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Full Length Research Paper

Optimal strategy of performance creation: Evidence from audit firms in China

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This study aims to investigate the performance determinants of audit firm in the People's Republic of China. Path analysis is applied to examine the association among auditor size, auditor quality, and financial performance of the Top 100 Audit Firms in China for 2002 - 2004 and 2007. Empirical result indicates a positive association between auditor size and auditor quality for both public and non-public company audit market firms. Auditor size and auditor quality are directly and positively related to performance in the public company audit market firms. However, only auditor quality directly relates to performance positively in the non-public company audit market firms. For both public and non-public company audit market firms, auditor quality is a mediator in the association between auditor size and performance. Specifically, auditor quality is the key factor in the creation of performance. Auditor plays an increasingly critical role in China. Empirical results obtained in this study not only contribute to the related literature but also provide useful information to practitioners for decision-making.

Key words: Auditor size, auditor quality, financial performance, audit firm.

INTRODUCTION

In the past few decades, rapid growth of publicly traded firms in China has led to a sharp increase in the demand for external audits. According to the 2006 report by China Securities Regulatory Commission (CSRC), the number of listed company in the Shanghai and Shenzhen Stock Exchange reached 1,434, which is 102.42 times that of in 1991. The stock market value of listed firms in both stock exchanges reached RMB 8,940.4 billion, 820.22 times that of in 1991. With the rapid development in economy, China has played a progressively increasingly important role in the world economic stage. By the end of 2006, the number of certified public accountants (CPAs) was over 73,000 and more than 4,200 public accounting firms were established in China. According to the recent report provided by the Chinese Institute of Certified Public Accountants (CICPA), over 600,000 people participate in the CPA Uniform Examination annually but only a few thousand pass the examination and join the CICPA.

As a developing economy, Chinese audit market provides a ready environment for researchers. China promulgated Chinese independent auditing standards in 1995. A decade ago, Chinese audit market existed some major features, such as the lack of audit independence, the shortage of well-qualified auditors, an environment of extensive corruption, and the existence of many misconceptions about the audit (Xiao et al., 2000). However, recent research indicates that the implementation of a set of new auditing standards increases the quality of earnings and the quality of firm-specific information available to investors (Sami and Zhou, 2008). Further, after the auditor disaffiliation program introduced by the Chinese government, auditor independence is improved (Gul et al., 2009). As the Chinese audit market structure is unique, auditing-related articles mushroom and can be grouped into 7 categories, including audit opinions (Haw et al., 2003; Chen et al., 2000; Chen et al., 2001), auditing standards (Sami and Zhou, 2008; Lin and Chan, 2000; Xiao et al., 2000), audit pricing (Chen et al., 2007), ethical climate (Shafer, 2008), auditor independence

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(Gul et al., 2009), the impact of culture on audit-detected accounting errors (Chan et al., 2003) and motivational factor and strategies for the entry of international CPA firms into China (Kirsch et al., 2000).

In practice, as society becomes more complex, decision makers are more likely to receive unreliable information due to remoteness of information, biases and motives of the information provider, voluminous data, and the existence of complex exchange transactions. Adapting from a communist economy to a capitalism economy, China is a ready example of becoming a complex society. This leads to an increased demand for audit service. Accordingly, audit firm in China plays a critical role in the efficient allocation of capital. Under the new economic landscape of substantial growth in both demand for and supply of audit service, how to create and sustain competitive advantage constitutes a critical lesson for both the practitioners and the academics.

In the line of research on audit firms, Brocheler et al. (2004) suggest that at least three areas of research are underdeveloped in the audit market, including the determinants of audit firm performance, human capital of audit firm and smaller audit firm. Numerous prior studies analytically or empirically indicate that auditor size is positively related to auditor quality in terms of the audit client (DeAngelo, 1981; Palmrose, 1988; Krishnan and Schauer, 2000). Then, auditor size associates positively with performance (Rescho, 1987; Banker et al., 2003). However, few prior studies probe the determinants of audit firm performance by simultaneously taking auditor size, auditor quality and performance into account from the perspective of audit firm. Further, to the best of the knowledge, no prior study investigated this issue by using Chinese data, which motives this study. Specifically, this study addresses the relation among auditor size, auditor quality and performance of audit firms with an assumption that auditor quality mediates the relation between auditor size and performance.

Empirical data of 400 firm-year observations are obtained from the 2002 - 2004 and 2007 Information on Comprehensive Evaluation of Top 100 Audit Firms in China, published by the CICPA. Total audit firms are divided into two sub-samples, including public company audit market firms and non-public company audit market firms. Based on prior studies (Meinhardt et al., 1987; Aldhizer et al., 1995; FRC, 2006; Liu, 1997), this study extracts auditor quality from the components of human capital in an audit firm. Path analysis is applied to examine the association among auditor size, auditor quality and performance of audit firm. Empirical result indicates a significant impact of auditor size on auditor quality. Both auditor size and auditor quality are directly and positively related to performance in the public company audit market firms. For the non-public company audit market firms, auditor quality only directly relates to performance positively. Auditor quality is a mediator in the association between auditor size and performance for both sub-sample firms. In addition, auditor quality is the key factor in the creation of audit firm's performance.

In addition to fill the gap left by prior studies, this study possesses managerial implications for the practitioners. To respond to the continually changing environment, audit firms in China need to recognize clearly their position and to take appropriate competitive strategy. For the public company audit market firms, improvement of auditor quality and enlargement of size are two advisable operating strategies in the creation of performance and in particular auditor quality is the key driver of performance. For the non-public company audit market firms, upgrade of auditor quality is the only way to improve their performance.

The remainder of the paper is organized as follows: Section 2 reviews prior studies and develops hypotheses. Section 3 describes methodology used. Section 4 reports findings obtained and this study concludes in Section 5.

Literature review and hypotheses development

Objective of this study is to examine the determinants of performance, that is, the relation among auditor size, auditor quality and financial performance of audit firms in China. To this end, this study focuses on the following two questions:
(1) Does auditor size influence auditor quality?
(2) Does auditor size directly or indirectly affect financial performance through auditor quality?

