

## **Auditor Market Share and Industry Specialization of Non-Big 4 Firms**

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*This paper examines auditors' market share and auditor dominance in China's audit market with a focus on non-Big 4 auditors. We also examine the impact of auditor industry specialization on audit fees, and find that Big 4 audit firms earn fee premiums for both general brand name and industry specialization. Non-Big 4 specialized auditors, however, only earn fee premiums due to stronger industry specialization rather than general reputation. In addition, the non-Big 4 premium from industry expertise is much smaller than the specialization premium earned by Big 4 firms. Moreover, Non-Big 4 specialist auditors charge higher audit fees only for smaller clients. For larger clients, the fee premium disappears because of the bargaining power of large clients. Overall, our findings suggest that specialized audit firms in China adopt different pricing strategies based upon their market share and client characteristics. The results have important implications for audit firms as well as for the Chinese standard setters.*

### **INTRODUCTION**

Industry specialization is an important, strategic decision for audit firms. The impact of industry specialization on audit pricing, audit quality, and financial report quality, is of primary interest to regulators and financial statement users (Craswell and Taylor 1991; DeFond, Francis, & Wong 2000; Mayhew and Wilkins 2003; Casterella, Francis, Lewis, & Walker 2004; Cahan, Godfrey, Hamilton, & Jeter 2008). In a report issued by the U.S. General Accounting Office (GAO) in 2003, auditors' industry expertise was identified as a critical factor for firms choosing an auditor (GAO 2003). However, extant empirical studies mainly focus on the industry expertise of Big 4 audit firms and whether industry specialization increase or decrease audit fees in developed economies (e.g. U.S., Australia, Canada, and Hong Kong). Evidence is scarce regarding the development of industry practice of audit firms (especially non-Big 4 auditors) in the emerging markets, which are playing increasingly important role in the global accounting world. For example, Big 4 accounting firms are making great efforts to seek high growth and

competitive advantage in the international markets.<sup>1</sup>

Wang, O, and Iqbal (2009) did an explorative study on the relation between auditor industry expertise and audit fees using listed companies in China's B share market<sup>2</sup>, and reported fee premiums associated with brand name as well as industry specialization for Big 4 firms. Their sample, however, focused on a relatively small and isolated market dominated by Big 4 firms due to the information needs of foreign investors. The majority of public companies (i.e., A shares) that are normally audited by non-Big 4 audit firms are left out from the study. As such, it is difficult to draw inference from Wang et al.'s findings to the features of the general audit market in terms of auditor market share, audit fees, and industry strategy of audit firms.

This study attempts to extend Wang et al. (2009) and make incremental contribution to the literature in two aspects. First, we examine the competition level of audit firms in the Chinese market by analyzing auditors' market share and auditor dominance. To our knowledge, this is the first study that provides empirical evidence on auditor competition in the setting of an emerging economy such as China. Second and more important, we investigate the impact of specialized service on the pricing strategy of non-Big 4 firms using a much larger and more comprehensive sample (i.e. A shares) of China's capital market. Specifically, do they charge higher audit fees due to increased service quality that are related to specialization, or decrease audit fees because economies of scale gained from specialization can help auditors produce more efficient and lower cost audits? Answering these questions contributes to the understanding of the dynamics of professionalisation in emerging markets, and is important to the future of the global auditing profession.

China, which is potentially one of the world's fast growing economies, provides an ideal setting to study auditor's role in emerging capital markets, especially for non-Big 4 audit firms. As pointed by prior studies (Wang et al. 2009, Li, Song, & Wong 2005), competition among auditors is more pronounced in China due to active participation of local CPA firms and low concentration of Big 4 auditors. Therefore, when studying industry specialization, it is relatively easy to eliminate the confounding effect of auditor general reputation due to market dominance. This is important because prior studies observe that benefits of industry specialization for Big 4 auditors are related to their brand reputation (DeFond et al. 2000). In addition, Chinese auditors usually operate only in the local market rather than in the national market because Chinese companies like to have auditors in close proximity to their headquarters. Thus, it is not essential that the firm-wide industry expertise be separated from the office-level expertise when examining audit fees in China, a problem that has been encountered by prior studies in developed countries.<sup>3</sup>

