al. 2000).

Recent studies cast doubt on the diversification discount, focusing on the endogeneity of the decision to diversify and on measurement problems of both performance and diversification (Whited 2001; Campa and Kedia 2002; Martin and Sayrak 2003; Chevalier 2004). In emerging markets, evidence of the benefits and costs of group diversification is mixed and far from conclusive. Khanna and Palepu (2000a, b) find that in India and Chile the relationship between diversification and profitability among business groups is non-linear; that is, beyond a certain level, diversification is associated with higher profits. For an emerging market sample, Lins and Servaes (2002) find a diversification discount in firms that are part of industrial groups. Claessens et al. (2003) find a diversification premium in the relatively poor countries of East Asia (e.g., Indonesia, Philippines, or Thailand) and a diversification discount in the richer countries in the region (e.g., Hong Kong or

⁶ ISA 600 "Special Considerations—Audits of Group Financial Statements (Including the Work of Component Auditors)" is issued by International Auditing and Assurance Standards Board (IAASB) and is effective for audits of group financial statements for periods beginning on or after December 15, 2009.

⁷ Rumelt (1974) established three ratios to evaluate a firm's diversification strategy: (1) Specialization Ratio (R_s) is the ratio of the largest sales from a single business to the firm's total sales, (2) Related Ratio (R_r) is the ratio of the largest sales from related businesses to the firm's total sales, and (3) Vertical Ratio (R_v) is the ratio of the sales from vertical production (including secondary products, joint products, and final products) to the firm's total sales.

Taiwan). This stream of literature also considers whether diversified groups emerge in response to external capital market imperfections (Shin and Park 1999; Perotti and Gelfer 2001; Khanna and Yafeh 2005), and labor/product market imperfections (Khanna and Palepu 1999; Jones 2000; Maurer and Sharma 2001; Chang 2003; Khanna and Palepu 2005). Finally, there seems to be considerable variation in the extent of vertical integration across groups within the same country, suggesting that group and industry-specific factors play a role which is sometimes more important than country-specific institutional factors (Chang 2003). In short, the ambiguity of the results suggests that in emerging markets, the performance of diversified business groups is not only associated with the costs and benefits of diversification, but also with economic and institutional development.

The second research theme suggests that agency costs may be important for determining the gains and losses from individual group-affiliated firms, specifically agency costs centering on conflicts of interests between controlling and minority shareholders. This research looks at the link between group ownership/control structure (such as pyramids, cross shareholdings, family-controlled or dual class shares) and the expropriation of minority shareholders (tunneling). Bae et al. (2002) examine acquisitions by South Korean business groups (*chaebols*) and find that within-group acquisitions rarely improve the value of the bidder, but do improve the value of other group members. Baek et al. (2006) also find that private securities offerings within South Korean *chaebols* are used as a way for controlling shareholders to benefit at the expense of minority shareholders. Cheung et al. (2006) provide evidence that tunneling is often done through “connected transactions” between related parties in Hong Kong. Additionally, Bennedsen and Nielsen (2006) find that in Europe dual class shares destroy more value than pyramids do. Generally, this stream of literature suggests that complex ownership structures are common in business groups, the complexity may exacerbate agency problems resulting from greater deviations of voting from cash flow rights, and complex ownership structures may facilitate the exploitation of minority shareholders.

Business group research suggests that diversified business groups are common in emerging economies. Moreover, diversification and complex ownership structures are prevalent among these business groups and may lead to greater agency conflicts and agency costs. Hence, focusing on how to alleviate agency problems and reduce agency costs is important.⁸ Recent studies pay attention to the governance role of external auditors and suggest that auditors are used as monitoring or bonding agents to mitigate agency problems in emerging economies. From a governance perspective, auditors could play an important role in emerging economies, especially among group-affiliated firms. Thus the process of auditor selection among group-affiliated firms merits investigation.

2.2 Auditor selection

Prior literature often views auditor selection as a function of demand-side factors (client characteristics). Three separate but related sources of demand for audit services pointed out by Wallace (1980) are agency (or stewardship) demand, information demand, and insurance demand. The agency demand for audit is derived from agency theory, which suggests that owners and their agents (managers) benefit from monitoring (Jensen and Meckling 1976). Furthermore, the agency problem could be mitigated through reliable financial statements. It is argued that audits serve as monitoring devices to increase the reliability of

⁸ Fan and Wong (2005) argue that in emerging markets, the agency conflicts between controlling owners and the minority shareholders are difficult to mitigate through conventional corporate control mechanisms such as boards of directors and takeovers.

accounting information and reduce agency costs from self-serving agents. Dopuch and Simunic (1982) indicate that information demand for audit is closely related to agency demand as it also arises from information asymmetries. The selection of auditors signals management's honesty and the credibility of financial statements to all parties. Finally, from an insurance demand perspective, audits serve as an efficient means to indemnify investors and creditors against financial loss by claiming against auditors' "deep pockets." Most studies examine the link between auditor choice and client characteristics such as client size, leverage, ownership structure, audit committee,⁹ board independence, new acquisition, and new funds received from external markets (Francis and Wilson 1988; Johnson and Lys 1990; DeFond 1992; Firth and Smith 1992; Beattie and Fearnley 1995; Abbott and Parker 2000; Beasley and Petroni 2001; Fan and Wong 2005). The focus of this literature is on agency-related factors.

The specific audit firm chosen is also affected by supply-side factors (auditor characteristics). Beattie and Fearnley (1995) show that the three most important characteristics are: (1) integrity of audit, (2) technical competence of audit, and (3) quality of working relationship with the audit partners. Furthermore, they suggest that audit firm specialization in audit technologies can yield economies of scale and scope.

Previous studies usually investigate the auditor-selection process at the individual firm level. However, the core firm of a business group generally exercises management control over member firms through various means and affects member firms' decisions including auditor selection. The auditor selection decisions within a business group may differ from those among stand-alone firms. It is unknown whether the core firm's control and group characteristics determine member firms' auditor choices. Furthermore, the group characteristics that affect a member firm to engage the same auditor as its core firm have yet to be identified. Although business groups are prevalent in emerging markets and auditors could play an important corporate governance role, little attention has been paid to these questions, and we see a need to investigate the role of group characteristics in the auditor-selection process.