Auditor size and auditor quality

For question (1), most prior studies suggest that auditor size is positively related to auditor quality. DeAngelo (1981) states that auditor's start-up and client-switching cost enable the incumbent auditor to earn client-specific quasi-rents. Since the wealth of incumbent auditor relies on retaining a client, the auditor has strong economic incentive to comply with his/her client's desires by not reporting a discovered breach in the client's accounting records. Accordingly, the smaller auditor with fewer clients provides a lower quality audit service. In contrast, larger auditor has more clients and has greater aggregate client-specific quasi-rents at stake if a lack of independence or a lower quality audit becomes known. To avoid the loss of other quasi-rents, larger audit firm has more incentive to provide audit service of quality. Thus, a positive association between auditor size and auditor quality can be expected.

Moreover, by the following two statements, O'Keefe and Westort (1992) address that auditor size relates with auditor quality. First, as the manpower in larger audit firms undertakes a greater degree of specialization, the expertise of audit teams in larger firms might be greater than that in smaller firms. Second, as suggested by Westort (1990), auditors in larger firms take more

continuing professional education than those in smaller firms. Additionally, a positive association between auditor size and auditor quality is reported by Krishnan and Schauer (2000), Colbert and Murray (1998) and Palmrose (1988). Based on the statements above, this study advances the following hypothesis.

H1: Auditor size has a direct effect on auditor quality significantly.

Auditor size and audit firm performance

For question (2), this study establishes firm-specific factors as determinants of audit firm performance. In particular, auditor size and auditor quality are expected to influence performance directly. The direct effect of auditor size on firm's performance has to some extent been discussed in literature (Rescho, 1987; Banker et al., 2003; Chen and Cheng, 2008). However, auditor quality has not been explicitly identified as a determinant of performance. It is engaging and important to investigate the role played by auditor quality in explaining audit firms' performance therefore.

Under the resource-based view of firm, sustainable competitive advantage refers to the valuable, rare, inimitable, and non-substitutable resources that reside within an organization (Barney, 1991; Wright et al., 2001). Sustainable competitive advantage of an audit firm depends on both its size and human capital owned, such as auditor's education, experience, and professional training. In this study, human capital of an audit firm is used to define auditor quality, which could be viewed as a critical organizational capability that accompanies auditor size. As a result, to explore the mediating role of auditor quality in the association between auditor size and firm's performance may provide better explanation of how audit firms sustain competitive advantage and achieve long-term performance. On this account, the interaction of auditor size and auditor quality represents an indirect effect on performance of audit firm.

Direct effects on firm's performance

In theory, scale economies are said to exist in an industry when firms can reduce their average cost or increase their average revenue by expanding their operating size (Christenson and Greene, 1976; Darrough and Heineke, 1978). Banker et al. (2003) report that scale economies prevail in the public accounting industry and improve an audit firm's performance. In addition, Francis (1984), Gul (1999) and Taylor and Simon (1999) suggest that large audit firms earn more fee premium over small ones due to their brand name reputation. Examining the strategy and innovativeness of audit firm, Rescho (1987) points out that size, measured by the number of partners, significantly explains the quantitative measures of performance. Thus, taking the researches above into account, this study expects a positive and direct association between auditor size and performance and establishes the following hypothesis.

H2: Auditor size has a direct effect on firm's performance significantly.

In practice, product differentiation and overall cost leadership are two frequently adopted marketing strategies with which to achieve a sustainable competitive advantage and earn abnormal rates of returns in a hostile environment (Hall, 1980; Porter, 1980). Failure to take either strategy always leads to inferior performance (Porter, 1980; Dess and Davis, 1984). By definition, product differentiation segregates one product from the other and a unique product charges higher price and as a result leads to superior returns. Although various product differentiation alternatives exist, superior quality is the mostly employed approach to characterize this strategy (Kiechel, 1981). Differentiation by quality insulates a product from competitive rivalry by lowering customer sensitivity to price and protecting the product from other competitive forces that reduce price-cost margins (Porter, 1980). Moreover, high quality products allow a firm to avoid profit-damaging competition based on price (Gale and Swire, 1977). That is, higher quality enables the firm to charge premium prices and generate superior margins (Porter, 1980). Consistent with the arguments above, Schoeffler (1974), Buzzell (1978), Craig and Douglas (1982) and Phillips et al. (1983) provide solid evidences indicating that product quality is positively associated with financial performance, such as return on investment (ROI). Accordingly, a positive association between product quality and performance can be expected.

However, few prior studies have explored the association between auditor quality and performance in the public accounting profession. Simunic and Stein (1987) states auditor quality possesses the property of product differentiation, a perspective similar to Porter (1980). Besides, many prior studies report that larger audit firms with international reputation earn fee premiums because of auditor quality (Yardley et al., 1992; Walker and Johnson, 1996; Moizer, 1997; Taylor and Simon, 1999). Klein and Leffler (1981) note that price premiums arise to motivate competitive firms to honor high quality promises because the value of satisfied customers may exceed the cost savings of cheating them. Extending Klein and Leffler (1981), Shapiro (1983) also points out that high-quality firms earn a price premium, which serves either as an incentive to produce quality service continuously or as a return on their investment in reputation. Based on the foregoing researches, this study establishes the following hypothesis.

H3: Auditor quality has a direct effect on firm's

performance significantly.

Indirect effects on firm's performance

Prior studies analytically or empirically indicated that auditor size is associated either with auditor quality (Krishnan and Schauer, 2000; Palmrose, 1988; DeAngelo, 1981) or with performance (Banker et al., 2003; Rescho, 1987) and then auditor quality is associated with performance (Chen and Cheng, 2008). Alternatively stated, auditor size has a direct and positive effect on auditor quality and in turn auditor quality affects financial performance directly.

Therefore, it is expected that audit firms create better performance by directly taking advantage of either economies of scale or differentiation by quality.

In addition to the direct effect, auditor size has an indirect effect on financial performance. Using the census report of audit firms in Taiwan, Chen and Cheng (2008) find that auditor quality mediates the relationship between auditor size and auditor performance.

For maintaining reputation, large audit firms provide services with high quality. High quality services result in fee premiums and thus superior financial performance. Accordingly, auditor size has an indirect effect on financial performance through the upgrade of auditor quality.

In sum, this study expects that, in addition to direct effect, auditor size affects performance indirectly through auditor quality and establishes the following hypothesis to answer our question (2).