Consistent with the measures used by the GAO and by prior studies (e.g. Ferguson and Stokes 2002; Hogan and Jeter 1999; Mayhew and Wilkins 2003), we choose auditor concentration based on client size to measure industry specialization. In a sample of 1,028 publicly listed companies, we find that the average market share of Chinese auditors is 7 percent, and the two-firm and three-firm concentration ratio are 0.36 and 0.45, respectively. The concentration ratio values are much lower than those reported for the U.S. market (e.g., average 0.5 – 0.64 in Kwon 1996; Hogan and Jeter 1999; Cahan, et al. 2008). We also find that the top three audit firms in a particular industry have similar market shares. In addition, the findings on auditor dispersion and average number of clients provide strong indication that the dominance of one or two auditors in an industry is less likely in the Chinese setting.

Collectively, the results on auditor market share and auditor dominance suggest that competition among audit firms is much stiffer in the Chinese A share market. We offer two interpretations. First, a low entrance barrier in the A share audit market allows more audit firms to provide services in that market. Second, the majority of the Chinese listed companies are clustered in the homogenous industries (e.g., electronics, chemical and allied products, and industrial machinery), which are highly competitive by nature. Such industry homogeneity limits the demand for the audit specialists as companies avoid being audited by their competitors' auditor due to concerns about the transfer of proprietary information (e.g., Cainey and Young 2006; Cahan et al. 2008).

With respect to the impact of auditor industry specialization on audit fees, we find that Big 4 audit firms earn fee premiums for both general brand name and industry specialization. And this result is robust

for a partition of the sample into large and small clients based on median assets. Non-Big 4 specialized auditors, however, only earn fee premiums due to stronger industry specialization rather than general reputation. In addition, the non-Big 4 premium associated with industry expertise is much smaller than the specialization premium earned by Big 4 firms. Finally, we find that non-Big 4 specialist auditors charge higher audit fees only for smaller clients. For larger clients, the fee premium disappears as compared to other auditors without industry expertise. These results are consistent with the finding that bargaining power of large clients could neutralize fee premiums for Big 4 industry specialists in the U.S. (Mayhew and Wilkins 2003; Casterella et al. 2004). The underlying reason may be that for large companies, non-Big 4 Chinese audit firms are willing to pass along a portion of their cost savings from production economies to these clients or they are simply cutting corners in order to retain these clients and market share.

To the extent that industry specialized auditors earn a fee premium, our findings suggest that differentiated audit quality is valued by managers and controlling shareholders in the Chinese capital market. Second, the results have implications for Chinese regulatory bodies in their efforts to establish Chinese international accounting firms through mergers and acquisitions. Drawing on the results of GAO (2003) regarding consolidation and competition among public accounting firms, Chinese auditors will benefit more by building strong industry expertise and providing multi-layer services after the reorganization.

The remainder of the paper is structured as follows. The next section offers background information about the audit market in China and reviews prior literature. Sample selection and data collection will be explained later followed by empirical results and analysis. The final section presents conclusions and limitations of the study.

## **BACKGROUND AND RESEARCH QUESTIONS**

### **Background**

The accounting services sector in China has grown by leaps and bounds in the period since economic liberalization began in earnest in the mid-1980s. In fact, under the planned economy, accounting and auditing was limited to State Owned Enterprises (SOEs) or public sector budgeting. As privatization takes place and private sector companies move to the forefront, the needs for direct financing in the form of share issuance brings an emerging demand for independent audit information. Partially in response to such a need, the Chinese Institute of Certified Public Accountants (CICPA) was established in 1989, and the Shanghai Stock Exchange and Shenzhen Stock Exchange were established in 1990 and 1991, respectively. The two markets have expanded steadily and provide direct incentives and pressure for market-oriented financial disclosure. Till the end of the 2010, there are roughly 1,361 companies listed in the main boards of the two stock markets and the total market capitalization is about USD 3,716.58 billion.