3 Hypotheses development

Given the prevalence of diversification and complex ownership structures among business groups in emerging economies, controlling shareholders could exert control over a group's management through operational or ownership linkages. Via these linkages, a core firm under the controlling shareholders' control could affect an individual member firm's decisions, including its auditor selection decision. In this study we seek to investigate whether these linkages play a role in a member firm's decision to engage the same auditor as the core firm.

⁹ Abbott and Parker (2000) did prove that function of audit committee is one of the decision factors of auditor selection. In Taiwan, however, mandated requirement of setting up audit committee is a recent institutional issue. Please note that the Taiwan Financial Supervisory Commission requires a public company whose paid-up capital exceeding 10 billion New Taiwan Dollars (NTD) or above to have its audit committee ready by 2015. In addition, a public company whose paid-up capital lies between 2 and 10 billion NTD 2–10 must have its audit committee ready by 2017. Our sample period ranges from the year 2000 to 2010, when there is no issue of audit committee over auditor selection.

3.1 Core firm characteristics

Research suggests that audit clients demand different levels of audit quality due to different motivation for auditing. DeAngelo (1981) argues that audit quality¹⁰ increases with auditor size because larger auditors are less likely to lower audit quality in order to retain a client. Hence, researchers generally use auditor size as a proxy for audit quality (Firth and Smith 1995; Fan and Wong 2005; Hossain et al. 2010). Some researchers suggest that industry-specific auditors provide higher quality audits. O’Keefe et al. (1994) find that audit quality measured by an assessment of auditor compliance with GAAS increases with auditor industry specialization. Craswell et al. (1995) find that industry specialist Big 8 auditors earn a premium over non-specialist Big 8 auditors. Balsam et al. (2003) and Krishnan (2003) find that specialist auditors mitigate accruals-based earnings management more than non-specialist auditors because of specialist auditors’ superior knowledge of the client’s industry.

Previous studies support the idea that market perceives auditor size and industry specialist knowledge as proxies for audit quality. The investor characteristics may influence the choice of auditor (Velury et al. 2003). Thus, when a core firm engages a Big N¹¹ auditor or an industry specialist auditor, it may be suggested that the core firm pursues higher audit quality. Johnstone et al. (2011) find that when suppliers and customers engage a common supply chain auditor, the auditees’ discretionary accruals and reported earnings are smaller, suggesting better audit quality. It is likely that the core firm will encourage the other member firms to engage the same auditor to signal higher audit quality. This means that the higher demand for audit quality may lead the core firm to encourage member firms to signal financial reporting credibility by engaging the same auditor. Additionally, from the perspective of aiming to achieve cost-saving in communication and improve audit efficiency, when both the core firm and the member firm engage the same Big N auditor, the auditor can obtain a better understanding of the operating status of a business group. Also, the management of the core firm can form a stronger communication channel with the auditor. The liaison cost of both parties can thus be reduced if the member firm also engages the same auditor as the core firm. Hence, we predict that when a core firm’s auditor is a Big N auditor, a member firm is more likely to engage the same auditor as its core firm. Additionally, when a core firm’s auditor is also a specialist in the member firm’s industry, the member firm is more likely to engage the same auditor. Stated in alternative form, we hypothesize that:

H1 A member firm is more likely to engage the same auditor as its core firm for the same Big N.

H2 A member firm is more likely to engage the same auditor as its core firm when a core firm’s auditor is also a specialist in the member firm’s industry.

3.2 Group characteristics

A core firm may affect its member firm’s auditor selection decision through operational or ownership linkages. Following the different linkages, we develop specific hypotheses to disentangle the relationships between different linkages and auditor selection.

¹⁰ DeAngelo (1981) defines “audit quality” as the probability that an auditor will discover and report a breach in the accounting system.

¹¹ Consistent with the prior research, we refer to the original Big 5 auditors before 2003 and now Big 4 auditors in Taiwan as Big N auditors.

3.2.1 Operational linkages

Compared to stand-alone firms, business groups are associated with greater use of internal factor markets, which involves a large number of intra-group transactions. A core firm could affect a member through its control of critical strategic resources such as technology, distribution, and production. For example, a core firm could control members through special supply contracts for provision of technology, intermediate components, or distribution of the final outputs (Lorenzoni and Lipparini 1999). As observed in Taiwan, business groups resemble networks in which individual firms share resources or capabilities (Yiu et al. 2007). Vertical (buyer–supplier) linkages between a core firm and its members may lead to more inter-firm transactions such as reciprocal purchases and sales. Through auditing a core firm, the auditor may better understand the business environment, supply chain, and the nature of transactions of its member firms than other auditors. Conversely, when the degree of vertical relatedness between a group's core and member firms is low, the economies of scale and audit efficiency from engaging the same auditor may decline. This situation results in a lower likelihood that the member firms will engage the same auditor as their core firm.

Given the foregoing discussion, we predict that the stronger the vertical linkages in the supply chain between a core and its members, the greater the economies of scale and audit efficiency from engaging the same auditor. Accordingly, we hypothesize that:

H3 A member firm is more likely to engage the same auditor as its core firm when the degree of vertical relatedness between the core and the member firms increases.

3.2.2 Ownership linkages

Prior literature suggests that complex ownership structures are common in business groups, and the complexity exacerbates agency problems arising from greater deviations of voting from cash flow rights (Johnson et al. 2000; Yeh et al. 2001; Bae et al. 2002; Baek et al. 2006; Cheung et al. 2006; Claessens et al. 2006). When agency conflicts are greater and information asymmetries are more acute, firms are more likely to engage higher quality auditors to minimize agency costs (Choi and Wong 2004; Fan and Wong 2005). In contrast, a group's core firm is less likely to demand higher audit quality when agency conflicts and information asymmetries are less severe. In such cases, the auditor selection decisions of the member firms are less likely to be influenced by that of their core firm.

Bell et al. (1997) demonstrate that if a core firm and an affiliated member firm adopt the same auditor, that auditor will be more capable of detecting abnormal risk over its audit process through both greater knowledge of the firms' relationship and common audit practice. In addition, Benston (1985) elaborates that hiring the same auditor within a business group can result in better audit quality, mainly benefiting from information sharing, better audit coordination, integrated audit procedures design, common quality control systems, and audit experience sharing. Therefore, auditors can more easily identify risks of material misstatement, regardless of fraud or error. Results by Branson and Breesch (2004) indicate that audit quality positively correlates with monitoring and coordinating functions. Furthermore, if the Taiwanese business groups sample is applied, Chang et al. (2008) empirically prove that average earnings management measure is smaller for the groups that engage the same auditor. If earnings management measure is a proxy of agency costs, considering control rights and cash flow rights, a core firm may mitigate agency costs by hiring a common auditor.