H4: Auditor size has an indirect effect through auditor quality on firm's performance significantly**.**

METHODOLOGY

Sample selection

Empirical data used in this study are from the information on Comprehensive Evaluation of Top 100 Public Accounting Firms in China, published by the Chinese Institute of Certified Public Accountants (CICPA). With concerns about the evolution of Chinese audit market, CICPA has surveyed the largest 100 audit firms in China since 2002. The latest year of the survey is 2007. Content of the survey mainly includes total revenues, number of practicing certified public accountant (CPA), educational background of CPA, age of CPA in an audit firm, and professional training of CPA. As the information about educational background and age of CPA is unavailable for 2005-2006, final number of observation included in this study is 400 for 2002 - 2004 and 2007. To some extent, there is market segmentation in the public accounting profession due primarily to either government regulation or size of clients served (Wind and Cardozo, 1974; Besanko et al., 2000). Size of audit clients of public company is always larger than that of audit clients of non-public company. This study as a result divides total observations into public company audit market firms (PCAMF) and non-public company audit market firms (NCAMF) in terms of size of audit client. Of the 400 observations, there are 255 (63.75%) PCAMFs and 145 (36.25%) NCAMFs respectively.

Definitions of variable

Most prior studies (Palmrose, 1988; Becker et al., 1998; Francis et al., 1999) exploit a dichotomy approach, Big 4 - 8 and non-Big 4 - 8, to separate larger audit firms from smaller ones.

This study instead operationalizes size of audit firm as total number of partners (SIZE). With regards to auditor quality (AQ), this study exploits four elements of human capital to extract its underlying construct. As indicated by prior studies (Meinhardt et al., 1987; Aldhizer et al., 1995; Liu, 1997; FRC, 2006), the determinants of auditor quality used in this study include educational level and work experience of auditors.

According to the resource-based view of firm, resources that are valuable, rare, unique, and difficult to imitate can provide a basis for the firms' sustained competitive advantages (Barney, 1991). Partner/practicing CPA plays dual role as the chief executive officer and owner in an audit firm and thus has a greater incentive to use his/her human capital for firm growth and performance than do other employees (Pennings et al., 1998).

This study asserts that human capital from partner is the key factor for audit firm to gain sustained competitive advantages in the market. Hence, educational level and work experience of partner are used to define the determinants of auditor quality.

This study includes two indicators of educational level, number of partner with or above master's degree (MASTER) and number of partner with bachelor's degree (BACHELOR). Two indicators of work experience are number of partner aged below 30 (EXP30) and number of partner aged between 30 and 50 (EXP30_50). Individual indicator alone is expected to be an imperfect measure of auditor quality. As a result, this study utilizes the principal components analysis (PCA) technique to extract the auditor quality from the four indicators. PCA is a factor analysis technique used to extract common factors from a set of variables (Sharma, 1996).

For this study, it is achieved by performing an Eigen-value analysis on the correlation matrix of the four indicators to determine their linear combination that will explain the maximum amount of variance. Common factor extracted is served as a measure of auditor quality.

In other word, the auditor quality (AQ) estimated in this study is a human capital-based auditor quality. Performance (PF) is defined as natural log of total revenue of an audit firm. Definitions of variable are summarized as follows:

PF = natural log of annual total revenue of an audit firm
SIZE = natural log of total number of partner
AQ = auditor quality extracted by the principal components analysis
MASTER = number of partner with or above master's degree
BACHELOR = number of partner with bachelor's degree
EXP30 = number of partner aged below 30
EXP30_50 = number of partner aged between 30 and 50.

Path analysis

Path analysis, a straightforward extension of multiple regression analysis, is applied to test the hypotheses. Figure 1 presents a path model depicting the relationship among auditor size (SIZE), auditor quality *(*AQ*)* and firm's performance (PF). As posited in Figure 1, auditor size affects performance directly and indirectly through auditor quality.

As auditor size (SIZE) affects performance (PF) directly (b_2) but also indirectly through auditor quality (AQ) (product of b_1 and b_3), the relation between auditor size and performance comprises two parts: direct effects and indirect effects. This study terms the sum of direct and indirect effects as total effects. Causal relationship above

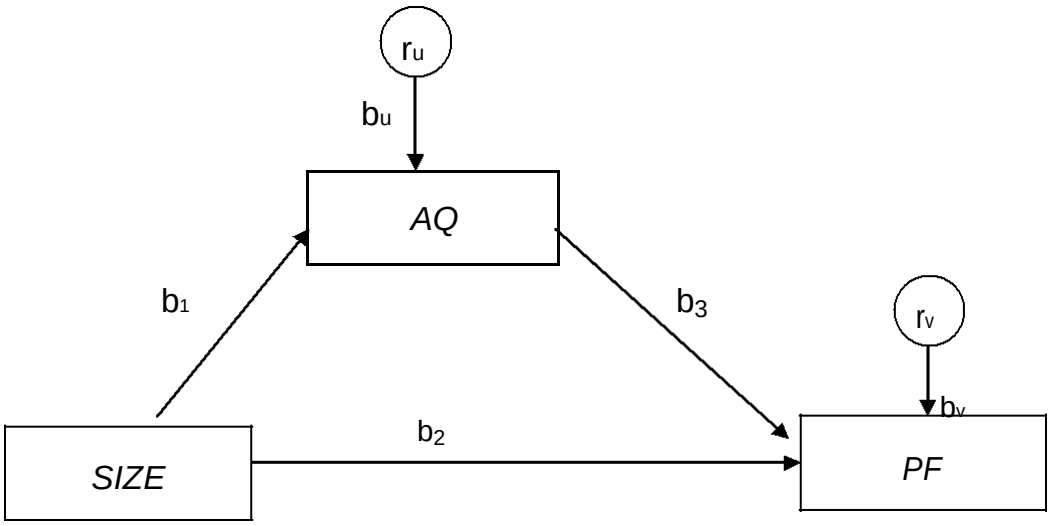

Figure 1. Path model among auditor size, auditor quality and performance.

results in two structural equations as follows:

$$AQ = b_1\ SIZE + b_u\ r_u \quad (1)$$

$$PF = b_2\ \ SIZE + b_3\ AQ + b_v\ r_v \quad (2)$$

Where AQ is auditor quality, SIZE denotes auditor size, PF is performance of an audit firm. In addition, b_1, b_2, and b_3 are parameter estimates, and r_u and r_v are error terms in equations.