Most of the Chinese listed firms are former SOEs with the government (both central and local) holding a certain percentage of shares, and they are the most sought after clients of audit firms. However, this market is only open to specially designated audit firms that meet the requirements set up by Minister of Finance (MOF) and China Securities Regulatory Commission (CSRC), which is a unique feature of the Chinese audit market.<sup>4</sup> By the end of March 2007, only 73 CPA firms were qualified to audit publicly traded firms.<sup>5</sup> Among them are the Big4 international accounting firms KPMG, PWC, Deloitte, and Ernst & Young who presently monopolize the audit market for companies listed overseas. The market share of Big 4 auditors is small based on number of clients, but very large if measured by total assets or revenues audited. For example, in 2008, the total revenue of the Big 4 auditors in China amounted to 10.4 billion Chinese RMB (i.e., 1.53 billion U.S. dollars), which accounted for 33.5 percent of the total revenue from the entire audit market and more than 52.8 percent of the total revenue of the top 100 audit firms. The average total revenue of the Big 4 firms is 24 billion RMB, and PWC enjoyed the highest revenue of 27.56 billion RMB. In contrast, the highest annual revenue of Chinese local firms (i.e., Shulun Pan CPAs) is only 6.67 billion RMB. Table 1 lists the top 20 audit firms in China ranked by the CICPA based on

revenue, audit quality, number of CPAs, the education background of CPAs, and other factors (CICPA 2009).<sup>6</sup>

**TABLE 1**  
**COMPREHENSIVE EVALUATION OF THE TOP CPA FIRMS (EXCERPT)**

| Accounting Firms              | Comprehensive Rank | Total Revenue 2008 (M)* | Revenue from Audit Service (M) | # of CPAs* | # of Local Offices | # of Employees | Education of CPAs |      |       |
|-------------------------------|--------------------|-------------------------|--------------------------------|------------|--------------------|----------------|-------------------|------|-------|
|                               |                    |                         |                                |            |                    |                | B.S.              | M.S. | Ph.D. |
| PWC                           | 1                  | 275518                  | 260984                         | 587        | 9                  | 4583           | 447               | 133  | 2     |
| Ernst & Young                 | 2                  | 270000                  | 226251                         | 750        | 7                  | 4094           | 550               | 182  | 4     |
| Deloitte & KPMG               | 3                  | 249882                  | 170449                         | 668        | 6                  | 4371           | 457               | 181  | 6     |
| RSM China                     | 4                  | 243517                  | 154017                         | 550        | 3                  | 4890           | 376               | 164  | 0     |
| Horwath (Shulun Wanlong Asia) | 5                  | 65217                   | 55433                          | 1013       | 18                 | 1825           | 621               | 84   | 5     |
| Pan-China                     | 6                  | 31466                   | 24401                          | 339        | 2                  | 930            | 265               | 46   | 2     |
| Daxin                         | 7                  | 31373                   | 27550                          | 360        | 9                  | 946            | 211               | 36   | 4     |
| Shinewing                     | 8                  | 26153                   | 22287                          | 590        | 6                  | 803            | 430               | 45   | 0     |
| Reanda                        | 9                  | 27253                   | 24677                          | 532        | 16                 | 950            | 362               | 34   | 0     |
| Acenda                        | 10                 | 23944                   | 21440                          | 402        | 8                  | 903            | 287               | 57   | 6     |
| Tianzhi                       | 11                 | 24258                   | 20858                          | 332        | 6                  | 654            | 218               | 10   | 0     |
| Beijing                       | 12                 | 26047                   | 23639                          | 351        | 7                  | 706            | 225               | 31   | 1     |
| Zhonghezhenxin                | 13                 | 19675                   | 14937                          | 430        | 15                 | 651            | 270               | 31   | 0     |
| Zhongshen                     | 14                 | 21088                   | 18338                          | 397        | 6                  | 546            | 245               | 26   | 0     |
| Beijing Xinghua               | 15                 | 13476                   | 11865                          | 255        | 4                  | 353            | 136               | 22   | 6     |
| Zhongzhui                     | 16                 | 11967                   | 11381                          | 326        | 7                  | 660            | 212               | 27   | 1     |
| Grant Thornton                | 17                 | 14405                   | 13136                          | 111        | 0                  | 209            | 74                | 11   | 0     |
| Zhonglei                      | 18                 | 13012                   | 11080                          | 319        | 12                 | 446            | 179               | 27   | 1     |