Given the foregoing discussion, we predict that the controlling shareholders' deviation of voting rights from cash flow rights provides incentives for a core firm to affect its member firms' auditor selection. Accordingly, we hypothesize that:

H4 A member firm's decision to engage the same auditor as its core firm is influenced by the deviations of control rights and cash flow rights between the core and the member firms.

4 Methodologies

4.1 Sample selection

We identify business groups as our sample from the Taiwan Economic Journal (TEJ) database.¹² To define a group's core and member firms, we follow the definition as given by the TEJ Corporate Governance—Group Information Database. Our sample comprises listed, OTC, emerging stock, and public member firms from 2000 to 2010. Table 1 presents the sample selection process. After excluding financial firms, the original sample in the market is 21,794, of which 10,218 are non-business groups. We exclude business groups controlled by financial institutions as they operate under a special regulatory environment. We also exclude government-controlled business groups; that is, we only look at private-sector groups. Finally, we exclude business groups with missing data and business groups made up of only one company; this sample selection procedure yields 3,979 firm-year observations. Yearly firm-year observations are 293, 334, 393, 439, 399, 370, 350, 359, 347, 351, and 344 for 2000 through 2010, respectively.

Our data on auditors and financial statements is also obtained from the TEJ database, while the Input–Output Tables data comes from the Taiwan Directorate-General of Budget, Accounting and Statistics, Executive Yuan.

4.2 Measures of industry specialization

Following Krishnan (2003), we construct our measures of industry specialty as follows: First, we calculate an auditor's industry market share (*IMS*) to proxy for audit fees earned by an auditor in an industry as a proportion of the total audit fees earned by all auditors that serve that particular industry.

$$IMS_{ik} = \frac{\sum_{j=1}^{J_{ik}} SALES_{ijk}}{\sum_{i=1}^k \sum_{j=1}^{J_{ik}} SALES_{ijk}} \quad (1)$$

¹² According to the TEJ Corporate Governance—Group Information Database, a firm is considered to be a group's core firm if it is at the top of a pyramidal shareholding, while remaining firms that form the group are known as member firms. In other words, the definition is based on the concept of ultimate controlling shareholders. Specifically, group-affiliated firms include any of the following conditions: (1) major shareholders of the firms are made up of the same person or the same family members (the major shareholders refer to the top 10 shareholders or shareholders who hold more than 5 % shareholdings); (2) at least one-third of directors and supervisors on the board are identical among the firms; (3) the firms have the same main business sectors, and the CEO (or Chairman) of a member firm is also the CEO (or Chairman) of its core firm; (4) there exists a relationship of control or affiliation; (5) there exists a relationship of mutual investment, and the amount of investment exceeds one-third of the voting shares or total shareholders' equities.

Table 1 Sample selection process

All public firms (excluding financial firms)		21,794
Less		
Non-group firms	10,218	
Group firms controlled by financial institutions and government	1,638	
Firms without complete data for variables	3,261	
Groups within which only single firm data is available	1,088	
Core firms	1,610	
		(17,815)
Final sample		3,979

where *SALES* is sales revenue, and the numerator is the sum of sales of all J_{ik} clients of audit firm i in industry k . The denominator is the sales of J_{ik} clients in industry k summed over all I_k audit firms in the sample with clients (J_{ik}) in industry k .

In every industry, an auditor is defined as a specialist auditor if the auditor's market share calculated based on Eq. (1) exceeds 15 percent or is within 3 % from that of another specialist auditor.

4.3 Measures of vertical relatedness

We employ commodity flow data in R.O.C. (Taiwan) input–output (IO) Tables and construct our IO-based measures to capture inter-industry and inter-firm (within a business group) vertical relatedness. Following Fan and Lang (2000) and Fan and Goyal (2006), we construct our measures of vertical relatedness as follows.

1. We first identify every primary product¹³ of a core firm and its member firms from their financial statement disclosures and trace every primary product to its corresponding industrial sector.¹⁴
2. We next follow the approach of Lemelin (1982) to construct the inter-industry relatedness coefficients. The building block of these coefficients is the “IO Table” provided by the Taiwan Directorate-General of Budget, Accounting and Statistics. This table is official and publicly accessible. In addition, this table reports for each pair of industries, i and j , the dollar value of i 's output required to produce industry j 's total output, denoted as a_{ij} . We divide a_{ij} by the dollar value of industry j 's total output to get vc_{ij} , representing the dollar value of industry i 's output required to produce one dollar's worth of industry j 's output. Conversely, we divide a_{ji} by the dollar value of industry i 's total output to get vc_{ji} , representing the dollar value of industry j 's output required to produce one dollar's worth of industry i 's output.
3. We then take the maximum of the two input requirement coefficients to obtain the vertical relatedness coefficient of industries i and j , $v_{ij} = \text{Max}(vc_{ij}, vc_{ji})$, which can be intuitively interpreted as a proxy for the opportunity for vertical integration between industries i and j (Fan and Goyal, 2006).
4. Finally, we include every primary product of a core firm and its member firms within a business group to calculate our measures of vertical relatedness between a core firm and its individual member firms.

¹³ We employ “10 % of sales revenue” as a cutoff point to define a primary product in individual firms.

¹⁴ Taiwan Directorate-General of Budget, Accounting and Statistics defines roughly 166 industrial sectors. We employ this detail and public data to capture the relatedness of products.

$$V = \sum_{c=1}^c \sum_{p=1}^p (w_p \times v_{cp}) \quad (2)$$

where w_p is sales revenue percentage of primary products p in individual member firms, and v_{cp} is vertical relatedness coefficient of primary products c in a core firm and primary products p in individual member firms within a business group. The V is the vertical relatedness of a core firm and its individual member firms.