EMPIRICAL RESULTS

Determinants of auditor quality

Table 1 reports the descriptive statistics and correlation matrix for the four determinants of auditor quality: number of partner with or above master's degree (MASTER), number of partner with bachelor's degree (BACHELOR), number of partner aged below 30 (EXP30), and number of partner aged between 30 and 50 (EXP30_50). As shown, mean number of partner with master's degree (MASTER) is 10.2857 and 3.4074 for the public company audit market firms (PCAMF) and non-public company audit market firms (NCAMF), respectively. Mean number of partner with bachelor's degree (BACHELOR) for the PCAMF and NCAMF is 86.5059 and 38.8592. Average number of partner aged below 30 (EXP30) is 31.8745 for the PCAMF and is 9.2042 for the NCAMF. Number of partner aged between 30 and 50 (EXP30_50), on average, is 95.6078 for the PCAMF and 51.8621 for the NCAMF. Taken together, mean number of the four determinants of auditor quality in the PCAMF is higher than that of in the NCAMF.

This study exploits the principal component analysis (PCA) with no rotation to obtain a description of the variation in the four determinants of auditor quality. Before proceeding to PCA, appropriateness of factor analysis needs to be assessed. This can be done by examining sampling adequacy through Kaiser-Meyer-Olkin (KMO) statistic and Bartlett's test of sphericity. KMO value estimated is 0.6, indicating that the empirical data are adequate for PCA. The significance level of Bratlett's test of sphericity is less than 0.00, which is small enough to reject the null hypothesis and support a PCA for the empirical data used.

Next, the PCA dictates that the number of component needed to be retained is based on the eigenvalue-greater-than-one rule. Further, in order to assess the appropriateness of the empirical data for PCA, the communalities derived from the PCA are reviewed. All communities obtained are greater than 0.5, indicating the appropriateness of the data set (Stewart, 1981). The eigenvalue-greater-than-one rule suggests that only one principal component should be retained for this study. The significant common factor, named auditor quality (AQ), has an eigenvalue of 3.1561, indicating that 79% of the variance is explained by the resulting factor. The factor score coefficients generated by PCA were 0.8948 for MASTER, 0.9683 for BACHELOR, 0.8483 for EXP30, and 0.8356 for EXP30_50. The distribution of the scores indicates each variable is relatively important in contributing to the explanation of the overall variance. In notation, the common factor extracted is formed as follows in terms of the relative score of the four determinants of auditor quality.

$$AQ = 0.2835\ \text{MASTER} + 0.3068\ \text{BACHELOR} + 0.2688\text{EXP30} + 0.2648\ \text{EXP30\_}50 \quad (3)$$

Descriptive statistics of variables in the path model

Descriptive statistics of auditor size (SIZE), auditor quality

Table 1. Descriptive statistics and correlation matrix.

Panel A: Full Sample (N=400)						
	Mean	**S.D.**	***MASTER***	***BACHELOR***	***EXP30***	***EXP30_50***
MASTER	7.8863	14.5382	1.0000	0.6946***	0.5699***	0.5682***
BACHELOR	69.4635	67.3173	0.7743***	1.0000	0.6760***	0.8353***
EXP30	23.7657	36.5523	0.7475***	0.8029***	1.0000	0.4765***
EXP30_50	79.7500	62.8992	0.6532***	0.8572***	0.4649***	1.0000
Panel B: Public company audit market firms (PCAMF) (N=255)						
	Mean	**S.D.**	***MASTER***	***BACHELOR***	***EXP30***	***EXP30_50***
MASTER	10.2857	17.2628	1.0000	0.7696***	0.7373***	0.6394***
BACHELOR	86.5059	76.0703	0.7696***	1.0000	0.7952***	0.8378***
EXP30	31.8745	43.1685	0.7373***	0.7952***	1.0000	0.4105***
EXP30_50	95.6078	70.2666	0.6394***	0.8378***	0.4105***	1.0000
Panel C: Nonpublic company audit market firms (NCAMF) (N=145)						
	Mean	**S.D.**	***MASTER***	***BACHELOR***	***EXP30***	***EXP30_50***
MASTER	3.4074	4.4274	1.0000	0.6521***	0.5511***	0.5672***
BACHELOR	38.8592	28.8849	0.6521***	1.0000	0.6441***	0.8674***
EXP30	9.2042	7.9328	0.5511***	0.6441***	1.0000	0.5001***
EXP30_50	51.8621	32.0125	0.5672***	0.8674***	0.5001***	1.0000

Notes: 1. In the correlation matrix, Spearman correlation is shown above the diagonal while Pearson correlation below the diagonal. 2. ***, **, and * denote significant at 1%, 5%, 10% level for two-tailed test. 3. MASTER = number of partner with above master's degree. BACHELOR = number of partner with bachelor's degree. EXP30 = number of partner aged below 30. EXP30_50 = number of partner aged between 30 and 50. N = number of observation.

(AQ) and performance (PF) are displayed in Panel A of Table 2 for the full sample. Panel B lists the means and medians of the three variables for public company audit market firms (PCAMF) and non-public company audit market firms (NCAMF). As shown in Panel B, mean SIZE of PCAMF is 4.8332 and is 4.2789 for the NCAMF. Average standardized AQ is 0.2345 and -0.4477 for the PCAMF and NCAMF, respectively. PCAMF has mean PF of 8.5392 and mean PF of NCAMF is 7.9343. Stated another way, the amounts of untransformed performance of PCAMF and NCAMF, their mean total revenues, are RMB 112,730,000 and RMB 30,950,000. Panel B lists the comparing results of the three variables between PCAMF and NCAMF. Both parametric and nonparametric tests indicate that the PCAMF tends to be substantially larger, higher, and more profitable than the NCAMF. Specifically, SIZE of PCAMF are statistically larger than that of NCAMF (t = 9.4465; | *z* | = 8.2950), which justifies the classification of auditor firm. Standardized AQ of PCAMF is higher than that of NCAMF (t = 6.7036; | *z* | = 10.5763). PCAMF outperforms NCAMF statistically significantly (t = 7.4516; | *z* | = 8.0252).