\*Notes

1. Total revenue: as shown in the accounting firms' financial statements from 2008.

2. # of CPAs: as of the end of 2008.

3. All the Big 4 firms in the table are joint ventures. They don't have individual partners.

4. The information already reflects the mergers and acquisitions of the accounting firms as the end of 2008.

In order to tackle competition from international accounting firms, CICPA is engaged in aggressive reform of the auditing profession by improving audit integrity and quality of local auditors. One of its new policies states that, in the next five to ten years, China should cultivate ten accounting firms capable of operating internationally to support domestic companies that go global, and another 100 firms big enough to serve large domestic enterprises. To this end, China's local accounting firms have undergone more market-driven mergers and acquisitions, or partnerships with second-tier international auditors (e.g., Horwath and BDO). For example, seven Chinese local firms have partnered with Horwath since 2001, including Shanghai Shulun Pan CPAs, one of the largest local CPA firms in China. By capturing the market shares of its partners, Horwath became the largest audit firm immediately following the Big 4 operations in the Chinese market.

Another strategy that both Big 4 and Chinese local auditors are adopting is to develop industry specialization. The business focus on industry expertise is especially apparent from the promotional materials on the web pages for the top local firms. For example, the Shinewing CPAs website states:

In order to provide efficient, high quality, and specialized service, our professionals have gained in-depth understanding of a range of key industries and the issues faced by each. Our service is targeted to the special needs of the clients. Our business is organized and managed in accordance with the similar type of clients and personnel that serve the same industry (Shinewing CPAs 2010).

The Shinewing website also lists its specializations in such industries as telecommunication, automobile, petroleum, financial services, electricity, and pharmaceuticals. In most cases, when a leading company in a particular industry requires extensive service, two or three departments will get involved simultaneously. For instance, Shinewing has put 150 professionals to work for a single client. Industry focus is also evident in the reorganization of Chinese local CPA firms in an effort to achieve competitive advantage over foreign firms (People's Daily 2006). These emphasize on industry experiences will have a profound impact not only on the Chinese audit market, but on the U.S. and global markets. Our study is, therefore, expected to shed light on the development of industry specialization in the rapidly growing audit market in China.

## **Research Questions**

Industry specialization provides auditors key knowledge when dealing with clients. In the established market, the benefits of Big 4 audit firms with increased or increasing levels of industry specialization can come from increased market share, profits, audit quality, or audit fees (Hogan and Jeter 1999). Specialized knowledge may also be beneficial in auditor negotiations with client management. For example, Gibbins et al. (2010) examine auditor's strategy selection for negotiation with management.

Normally, audit firms acquire a reputation as industry specialists by developing industry-specific skills and expertise over and above normal auditor expertise, but leaving the basic audit production process unchanged. In this case, the cost associated with industry specialization would be in the form of human capital and technology investment in industry-specific knowledge, and higher audit fees would be required to earn a return on these investment.

Industry specialization also can help audit firms achieve production economies of scale and become more efficient, lower-cost producers of audits. Under these circumstances, some studies argue that if a large client has bargaining power over the auditor firm, then the client could capture some of the production efficiencies through a lower audit fee (Eichenseher and Danos 1981; Casterella et al. 2004). The net effect on fees will depend on whether premium for differentiation dominates product efficiencies, or vice versa. To date, prior studies with a focus on Big 4 firms show a positive relation between audit fee and industry specialization for the U.S. market, but mixed results for the Australian market (e.g. Craswell, Francis, & Taylor 1995; Craswell and Francis 1999; Mayhew and Wilkins 2003; Casterella et al. 2004).