4.4 Empirical model

The purpose of this study is to investigate the determinants of common auditor selection among the firms of a business group. For modeling the binary dependent variable, we perform a logistic regression analysis. We represent the notation following the suggestions of Ge and Whitemore (2010). Let SAC denote the event that the member firm of a business group engages the same auditor as the core firm. We define y as a dependent variable where $y = 1$ if SAC occurs and $y = 0$ otherwise, and we define $p = P(SAC)$ as the probability of event SAC . We test our hypotheses by estimating the following pooled time-series, cross-sectional logistic¹⁵ regression model:

$$\begin{aligned} \log it(p) = \ln\left(\frac{p}{1-p}\right) = & \beta_0 + \beta_1 BIGN_{it} + \beta_2 SPEC_{it} + \beta_3 V_{it} + \beta_4 DEV_{it} \\ & + \beta_5 SHARE_{it} + \beta_6 DUAL_{it} + \beta_7 ID_{it} + \beta_8 DIFSD_{it} + \beta_9 RESIZE_{it} \\ & + \beta_{10} ROA_{it} + \beta_{11} SIZE_{it} + \beta_{12} ZSCORE_{it} + \beta_{13} SIND_{it} + \beta_{14} GSIZE_{it} \\ & + \beta_{15} IMR_{it} + \sum_j \gamma_j YEAR_j + \sum_k \delta_k IND_k + \sum_l \mu_l GPR_l \end{aligned} \quad (3)$$

Dependent and independent variables are as follows:

Variable	Direction	Definition
SAC		1 when the member firm of a business group engages the same auditor as the core firm, and 0 otherwise;
<i>Test variables</i>		
BIGN	+	1 when the auditor of a core firm is a Big N auditor, and 0 otherwise;
SPEC	+	1 when the auditor of a core firm is an industry-specialist auditor of both the core and the member firms, and 0 otherwise;
V	+	vertical relatedness of the member firm and its core firm;
DEV	+	percentage of control rights of any member firm possessed by controlling shareholders (of its core firm) subtracted by percentage of cash flow rights (ownership) possessed by controlling shareholders;
<i>Control variables</i>		
SHARE	+	percentage of ownership of any member firm possessed by controlling shareholders of its core firm;
DUAL	+	1 when the CEO (or chairman) of the member firm is also the CEO (or chairman) of its core firm, and 0 otherwise;

¹⁵ We run the logistic regression for the auditor choice model, which is similar to the model used by prior literature (Fortin and Pittman 2007; Behn et al. 2008; Chang et al. 2009; Johnstone et al. 2011).

continued

Variable	Direction	Definition
<i>ID</i>	+	the number of interlocking directorates of the member firm and its core firm divided by the number of directors in the member firm;
<i>DIFSD</i>	–	capital structure of the member firm subtracted by capital structure of its core firm (capital structure = long-term debts divided by total stockholders' equity);
<i>RELSIZE</i>	–	size of the member firm divided by size of its core firm (size = natural logarithm of sales revenue);
<i>ROA</i>	?	return on assets (earnings before tax divided by total assets);
<i>SIZE</i>	?	natural logarithm of total assets;
<i>ZSCORE</i>	?	Altman's (1983) bankruptcy prediction model to calculate Zscore; $Zscore = -4.336 - 4.513(ROA) - 5.679(FINL) - 0.004(LIQ)$ where ROA is return on assets (earnings before tax divided by total assets), FINL is financial leverage (total liabilities divided by total assets), and LIQ is liquidity ratio (current assets divided by current liabilities);
<i>SIND</i>		1 when core and member firms are in the same industry, and 0 otherwise;
<i>GSIZE</i>	?	natural logarithm of total group assets;
<i>IMR</i>	?	the inverse-Mill ratio controlling for the sample self-selection in auditor choice.

4.5 Core firm characteristics

In regard to H1, the testing variable is *BIGN*, an indicator variable equals to 1 when the auditor of a core firm is a Big N auditor, and 0 otherwise. We expect a positive association between *BIGN* and *SAC*. As for H2, the variable of interest is *SPEC*, an indicator variable equals to 1 when the auditor of a core firm is an industry-specialist auditor of both the core and member firms, and 0 otherwise. The measurement of industry specialist is presented in Sect. 4.2. We expect a positive association between *SPEC* and *SAC*.

4.6 Group characteristics

4.6.1 Operational linkages

With respect to H3, the testing variable is *V*, which follows closely the measurement of Fan and Lang (2000) and Fan and Goyal (2006) to calculate the vertical relatedness of the member firm and its core firm. We expect a positive association between *V* and *SAC*.

4.6.2 Ownership linkages

For H4, the testing variable is *DEV*, the deviation between control rights and cash flows rights. *DEV* is measured by percentage of control rights of any member firm possessed by controlling shareholders (of its core firm) subtracted by percentage of cash flow rights (ownership) possessed by controlling shareholders. We expect a positive association between *DEV* and *SAC*.

Generally, a core firm could control a member firm's management decisions through ownership and the board of directors. Hence, we examine our research questions by controlling for the percentage of ownership of any member firm possessed by controlling shareholders of its core firm, the duality of CEO (or chairman), and the interlocking directorates. In addition, we examine our research questions by controlling for the differences of

Table 2 Distribution of auditor selection between core firms and member firms

		Member firm						Total
		Big N			Non Big N			
		Same	Different	Subtotal	Same	Different	Subtotal	
Core firm	Big N	2,257	963	3,220	NA	168	168	3,388
		(56.72 %)	(24.20 %)	(80.92 %)		(4.22 %)	(4.22 %)	(85.14 %)
	Non Big N	NA	297	297	251	43	294	591
				(7.47 %)	(7.47 %)	(6.31 %)	(1.08 %)	(7.39 %)
	Total	2,257	1,260	3,517	251	211	462	3,979
		(56.72 %)	(31.67 %)	(88.39 %)	(6.31)	(5.30 %)	(11.61 %)	(100.00 %)

capital structure (long-term debts divided by total stockholders' equity) and size (natural logarithm of sales) between a member firm and its core firm. Following prior literature, we control the other relevant variables that could affect auditor selection. *ROA* controls for firm profitability. We take the natural logarithm of total assets to control for company size, and adopt Altman's (1983) bankruptcy prediction model to calculate Z-score to control for company's financial risk. Finally, we include a variable that determines whether core and member firms are in the same industry, group size, and sample self-selection in auditor choice.¹⁶ Year, industry, and group fixed effects are included in the estimate model.

5 Results

5.1 Descriptive statistics

Table 2 provides descriptive statistics for the pooled sample for the distribution of auditor selection between core firms and member firms from 2000–2010, and shows that Big N auditors dominate the auditing activities in our sample. Interestingly, the member firms exhibit a higher incidence of engaging Big N auditors than the core firms (88.39 vs. 85.14 %).¹⁷ In addition, when core firms engage Big N auditors, the member firms engage the same Big N auditors as their core firms with 56.72 % frequency. When core firms engage non Big N auditors, the member firms engage the same non Big N auditors as their core firms with 6.31 % frequency.