Model estimation

Parameter estimates

Table 3 presents the standardized parameter estimates for equations (1) and (2) and their diagnoses of multi-collinearity amongst independent variables. As shown, all variance inflation factors (VIF) are less than 10, implying that there is no serious multi-collinearity. Panel A displays empirical results for full sample observations. As expected, auditor size (SIZE) has a significantly positive influence on auditor quality (AQ) (b_1=0.7560, *t* statistic = 23.0413) in equation (1). Similarly, in equation (2), both *SIZE* and *AQ* have a statistically significant impact on performance (*PF*) (b_2=0.1165, t statistic =2.7644 and b_3=0.7432, t statistic =17.6275, respectively). Next, Panel B shows results for public company audit market firms **(**PCAMF). SIZE significantly affects *AQ* (b_1=0.8382, t statistic=24.4468) and in turn *AQ* affects *PF* (b_3=0.6001, t statistic =9.5517). Also, SIZE directly affects PF (b_2=0.2689, t statistic=4.2792) significantly. Finally, Panel C reports the results for nonpublic company audit market firms (NCAMF). SIZE significantly affects *AQ* (b_1=0.7648, t statistic=14.1955) and *AQ* affects *PF* (b_3=0.7324, *t* statistic =7.6285). However, *SIZE* does not significantly affect *PF*.

Fitness of model

As shown in panel A of Table 3 for full sample, the F statistics for equations (1) and (2) are large enough to reject the null hypotheses that SIZE and *A*Q have no effect on PF. Both F statistics of equations (1) and (2) are

Table 2. Descriptive statistics of variables used in the path model.

Panel A Descriptive statistics (N=400)					
	Mean	**S.D.**	**Maximum**	**Median**	**Minimum**
SIZE	4.6323	0.6234	6.9078	4.5951	2.0794
AQ	0.0000	1.0000	8.0738	-0.2436	-0.9700
PF	8.3199	0.8321	12.4783	9.1137	7.3212

Panel B Uni-variate test						
	Mean		**Median**		**Difference**	
	PCAMF (N=255)	NCAMF (N=145)	PCAMF (N=255)	NCAMF (N=145)	*t*-stat.	| *z*-stat. |
SIZE	4.8332	4.2789	4.7449	4.3694	0.5543*** (9.4465)	0.3755*** (8.2950)
AQ	0.2345	-0.4477	-0.1082	-0.5292	0.6822*** (6.7036)	0.4210*** (10.5763)
PF	8.5392	7.9343	8.2772	7.8617	0.6049*** (7.4516)	0.4155*** (8.0252)

Notes: 1. PCAMF and NCAMF represent public company audit market firms and nonpublic company audit market firms, respectively. 2 *** denotes significant at the 1 % level. 3. SIZE = auditor size defined as natural log of total number of partner; AQ = auditor quality estimated by the principal components analysis; PF= performance defined as natural log of total revenue of audit firm; N = number of observations.

jointly statistically significant at the 1% level (F statistics= 509.6086 and 445.7331, respectively). Similarly, F statistics of equation (1) and (2) for both PCAMF and NCAMF, reported in Panel B and C, are jointly statistically significant at the 1% level (F statistics of PCAMF= 590.4805 and 294.2272; F statistics of NCAMF = 181.1632 and 53.5407). Results of the F-test demonstrate that SIZE and AQ have joint effect on PF and justify the linear relationships in equations (1) and (2).

In addition, auditor size in PCAMF has greater explanatory power for auditor quality than NCAMF in equation (1), with an adjusted R^2 of 0.7014 compared to 0.5817 for the NCAMF. This result means that auditor size is a more suitable proxy for auditor quality in the PCAMF than in the NCAMF. Auditor size and auditor quality in PCAMF have greater explanatory power to firm's performance than NCAMF in equation (2), with an adjusted R^2 of 0.7003 compared to 0.4451 for the NCAMF. Also, PCAMF have a higher correlation between auditor size and auditor quality than the NCAMF, with a VIF of 3.3619 compared to 2.4089 for the NCAMF. These results again demonstrate using auditor size to proxy audit quality is more suitable in PCAMF than in NCAMF.

Finally, fitness of overall path model to the data (R^2_m) can be tested by computing the following generalized squared multiple correlations (Pedhazur, 1982):

$$R^2_m = 1 - (1 - R^2_1)(1 - R^2_2)\cdots(1 - R^2_n) \quad (4)$$

Where R^2_i denotes the ordinary squared multiple correlation coefficients for the regression equation in the model.

For the total sample observations have shown in panel A, adjusted R^2 in equations (1) and (2) are 0.5704 and 0.6990, respectively. Therefore, R^2_m in the path model above can be computed as follows:

$$R^2_{total\ sample} = 1 - (1 - 0.5704)(1 - 0.6990) = 0.8707 \quad (5)$$

The result in equation (5) indicates an obvious improvement of adjusted R^2 over their individual multiple regression models of adjusted R^2=0.5704 or 0.6990, shown in panel A of Table 3, and implies that the path model fits to the data used in this study. Similarly, the R^2_m of PCAMF, 0.9105, is higher than their individual adjusted R^2 of 0.7014 and 0.7003, shown in panel B of Table 3. In the NCAMF, R^2_m of 0.7679 is also greater than its individual adjusted R^2 of 0.5817 and 0.4451 shown in panel C of Table 3. Taken the results together, the overall path model has a very well goodness-of-fit.

$$R^2_{PCAMF} = 1 - (1 - 0.7014)(1 - 0.7003) = 0.9105 \quad (6)$$

$$R^2_{NCAMF} = 1 - (1 - 0.5817)(1 - 0.4451) = 0.7679 \quad (7)$$

Path decomposition: Direct, indirect and total effects

Table 4 reports the estimates of the standardized direct, indirect, and total effects in the path model. As shown in panel A of Table 4 for the full sample firms, auditor size

Table 3. Standardized parameter estimates of path model.