In the Chinese B share market, Wang, O, and Iqbal (2009) reported some initial evidence of fee premiums associated with industry specialization for Big 4 audit firms. They also found that second-tier

international firms do not charge higher fees given their increased market share in mid- and small-sized clienteles. However, one major limitation of Wang et al.'s research is the sample only included listed companies in a small and isolated market (i.e., B share) that is dominated by Big 4 firms. These companies represent a small portion of the entire listings in the stock market (less than 10%). Therefore, the findings from Wang et al. may not be generalized to the general A share market where the majority of the companies are audited by non-Big 4 firms. In addition, competition among auditors in the A share market is more pronounced, and the clients are largely diversified in terms of size, profitability, and industry distribution.

This study extends Wang et al. (2009) by performing more broader and in-depth analysis of the audit market and using a much larger and more comprehensive sample of Chinese public companies. Specifically, we pursue our research questions in two aspects. First, we examine the competition level of audit firms in the Chinese market by analyzing auditors' market share and auditor dominance.

Second, we examine the industry specialization of auditors in the A share market with a focus on non-Big 4 audit firms. Since there is no benchmark study in the literature, we predict both fee premiums and discounts are possible in the A share market for non-Big 4 audit firms due to industry specialization. In particular, if audit firms develop industry expertise to offer differential service quality than to lower cost, they are expected to charge higher prices to compensate their investment on industry specialization. We speculate that the top local audit firms are more likely to adopt this higher price strategy. On the other hand, local audit firms leverage more on mid- and small- sized clients to gain market share and develop industry expertise. These companies are not very profitable and are more likely to be a clientele that simply demands the lowest-priced audit available. In this case, we expect the benefits derived from product economies will enable industry specialized firms to lower audit fees in recruiting and retaining clients. The empirical findings will provide evidence on which of the two pricing strategies will dominate.

## **SAMPLE AND RESEARCH DESIGN**

### **Sample**

Our initial sample includes all 1,309 Chinese companies that were listed in the A share market in 2006. We hand collect audit fee and financial data from each company's annual report published by the Shanghai and Shenzhen Stock Exchanges. We delete industries that have ten companies or fewer for calculating auditor market share. After removing firms with missing data (e.g., primarily on audit fee and auditor tenure), the final sample includes 1,028 firms. The industry breakdown for the final sample is reported in Table 2. The top five industries in our sample are Electronics and other Electrical Equipment (10.31%), Chemicals and Allied Products (10.12%), Industrial and Commercial Machinery (7.39%), Primary and Fabricated Metals (6.62%), and Real Estate (6.32). The remaining 32 industries contain 59.24% of the sample firms.

**TABLE 2**  
**INDUSTRY REPRESENTATION OF THE SAMPLE**

| Industry Description                       | 2 Digit SIC | Number of Companies | % of the Sample |
|--|-------------|---------------------|-----------------|
| Electronics and Other Electrical Equipment | 36          | 106                 | 10.31           |
| Chemicals and Allied Products              | 28          | 104                 | 10.12           |
| Industrial and Commercial Machinery        | 35          | 76                  | 7.39            |
| Primary and Fabricated Metal Products      | 33          | 68                  | 6.62            |
| Real Estate                                | 65          | 65                  | 6.32            |
| Pharmaceuticals                            | 28          | 63                  | 6.13            |
| Retails                                    | 53          | 63                  | 6.13            |
| Utilities                                  | 49          | 51                  | 4.96            |
| Transportation Equipment                   | 37          | 47                  | 4.57            |
| Transportation                             | 40          | 43                  | 4.18            |
| Food and Beverages                         | 20          | 43                  | 4.18            |
| Business Services                          | 73          | 33                  | 3.21            |
| Stone, Clay, Glass, and Concrete Products  | 32          | 31                  | 3.02            |
| Whole Sales                                | 50          | 27                  | 2.63            |
| Constructions                              | 15          | 24                  | 2.33            |
| Agriculture                                | 01          | 22                  | 2.14            |
| All Other Industries                       |             | 162                 | 15.76           |
| <b>Total Sample Firms</b>                  |             | <b>1,028</b>        | <b>100.00</b>   |