Table 3 presents the descriptive statistics for the overall sample. About 63 % of member firms engage the same auditor as their core firms, 85 % of core firms engage Big N auditors, 19 % of core firms engage industry-specialist auditors of their member firms, and about one-third of member firms have the same CEO (or chairman) as their core firms. The

¹⁶ Following Chaney et al. (2004), we employ *Size* (logarithm of end of total assets), *Atun* (asset turnover, calculated as sales divided by total assets), *DA* (debt-asset ratio, calculated as long-term debt divided by total assets), *Curr* (current assets divided by total assets), *Quick* (quick ratio, calculated as current assets minus inventory divided by current liabilities), *ROA* (earnings before interest and taxes divided by total assets), *ROA* \times *Loss* (*Loss* equals 1 if the firm reported a loss in the previous year, 0 otherwise), *Export* (sales outside Taiwan divided by total sales) to estimate the probability of member firms to choose Big N auditors, and compute the inverse-Mill ratio (IMR) as an additional explanatory variable in our model.

¹⁷ Descriptive statistics for the year-by-year samples (not tabulated) show that 2002 is the turning point; that is, the core firms have the higher percentage of Big N auditors in 2000 and 2001, while the member firms have the higher percentage of Big N auditors from 2002–2010.

Table 3 Descriptive statistics

Variable	Mean	SD	Min	Q1	Median	Q3	Max
<i>SAC</i>	0.6303	0.4828	0	0	1	1	1
<i>BIGN</i>	0.8515	0.3557	0	1	1	1	1
<i>SPEC</i>	0.1930	0.3947	0	0	0	0	1
<i>V</i>	1.3958	0.4386	0	0.0953	0.4365	1.3101	5.5056
<i>DEV</i>	0.4225	0.2480	0	0.2529	0.4161	0.5895	0.9389
<i>SHARE</i>	0.4175	0.2267	0.0045	0.2500	0.3860	0.536	1
<i>DUAL</i>	0.3046	0.4603	0	0	0	1	1
<i>ID</i>	0.1320	0.1598	0	0	0.1000	0.1320	1
<i>DIFSD</i>	0.0248	0.0831	0	0	0.0038	0.0147	0.6541
<i>RELSIZE</i>	0.8939	0.0862	0.6850	0.8348	0.8939	0.9526	1.1131
<i>ROA</i>	0.0410	0.0770	-0.2155	0.0074	0.0316	0.0710	0.2997
<i>SIZE</i>	15.1262	1.5685	12.2733	13.9001	14.9077	16.1306	19.1384
<i>ZSCORE</i>	-2.0942	1.2116	-4.4846	-3.0031	-2.1306	-1.2965	1.1504
<i>SIND</i>	0.5672	0.4955	0	0	1	1	1
<i>GSIZE</i>	17.9832	2.0271	12.1591	16.4550	17.9769	19.4642	22.9499

The dependent variable *SAC* is a dummy variable with a value of 1 if the member firm of a business group engages the same auditor as its core firm, and 0 otherwise. *BIGN* is a dummy variable with a value of 1 if the auditor of a core firm is a Big N auditor, and 0 otherwise. *SPEC* is a dummy variable with a value of 1 if the auditor of a core firm is an industry-specialist auditor of both the core and the member firms, and 0 otherwise. *V* measures vertical relatedness of the member firm and its core firm. *DEV* is the percentage of control rights of any member firm possessed by a core firm and its controlling shareholders subtracted by percentage of cash flow rights (ownership) possessed by a core firm and its controlling shareholder. *SHARE* is the percentage of ownership of any member firm possessed by a core firm and its controlling shareholders. *DUAL* is a dummy variable with a value of 1 if the CEO (or chairman) of the member firm is also the CEO (or chairman) of its core firm, and 0 otherwise. *ID* measures the number of interlocking directorates of the member firm and its core firm divided by the number of directors in the member firm. The control variables are: *DIFSD* is the capital structure of the member firm subtracted by capital structure of its core firm (capital structure = long-term debts divided by total stockholders' equity); and *RELSIZE* is the size of the member firm divided by size of its core firm (size = natural logarithm of sales). *ROA* is return on assets (earnings before tax divided by total assets); *SIZE* is natural logarithm of total assets; *ZSCORE* is Altman's (1983) bankruptcy prediction model to calculate Zscore ($Zscore = -4.336 - 4.513(ROA) - 5.679(FINL) - 0.004(LIQ)$, where *ROA* is return on assets (earnings before tax divided by total assets), *FINL* is financial leverage (total liabilities divided by total assets), and *LIQ* is liquidity ratio (current assets divided by current liabilities). *SIND* is a dummy variable with a value of 1 if core and member firms are in the same industry. *GSIZE* is natural logarithm of total group assets

average vertical relatedness of the member firm and its core firm (*V*) is 1.3958, the average of control rights and cash flow rights is 0.4225, the average ownership is 0.4175, and the average degree of interlocking directorates is 0.1320.

Table 4 shows the simple correlation analyses. Each of the test variables (*BIGN*, *SPEC*, *V*, *DEV*) shows statistically significant positive correlations with our dependent variable (*SAC*). In addition, control variables like *RELSIZE* and *ZSCORE* show a significantly negative correlation with *SAC*, while *SHARE*, *DUAL*, *ID*, *SIZE*, *SIND*, and *GSIZE* are significantly and positively correlated with *SAC*. Finally, the correlation coefficient of any pair of independent variables is below 0.5. Variance inflation factors are estimated. All of the untabulated variance inflation factors are below 4.0, which is below the commonly used cutoff of 10 for multicollinearity (Belsley, Kuh, and Welsch 1980). Overall, our empirical results are not affected by potential multicollinearity.