Panel A: Full Sample (N=400)

Cause Variable	Effect Variable	Path Coefficient	Estimated Coefficient	*t*-stat.	VIF	*F*- stat.	adj. R^2
SIZE	*AQ*	b_1	0.7560***	23.0413	1.0000	509.6086***	0.5704
SIZE	*PF*	b_2	0.1165	2.7644	2.3341		
AQ	*PF*	b_3	0.7432***	17.6275	2.3341	445.7331***	0.6990

Panel B: Public company audit market firms (PCAMF) (N=255)

Cause Variable	Effect Variable	Path Coefficient	Estimated Coefficient	*t*-stat.	VIF	*F*- stat.	adj. R^2
SIZE	*AQ*	b_1	0.8382***	24.4468	1.0000	590.4805***	0.7014
SIZE	*PF*	b_2	0.2689	4.2792	3.3619		
AQ	*PF*	b_3	0.6001***	9.5517	3.3619	294.2272***	0.7003

Panel C: Nonpublic company audit market firms (NCAMF) (N=145)

Cause Variable	Effect Variable	Path Coefficient	Estimated Coefficient	*t*-stat.	VIF	*F*- stat.	adj. R^2
SIZE	*AQ*	b_1	0.7648***	14.1955	1.0000	183.1632***	0.5817
SIZE	*PF*	b_2	-0.0805	-0.8382	2.4089		
AQ	*PF*	b_3	0.7324***	7.6285	2.4089	53.5407***	0.4451

$AQ = b_1\ SIZE + b_u\ r_u$ (1)

$PF = b_2\ SIZE + b_3\ AQ + b_v\ r_v$ (2)

Notes: 1.*** denotes significant at 1 % level. 2. SIZE= auditor size defined as natural log of total number of partner; AQ= auditor quality estimated by the principal components analysis; PF= performance defined as natural log of total revenue of audit firm; N= number of observation.

(SIZE) has a direct effect on auditor quality (AQ) significantly (b_1=0.7560, t statistic =23.0413), which supports the hypothesis H1. Additionally, both SIZE and AQ are directly and positively associated with performance (PF) (b_2=0.1165, t statistic =2.7644 and b_3=0.7432, t statistic =17.6275), which lend a support to the hypotheses H2 and H3. As regards the indirect effect, the relationship between auditor size (SIZE) and performance (PF) is being mediated significantly by the auditor quality (AQ) and the estimate of indirect effect is 0.5619 (t statistic =14.0003). This indicates that auditor size has an indirect effect on financial performance through the upgrade of auditor quality and thus supports hypothesis H4. This indirect effect estimate is operationalized as the product of the following two effects: the effect of auditor size (SIZE) on auditor quality (AQ) and the effect of auditor quality (AQ) on performance (PF) (0.5619 = 0.7560*0.7432). Therefore, the total effect of auditor size (SIZE) on performance (PF) (0.6784) is the sum of direct effect (0.1165) and indirect effect (0.5619). That is, performance (PF) increases/improves by 0.6784 standard units for each 1 standard unit increase in auditor size (SIZE). Further, the indirect effect of auditor quality explains 82.83% (0.5619/0.6784) of the total variation in performance and the direct effect of auditor size explain 17.17% (0.1165/0.6784) only. This means that, ceteris paribus, of the one million dollars of performance, auditor quality creates about $828,300 over the $171,700 created by auditor size. In terms of total effects shown in the most right column of Table 4, the total effect of auditor quality (AQ) on performance (PF) (0.7432) is more than the total effect of auditor size (SIZE) on performance (PF) (0.6784). Results above mean that improving auditor quality is the optimal strategy in performance creation for the full sample.

Panel B of Table 4 displays the results for public company audit market firms (PCAMF)**.** As shown, auditor size (SIZE) has a direct effect on auditor quality (*AQ*) significantly (b_1=0.8382, t =24.4468), which supports the hypothesis H1. Further, both auditor size (SIZE) and auditor quality (*AQ*) are directly and positively related to performance (PF) (b_2=0.2689, t statistic= 4.2792 and b_3=0.6001, t statistic=9.5517, respectively). This lends a support to the hypotheses H2 and H3. Next, the relationship between auditor size (SIZE) and performance (PF) is being mediated significantly by the auditor quality (AQ) and the estimate of indirect effect is 0.5030 (t statistic = 8.8968). The estimate of indirect effect is defined as product of the effect of auditor size (SIZE) on auditor quality (AQ) and the effect of auditor quality (AQ) on performance (PF), that is, 0.5030 = 0.8382*0.6001. This indicates that auditor size has an indirect effect on financial performance through auditor quality and thus supports the hypothesis H4. Total effect of auditor size

Table 4. Decomposed path model: direct and indirect effects.

Panel A: Full sample (N=400)								
Path (from → to)			**Dir. effects (*t*-stat.)**		**Indi. effects (*t*-stat.)**		**total effects(*t*-stat.)**	
SIZE	→	*AQ*	0.7560***	(23.0413)			0.7560***	(23.0413)
SIZE	→	*PF*	0.1165***	(2.7644)	0.5619***	(14.0003)	0.6784***	(18.4214)
AQ	→	*PF*	0.7432***	(17.6275)			0.7432***	(17.6275)
Panel B: Public company audit market firms (PCAMF) (N=255)								
Path (from → to)			**Dir. effects (*t*-stat.)**		**Indi. effects (*t*-stat.)**		**total effects(*t*-stat.)**	
SIZE	→	*AQ*	0.8382***	(24.4468)			0.8382***	(24.4468)
SIZE	→	*PF*	0.2689***	(4.2792)	0.5030***	(8.8968)	0.7719***	(19.3125)
AQ	→	*PF*	0.6001***	(9.5517)			0.6001***	(9.5517)
Panel C: Nonpublic company audit market firms (NCAMF) (N=145)								
Path (from → to)			**Dir. effects (*t*-stat.)**		**Indi. effects (*t*-stat.)**		**total effects(*t*-stat.)**	
SIZE	→	*AQ*	0.7648***	(14.1955)			0.7648***	(14.1955)
SIZE	→	*PF*	-0.0805	(-0.8382)	0.5602^^^	(6.7196)	0.4797^^^	(6.5377)
AQ	→	*PF*	0.7324^^^	(7.6285)			0.7324^^^	(7.6285)

$AQ = b_1\ SIZE + b_u\ r_u$ (1)

$PF = b_2\ SIZE + b_3\ AQ + b_v\ r_v$ (2)

Notes: 1. *** denotes significant at 1 % level. 2. SIZE= auditor size defined as natural log of total number of partner; AQ= auditor quality estimated by the principal components analysis; PF= performance defined as natural log of total revenue of audit firm; N= number of observation.

(SIZE) on performance (PF) (0.7719) is the sum of direct effect of auditor size (SIZE) on performance (PF) (0.2689) and indirect effect of auditor size (SIZE) on performance (PF) through auditor quality (AQ) (0.5030). The total effect of 0.7719 means that performance increases (that is improves) by 0.7719 standard units for each 1 standard unit increase in SIZE. Further, it indicates that nearly 34.84% (0.2689/0.7719) of the total variation in performance can be accounted for by the direct effect of auditor size and nearly 65.16% (0.5030/0.7719) by the indirect effect of auditor quality. Results above indicate that auditor quality play a dominant roles in creating performance for the public company audit market firms.

Estimates of direct, indirect, and total effects for nonpublic company audit market firms (NCAMF) are listed in Panel C of Table 4. As can be seen, auditor size (SIZE) has a direct effect on auditor quality (AQ) significantly (b_1=0.7648, t statistic =14.1955). However, auditor size (SIZE) does not relate to performance (PF) directly and positively but auditor quality (AQ) does (b_3=0.7324, t statistic=7.6285). Hence, the hypothesis H2 is not supported but the hypothesis H3 is. Next, the relationship between auditor size (SIZE) and performance (PF) is being mediated significantly by the auditor quality (AQ) and the estimate of indirect effect is 0.5602 (0.7648*0.7324) (t statistic=6.7196). This indicates that auditor size has an indirect effect on financial performance through auditor quality and thus supports the hypothesis H4. The total effect of auditor size (SIZE) on performance (PF) consists of direct effect of auditor size (SIZE) on performance (PF) and indirect effect of auditor size (SIZE) on performance (PF) through auditor quality (AQ). That is, 0.4797 = -0.0805 + 0.5602. This means that total variation in performance can be completely accounted for by the indirect effect of auditor quality.

Moreover, for the NCAMF, total effect of auditor quality (AQ) on performance (PF) (0.7324) is greater than that of auditor size (SIZE) on performance (PF) (0.4797). This indicates that auditor quality plays much more important roles in creating performance than auditor size in the NCAMF. In sum, auditor quality is the key factor in creating performance for either full sample firms, PCAMFs or NCAMFs.

CONCLUSIONS AND LIMITATIONS

Based on the CICPA's surveys of the top 100 audit firms, this study probes the performance determinants of audit firm in China. Specifically, the relation among auditor size, auditor quality and performance of audit firms is investigated. Empirical result indicates that a positive association between auditor size and auditor quality for both public and non-public company audit market firms. Both auditor size and auditor quality are directly and positively related to performance in the public company audit market firms. However, auditor quality only directly relates to performance positively in the non-public company audit market firms. For both public and non-public company audit market firms, auditor quality is a mediator in the association between auditor size and performance and auditor quality is the key factor in the

creation of audit firm's performance.

To the best of the knowledge, much less attention has been paid to the interrelationship among auditor size, auditor quality and financial performance in the Chinese audit market. This study aims to bridge this gap by presenting and empirically testing a conceptual model that ties up all of those relationships, which contributes to the literature on audit market. Empirical results obtained in this study provide managerial implications to the practitioners in the following two dimensions. First, the optimal strategy in the public company audit market firms is the enlargement of size and improvement of auditor quality for performance creation, while improvement of auditor quality is the best strategy for the nonpublic company audit market firms. Next, the Chinese practitioners may devote more efforts to improve their firm's human capital, which in turn leading to higher auditor quality and thus creating superior performance.

Conclusions above, however, must be interpreted in light of the following limitations. Prior studies identify four human capital-related drivers of audit quality, including educational level, work experience, professional training of auditors, and in-charge auditor being a CPA (for example, Aldhizer et al., 1995; FRC, 2006). This study omits the last one due primarily to data unavailability. Apart from the auditor size and auditor quality, determinants of audit firm performance include such as age of an audit firm, culture of an audit firm, and effectiveness of the audit process. Data availability precludes them from incorporating into the path model, which constitutes another research limitation of this study. The Taiwanese Financial Supervisory Commission publishes the Census Report of Audit Firms annually. It is a promising avenue for future study to conduct a cross-strait comparison of the determinants of audit firm performance.

REFERENCES

Aldhizer GR, Miller JR, Moraglio JE (1995). Common attributes of quality audits. J. Acc., 179(1): 61-68.

Banker RD, Chang H, Cunningham R (2003). The public accounting industry production function. J. Acc. Econ., 35(2): 255-281.

Barney JB (1991). Firm resources and sustained competitive advantage. J. Manag., 17(1): 99-120.

Becker CL, DeFond ML, Jiambal J, Subramanyam KR (1998). The effect of audit quality on earnings management. Cont. Acc. Res., 15(1): 1-24.

Besanko D, Danove D, Shanley M (2000). Economics of Strategy. New York: John Wiley.

Brocheler V, Maijoor S, Witteloostuijn A (2004). Auditor human capital and audit firm survival: The Dutch audit industry in 1930-1992. Acc. Organ. Soc., 29(7): 627-646.

Buzzell RD (1978). Product Quality. Massachusetts: Strategic Planning Institute.

Chan KH, Lin KZ, Phyllis LLM (2003). An empirical study on the impact of culture on audit-detected accounting. Aud. J. Pract. Theo., 22(2): 281-295.

Chen CJP, Chen S, Su X (2001). Profitability regulation, earnings management, and modified audit opinions: Evidence from China. Aud. J. Pract. Theo., 20(2): 9-30.

Chen YS, Cheng YS (2008). Strategic role of size and quality in performance creation: Evidence from Taiwan's sole proprietorship audit firms. J. Hum. Res. Manag., 8(3): 73-93.

Chen CJP, Su X, Ronald Z (2000). An emerging market's reaction to initial modified audit opinions: Evidence from the Shanghai stock exchange. Cont. Acc. Res., 17(3): 429-455.

Chen CJP, Su X, Wu X (2007). Market competitiveness and big 5 pricing: Evidence from China's binary market. Int. J. Acc., 42(1): 1-24.

Christenson LR, Greene WH (1976). Economies of scale in the U.S. electric power generation. J. Polit. Econ., 84(4): 655-676.