Table 4 Correlation coefficients

	SAC	BIGN	SPEC	V	DEV	SHARE	DUAL	ID
SAC								
BIGN	0.178*		0.146***	0.086***	0.063***	0.146**	0.128***	0.060***
SPEC	0.146***	0.204***		0.015	0.062***	-0.034**	0.008	-0.062***
V	0.029**	0.061***	0.020		-0.071***	-0.053***	0.060***	-0.068***
DEV	0.057***	0.061***	-0.077***	0.110***		0.129***	0.128***	0.083***
SHARE	0.123***	-0.050***	-0.065***	0.127***	-0.122***		0.104***	0.108***
DUAL	0.128***	0.008	0.050***	0.023	0.131***	0.022		0.010
ID	0.066***	-0.086***	-0.074***	-0.012	0.134***	0.078**	0.162***	0.174***
DIFSD	-0.019	0.002	0.025	-0.027*	-0.019	-0.022	0.018	-0.016
RELSIZE	-0.095***	-0.109**	-0.108***	0.002	0.018	-0.118***	0.132***	0.213***
ROA	-0.006	-0.003*	-0.024	0.076***	-0.146***	0.217***	-0.082***	0.056***
SIZE	0.033**	0.081***	-0.077***	0.199***	0.318***	0.062***	0.130***	0.044***
ZSCORE	-0.065***	-0.007	-0.080***	-0.011	0.070***	0.094***	-0.007	-0.029***
SIND	0.062***	0.129***	0.427***	0.039**	-0.175***	-0.079***	0.022	-0.021
GSIZE	0.110***	0.134***	-0.100***	0.241***	0.255***	0.245***	-0.051***	-0.119***

	DIFSD	RELSIZE	ROA	SIZE	ZSCORE	SIND	GSIZE
SAC							
BIGN	-0.086***	-0.091***	-0.012	0.052***	-0.062***	0.062***	0.104***
SPEC	0.040**	-0.088***	0.005	0.088***	-0.002	-0.129***	0.127***
V	-0.095***	-0.010***	-0.023***	-0.062***	-0.075***	0.427***	-0.091***
DEV	0.059***	-0.109***	0.054***	0.097***	-0.020	0.350***	0.051**
SHARE	0.067***	0.111**	-0.143***	0.299***	0.058***	-0.171***	0.258***
DUAL	0.071***	0.013	0.168***	0.044***	0.110***	-0.088***	0.233***
ID	0.036***	-0.119***	-0.075***	-0.129***	-0.003	-0.022	-0.052**
DIFSD	0.025***	0.138***	0.014	0.062***	-0.026	-0.022	-0.099***
		0.263***	-0.057***	0.317***	0.456***	-0.053**	0.044**

Table 4 continued

	<i>DIFSD</i>	<i>RELSIZE</i>	<i>ROA</i>	<i>SIZE</i>	<i>ZSCORE</i>	<i>SIND</i>	<i>GSIZE</i>
<i>RELSIZE</i>	0.093***		0.017	0.443***	0.163***	-0.010	-0.218***
<i>ROA</i>	-0.086***	0.081***		0.014	-0.304***	0.015	0.121***
<i>SIZE</i>	0.029*	0.477***	0.014		0.221***	-0.247***	0.494***
<i>ZSCORE</i>	0.190***	0.160***	-0.377***	0.185***		-0.032**	0.035**
<i>SIND</i>	0.045***	-0.010	0.039**	-0.249***	-0.028*		-0.326***
<i>GSIZE</i>	-0.074***	-0.197***	0.098***	0.498***	0.023	-0.328***	

Pearson correlation coefficients are shown below the diagonal, while the upper diagonal shows Spearman correlation coefficients

***, **, and * denote significance level of 1, 5, and 10 %, respectively

Table 5 Logistic regression results

Variables	Prediction	Model 1	Model 2
Intercept		1.043 (0.12)	1.406 (0.54)
BIGN	+	1.342 (16.57)***	1.567 (20.13)***
SPEC	+	0.470 (9.24)***	0.457 (8.04)***
V	+	0.057 (8.17)***	0.141 (7.94)***
DEV	+	0.018 (6.81)***	0.021 (6.42)***
SHARE	+	0.040 (8.14)***	0.042 (9.32)***
DUAL	+	1.370 (8.05)***	1.248 (7.12)***
ID	+	0.698 (1.93)	0.743 (1.96)
DEV \times V	?	–	–0.003 (8.70)***
SPEC \times V	?	–	–0.001 (0.08)
DIFSD	–	–0.001 (0.01)	–0.001 (0.01)
RELSIZE	–	2.259 (0.31)	3.089 (0.54)
ROA	?	–0.019 (2.42)	–0.009 (1.91)
SIZE	?	–0.235 (0.86)	–0.240 (0.86)
ZSCORE	?	–0.368 (7.51)***	–0.419 (11.88)***
SIND	?	–0.351 (1.21)	–0.137 (0.16)
GSIZE	?	–0.743 (6.96)***	–0.659 (5.29)**
IMR	?	–0.594 (12.06)***	–0.614 (12.52)***
Year effect		Yes	Yes
Industry effect		Yes	Yes
Group effect		Yes	Yes
Observations		3,979	3,979
Pseudo R ²		0.345	0.445
Max-rescaledR ²		0.348	0.449

Variable Definitions: see Table 2. The reported coefficients and the corresponding χ^2 -statistics in parentheses are based on pooled cross-sectional regressions

*** Statistical significance at the 0.01 levels, for a two-tailed test

5.2 Logistic regression results

5.2.1 Main effects

Table 5 presents the logistic regression results estimated for the pooled sample period from 2000 to 2010. We employ Model 1 to examine the main effects of our test variables. We employ Model 2 to investigate the interaction effects between the $DEV \times V$ and $SPEC \times V$.

In Model 1, the results show that the coefficients of *BIGN*, *SPEC*, *V*, and *DEV* are positive and statistically significant at the 1 % level. As expected, a member firm is more likely to engage the same auditor as its core firm when the auditor engaged by the core company is a Big N auditor or an industry-specialist auditor of the member firm, when the degree of vertical relatedness between the member firm and its core company increases, or when the deviation of its control rights and cash flow rights increases.

In Model 2, the results show that the main effects of our test variables are robust. Interestingly, in terms of interaction effects, the coefficient of $DEV \times V$ is negative and

statistically significant at the 1 % level. Concerning the interaction between ownership deviations and operational linkages ($DEV \times V$), the result suggests that the likelihood of a member firm engaging the same auditor as its core firm induced by the higher deviation could be offset by the influence of the stronger business vertical linkages. This seems to suggest that the agency conflict is alleviated by operational linkages. In addition, the coefficient of $SPEC \times V$ is not statistically significant.

Finally, the coefficients of control variables $ZSCORE$ and $GSIZE$ are negative and statistically significant in both models. These findings indicate that the higher the company's financial risk and the greater the group size, the less likely the firms are to engage the same auditor. The significantly positive coefficients of $SHARE$ and $DUAL$ show that a member firm is more likely to engage the same auditor as its core firm when the core company's ownership of the member firm increases, or when the CEO (or Chairman) of the member firm is also the CEO (or Chairman) of its core company. The coefficients of the other control variables (ID , $DIFSD$, $RELSIZE$, ROA , $SIZE$, and $SIND$) in the two models are not statistically significant.

5.3 Sensitivity analysis

We next test the sensitivity of our results to model specification and alternative variable definitions. First, we include an additional interaction effect ($SPEC \times DEV$) in Eq. (3). Interestingly, we find that the positive significance of DEV is attenuated. The results (not tabulated) show that the coefficient of $SPEC \times DEV$ is positive and significant at the 1 % level, whereas the coefficient of DEV is positive but statistically insignificant. The results of other test variables are not sensitive to the inclusion of this interaction effect. Second, we re-estimate Eq. (3) using an alternative measure of industry specialty. We calculate industry market share using the square root of total assets as the base instead of sale revenue. Finally, we re-estimate Eq. (3) using an alternative measure of control rights using the percentage of directors nominated by controlling shareholders. Overall, the results are robust.

6 Conclusions

In recent years, with the acceleration of globalization, the scale of business groups has been growing rapidly. In the long run, business groups will play a more and more important role in the development of the world's economy, especially in emerging economies. Diversification and complex ownership structures are prevalent among these business groups, which may lead to greater agency conflicts. Therefore, alleviating agency problems and reducing agency costs are important issues. Recent studies have offered insights on the governance role of external auditors. Hence, the determinants of auditor selection among group-affiliated firms merit further investigation.

With a sample of business groups in Taiwan from 2000 to 2010, we investigate the determinants of auditor selection among group-affiliated firms. The results show that when a core firm engages a Big N auditor, it may encourage its member firms to engage the same auditor in order to pursue higher audit quality. In addition, when the auditor is an industry-specialist auditor of both core and member firms, a member firm is more likely to engage the same auditor in order to signal financial reporting credibility. The tighter the operational linkages, the more likely a member firm will engage the same auditor in order to reduce coordination cost and improve audit efficiency. The greater the divergences

between control rights and cash flow rights, the greater the agency conflicts, and the more likely a member firm will engage the same auditor in order to respond to the demand for higher audit quality. The results also show that the demand for reducing agency cost resulting from the greater deviations of control rights and cash flow rights is tempered by operational linkages, implying that operational linkages alleviate agency problems.

Findings in this study have multiple implications for research and practice. First, previous empirical studies have typically investigated the auditor selection process at the individual firm level. However, little empirical evidence is available regarding the auditor selection process from the perspective of operational or ownership linkages. Our study will help fill this void and may contribute to the existing literature. Our evidence shows that auditor selection of member firms within a business group is affected by operational linkages and ownership linkages with their core firm. Also, when compared to engaging a single audit firm, a business group that engages several audit firms incurs higher coordination and supervision costs. Branson and Breesch (2004) argue that a core firm is likely to encourage the member firm to engage the same auditor in order to benefit from uniform audit procedures, greater authority over auditors, and a monitoring mechanism already in place. With respect to possible advantages such as economies of scale and audit efficiency, our study examines the characteristics of core firms that attempt to benefit from engaging the same auditor. Finally, the International Standards on Auditing (ISA) 600 requires that the group engagement partner shall not refer to a component auditor in the auditor's report when auditing group financial statements; our results suggest that auditors that invest in building a brand and specialization may gain greater advantage as a result of the need to comply with ISA 600. However, we do not directly examine if engaging the same auditor can actually improve audit quality. We leave this issue for further investigations.

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References

- Abbott LJ, Parker S (2000) Auditor selection and audit committee characteristics. *Audit J Pract Theory* 19:47–66
- Bae K, Kang J, Kim J (2002) Tunneling or value added? Evidence from mergers by Korean business groups. *J Financ* 57:2695–2740
- Baek J, Kang J, Lee I (2006) Business groups and tunneling: evidence from private securities offerings by Korean chaebols. *J Financ* 61:2415–2449
- Balsam S, Krishnan J, Yang JS (2003) Auditor industry specialization and earnings quality. *Audit J Pract Theory* 22:71–97
- Beasley MS, Petroni K (2001) Board independence and audit firm type. *Audit J Pract Theory* 20:97–114
- Beattie V, Fearnley S (1995) The importance of audit firm characteristics and the driver of auditor change in UK listed companies. *Acc Bus Res* 25:227–239
- Behn BK, Choi JH, Kang T (2008) Audit quality and properties of analyst earnings forecasts. *Acc Rev* 83:327–349
- Bell TB, Marrs FO, Soloman I, Thomas H (1997) Auditing organizations through a strategic lens. The KPMG Business Measurement Process. NY, KPMG Peat Marwick LLP
- Bennedsen M, Nielsen KM (2006) The principle of proportional ownership, investor protection and firm value in Western Europe. Unpublished
- Benston GJ (1985) The market for public accounting services: demand, supply and regulation. *J Account Public Pol* 4:33–79
- Branson J, Breesch D (2004) Referral as a determining factor for changing auditors in the Belgian auditing market: an empirical study. *Int J Acc* 39:307–326
- Campa JM, Kedia S (2002) Explaining the diversification discount. *J Financ* 57:1731–1762