Colbert G, Murray D (1998). The association between auditor quality and auditor size: An analysis of small CPA firms. J. Acc. Aud. Fin., 13(2): 135-150.

Craig SS, Douglas SP (1982). Strategic factors associated with market and financial performance. Q. Rev. Econ. Bus., 22: 101-112.

Darrough M, Heineke J (1978). The Multi-output Translog Production Cost Function: The Case of Law Enforcement Agency. Amsterdam: North-Holland, Publishing Company.

DeAngelo LE (1981). Auditor size and audit quality. J. Acc. Econ., 3(3): 183-199.

Dess GG, Davis PS (1984). Porter's (1980) generic strategies as determinants of strategic group membership and organizational performance. Acad. Manag. J., 27(3): 467-488.

Francis JR (1984). The effect of audit firm size on audit prices. J. Acc. Econ., 6(2): 133-151.

Francis JR, Maydew EL, Sparks CH (1999). The role of big 6 auditors in the credible reporting of accruals. Aud. J. Pract. Theo., 18(2): 17-34.

FRC (2006). Promoting Audit Quality, Discussion Paper. London: Financial Reporting Council.

Gale BT, Swire DJ (1977). The Limited Information Report: A Strategic Planning Tool for Business Decision Making When Information is Difficult to Obtain. Cambridge, Massachusetts: Strategic Planning Institute.

Gul FA (1999). Audit prices, product differentiation and economic equilibrium. Aud. J. Pract. Theo., 18(1): 90-100.

Gul FA, Sami H, Zhou H (2009). Auditor disaffiliation program in China and auditor independence. Aud. J. Pract. Theo., 28(1): 29-51.

Hall WK (1980). Survival strategies in a hostile environment. Harv. Bus. Rev., 58(5): 75-85.

Haw IMG, Park K, Qi D, Wu W (2003). Audit qualification and timing of earnings announcements: Evidence from China. Aud. J. Pract. Theo., 22(2): 121-146.

Kiechel W (1981). Three (or four, or morse) ways to win. Fortune 104(October): 181-189.

Klein B, Leffler KB (1981). The role of market forces in assuring contractual performance. J. Polit. Econ., 89(4): 615-641.

Kirsch RJ, Laird KR, Evans TG (2000). The entry of international CPA firms into emerging markets: Motivational factors and growth strategies. Int. J. Acc., 35(1): 99-119.

Krishnan J, Schauer PC (2000). The differentiation of quality among auditors: Evidence from the not-for-profit sector. Aud. J. Pract. Theo., 19(2): 9-25.

Lin KZ, Chan KH (2000). Auditing standards in China: A comparative analysis with relevant international standards and guidelines. Int. J. Acc., 35(4): 559-577.

Liu C (1997). Legal Liability, Human Capital Investment, and Audit Quality. PhD dissertation, University of National Taiwan University, Taiwan.

Meinhardt J, Moraglio JF, Steinberg HI (1987). Governmental audits: An action plan for excellence. J. Acc., 164(1): 86-91.

Moizer P (1997). Auditor reputation: The international empirical evidence. Int. J. Aud., 1(1): 61-74.

O'Keefe TB, Westort PJ (1992). Conformance to GAAS reporting standards in municipal audits and the economics of auditing: The effects of audit firm size, CPA examination performance, competition. Res. Acc. Regul., 6: 39-77.

Palmrose ZV (1988). An analysis of auditor litigation and audit service quality. Acc. Rev., 63(1): 55-73.

Pedhazur EJ (1982). Multiple Regressions in Behavior Research: Explanation and Prediction. New York: Rinehart and Winston.

Pennings JM, Lee K, Whitteloostuijn AV (1998). Human capital, social capital, and firm dissolution. Acad. Manag. J., 41(4): 425-440.

Phillips LW, Chang DR, Buzzell RD (1983) Product quality, cost position, and business performance: A test of some key hypothesis. J. Mark.,

47(2): 26-43.
Porter ME (1980). Competitive Strategy. New York: The Free Press.
Rescho JA (1987). Public Accounting Firm Strategy and Innovativeness: A Study of the Adoption of Product, Technical, and Administrative Innovations Using a Strategic Typology. PhD dissertation, University of Mississippi, Oxford, Mississippi, United States.
Sami H, Zhou H (2008). Do auditing standards improve the accounting disclosure and information environment of public companies? Evidence from the emerging markets in China. Int. J. Acc., 43(2): 139-169.
Schoeffler S, Buzzell RD, Heany DF (1974). Impact of strategic planning on profit performance. Harv. Bus. Rev., 52(2): 137-145.
Shafer WE (2008). Ethical climate in Chinese CPA firms. Acc. Organ. Soc., 33(7/8): 825-835.
Shapiro C (1983). Premiums for high quality products as returns to reputations. Q. J. Econ., 98(4): 659-679.
Sharma S (1996). Applied Multivariate Techniques. New York: John Wiley.
Simunic DA, Stein MT (1987). Product Differentiation in Auditing: Auditor Choice in the Market for Unseasoned New Issues. Research monograph number 13. Vancouver: The Canadian Certified General Accountants' Research Foundation.
Stewart DW (1981). The application and misapplication of factor analysis in marketing research. J. Mark. Res., 18(1): 51-62.
Taylor MH, Simon DT (1999). Determinants of audit fees: The importance of litigation, disclosure, and regulatory burdens in audit engagements in 20 countries. Int. J. Acc., 34(3): 375-388.
Walker KB, Johnson EN (1996). A review and synthesis of research on supplier concentration, quality and fee structure in non-U.S. markets for auditor services. Int. J. Acc., 31(1): 1-18.
Westort P (1990). Investments in Human Capital by Accountants in Public Practice. PhD dissertation, University of Oregon Eugene, Oregon, United States.
Wind Y, Cardozo RN (1974). Industrial market segmentation. Ind. Mark. Manag., 3(3): 153-166.
Wright PM, Dunford BB, Snell SA (2001). Human resource and the resource based view of the firm. J. Manag., 27(6): 701-721.
Xiao JZ, Zhang Y, Xie Z (2000). The making of independent auditing standards in China. Acc. Horiz., 14(1): 69-89.
Yardley JA, Kauffman NL, Cairney TD, Albrecht WD (1992). Supplier behavior in the U.S. audit market. J. Acc. Lit., 11: 151-184.