- Chaney PK, Jeter DC, Shivakumar L (2004) Self-selection of auditors and audit pricing in private firms. *Acc Rev* 79:51–72
- Chang S (2003) Ownership structure, expropriation and performance of group-affiliated companies in Korea. *Acad Manage J* 46:238–253
- Chang RD, Fang CJ, Shen WH (2008) Earnings management of the affiliated Business Groups: the effect of whether being audited by the same CPA Firm. *Manage Rev* 27:29–52
- Chang X, Dasgupta S, Hilary G (2009) The effect of auditor quality on financing decisions. *Acc Rev* 84:1085–1117
- Cheung Y, Rau PR, Stouraitis A (2006) Tunneling, propping, and expropriation: evidence from connected party transactions in Hong Kong. *J Financ Econ* 82:343–386
- Chevalier J (2004) What do we know about cross-subsidization? Evidence from merging firms. *Adv Econ Anal Pol* 4:1–27
- Choi J, Wong TJ (2004) Audit markets and legal environments: an international investigation. Working paper. The Hong Kong University of Science and Technology
- Claessens S, Djankov S, Fan JPH, Lang LHP (2003) When does corporate diversification matter to productivity and performance? Evidence from East Asia. *Pac Basin Financ J* 11:365–392
- Claessens S, Fan JPH, Lang LHP (2006) The benefits and costs of group affiliations: evidence from East Asia. *Emerg Mark Rev* 7:1–26
- Craswell AT, Francis JR, Taylor SL (1995) Auditor brand name reputations and industry specialization. *J Acc Econ* 20:297–322
- Davison AG, Stening BW, Wan TW (1984) Auditor concentration and the impact of interlocking directorates. *J Acc Res* 22:313–317
- DeAngelo LE (1981) **Audit size and audit quality**. *J Acc Econ* 3:183–199
- DeFond ML (1992) The association between changes in client firm agency costs and auditor switching. *Audit J Pract Theory* 11:16–31
- Denis DJ, Denis DK, Sarin A (1997) Agency problems, equity ownership, and corporate diversification. *J Financ* 52:135–160
- Dopuch N, Simunic D (1982) Competition in auditing: an assessment. Fourth symposium on auditing research, pp 401–450
- Fan JPH, Goyal VK (2006) On the patterns and wealth effects of vertical mergers. *J Bus* 79:877–902
- Fan JPH, Lang LHP (2000) The measurement of relatedness: an application to corporate diversification. *J Bus* 73:629–660
- Fan JPH, Wong TJ (2005) **Do external auditors perform a corporate governance role in emerging markets?** Evidence from East Asia. *J Acc Res* 43:35–72
- Firth M, Smith A (1992) **Selection of auditor firms by companies in the new issue market**. *Appl Econ* 24:247–255
- Firth M, Smith A (1995) Auditor quality, corporate risk, and the valuation of new issues. *Rev Quant Financ Acc* 5:241–251
- Fortin S, Pittman JA (2007) The role of auditor choice in debt pricing in private firms. *Contemp Acc Res* 24:859–896
- Francis JR, Wilson ER (1988) Auditor changes: a joint test of theories relating to agency costs and auditor differentiation. *Acc Rev* 63:663–682
- Ge W, Whitemore GA (2010) Binary response and logistic regression in recent accounting research publications: a methodological note. *Rev Quant Financ Acc* 34:81–98
- Henderson AD, Fredrickson FW (1996) Information processing demands as a determinant of CEO compensation. *Acad Manage J* 39:575–606
- Hossain M, Lim CY, Tan PMS (2010) **Corporate governance, legal environment, and auditor choice in emerging markets**. *Rev Pac Basin Financ Mark Pol* 13:91–126
- Jensen MC, Meckling WH (1976) Theory of the firm: managerial behavior, agency costs and ownership structure. *J Financ Econ* 3:305–360
- Johnson WB, Lys T (1990) The market for audit services: evidence from voluntary auditor changes. *J Acc Econ* 12:281–308
- Johnson S, La Porta R, Lopez-de-Silanes F, Shleifer A (2000) Tunneling. *Am Econ Rev* 90:22–27
- Johnstone KM, Li C, Luo S (2011) **Client supply chain relationships, audit firm selection, and implications for audit quality and pricing**. Working paper
- Jones G (2000) Merchants to multinationals: British trading companies in the nineteenth and twentieth centuries. Oxford University Press, Oxford and New York
- Khanna T, Palepu K (1999) The right way to restructure conglomerates in emerging markets. *Harvard Bus Rev* 77:125–135

- Khanna T, Palepu K (2000a) Is group affiliation profitable in emerging markets? An analysis of diversified Indian business groups. *J Financ* 55:867–891
- Khanna T, Palepu K (2000b) The future of business groups in emerging markets: long run evidence from Chile. *Acad Manage J* 43:268–285
- Khanna T, Palepu K (2005) The evolution of concentrated ownership in India: broad patterns and a history of the Indian software industry. A history of corporate governance around the world: family business groups to professional managers. University of Chicago Press, Chicago
- Khanna T, Yafeh Y (2005) Business groups and risk sharing around the world. *J Bus* 78:301–340
- Khanna T, Yafeh Y (2007) Business groups in emerging markets: paragons or parasites? *J Econ Lit* 45:331–372
- Kim H, Hoskisson RE, Wan WP (2004) Power dependence, diversification strategy and performance in keiretsu member firms. *Strateg Manag J* 25:613–636
- Krishnan GV (2003) Does big6 auditor industry expertise constrain earnings management? *Acc Horiz* 17:1–16
- Lins K, Servaes H (2002) Is corporate diversification beneficial in emerging markets? *Financ Manag* 31:5–31
- Lorenzoni G, Lipparini A (1999) The leveraging of inter firm relationships as a distinctive organizational capability: a longitudinal study. *Strateg Manage J* 20:317–337
- Martin JD, Sayrak A (2003) Corporate diversification and shareholder value: a survey of recent literature. *J Corp Financ* 9:37–57
- Maurer N, Sharma Tridib (2001) Enforcing property rights through reputation: Mexico's early industrialization, 1878–1913. *J Econ Hist* 61:950–973
- O'Keefe TB, King RD, Gaver KM (1994) Audit fees, industry specialization, and compliance with GAAS reporting standards. *Audit J Pract Theory* 13:41–55
- Perotti EC, Gelfer S (2001) Red barons or robber barons? Governance and investment in Russian financial-industrial groups. *Eur Econ Rev* 45:1601–1617
- Rajan R, Servaes H, Zingales L (2000) The cost of diversity: the diversification discount and inefficient investment. *J Financ* 55:35–80
- Rumelt RP (1974) Strategy, structure, and economic performance. Harvard Business School Press, Division of Research, Boston
- Shin H, Park YS (1999) Financing constraints and internal capital markets: evidence from Korean Chaebols. *J Corp Financ* 5:169–191
- Velury U, Reisch JT, O'Reilly DM (2003) Institutional ownership and the selection of industry specialist auditors. *Rev Quant Finan Acc* 21:35–48
- Wallace WA (1980) The economic role of the audit in free and regulated markets. Touche Ross & Co, New York
- Whited TS (2001) Is it inefficient investment that causes the diversification discount? *J Financ* 56:1667–1691
- Yeh YH, Shu PG, Huang WY (2001) The rear-end anomaly of Taiwanese family-controlled groupings. *Rev Pac Basin Financ Mark Pol* 4:127–163
- Yiu DW, Lu Y, Bruton GD, Hoskisson RE (2007) Business groups: an integrated model to focus future research. *J Manag Stud* 44:1551–1579

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