### Industry Specialization and Auditor Dominance

Prior research measures auditor industry specialization using two main approaches that proxy for a firm's commitment to gaining specific knowledge and audit technologies within a given industry (Neal and Riley 2004). Under the first approach, auditor market share captures within-industry differentiation across competing audit firms, which is estimated by dividing total assets (sales) of each auditor's clients in a particular industry by total industry total assets (sales). In particular, the literature commonly uses a two-firm or three-firm concentration ratio, ACR2 or ACR3, which is the sum of the market share of the top two or three auditors in each industry to proxy for auditor market share. The second approach, namely auditor portfolio share, captures within-audit firm differentiation across industries and is estimated as an auditor's client sales in each industry divided by the auditor's firm-wide client sales.

In Table 3 we report results on auditor concentration ratio for the majority of the sample industries listed in Table 2.<sup>7</sup> Two-digit SIC codes are used to identify industry categories. On average, there are roughly 30 audit firms providing service in each industry in the Chinese market. Because of the large number of active auditors, we present four-firm market concentration ratio in addition to the other three concentration ratios (i.e., ACR1, ACR2, and ACR3). The mean (median) two-firm auditor concentration ratio is 0.36 (0.30), and the mean (median) three-firm auditor concentration ratio is 0.45 (0.40). These numbers are much lower than the market share of Big 4 firms in the U.S., confirming that competition among auditors is high in China.<sup>8</sup>

**TABLE 3**  
**AUDIT FIRM MARKET CONCENTRATION AND DOMINANCE**

| Industries                                 | # of Auditors | Auditor Concentration Ratio |      |      |      | -----<br>Dominance |      |
|--|---------------|-----------------------------|------|------|------|--------------------|------|
|  |               | ACR                         | ACR2 | ACR3 | ACR4 | SICD               | SICA |
| Electronics and Other Electrical Equipment | 40            | 0.15                        | 0.26 | 0.36 | 0.43 | 4.04               | 3.53 |
| Chemicals and Allied Products              | 42            | 0.17                        | 0.24 | 0.29 | 0.35 | 3.38               | 2.90 |
| Industrial and Commercial Machinery        | 37            | 0.13                        | 0.25 | 0.34 | 0.42 | 2.09               | 2.40 |
| Products                                   | 36            | 0.2                         | 0.28 | 0.35 | 0.43 | 1.75               | 2.38 |
| Pharmaceuticals                            | 39            | 0.16                        | 0.27 | 0.35 | 0.44 | 2.08               | 2.23 |
| Retails                                    | 30            | 0.42                        | 0.51 | 0.61 | 0.69 | 2.99               | 2.70 |
| Real Estate                                | 30            | 0.21                        | 0.41 | 0.49 | 0.55 | 2.69               | 2.57 |
| Utilities                                  | 27            | 0.23                        | 0.41 | 0.54 | 0.61 | 1.95               | 2.42 |
| Transportation Equipment                   | 30            | 0.11                        | 0.21 | 0.3  | 0.37 | 1.26               | 1.87 |
| Transportation                             | 27            | 0.16                        | 0.27 | 0.36 | 0.44 | 1.32               | 2.04 |
| Food and Beverages                         | 30            | 0.23                        | 0.35 | 0.44 | 0.52 | 1.98               | 1.83 |
| Business Services                          | 25            | 0.25                        | 0.36 | 0.46 | 0.55 | 1.31               | 1.76 |
| Stone, Clay, Glass, and Concrete Products  | 25            | 0.13                        | 0.25 | 0.33 | 0.41 | 0.96               | 1.72 |
| Whole Sales                                | 15            | 0.25                        | 0.35 | 0.46 | 0.53 | 1.59               | 2.47 |
| Agriculture                                | 20            | 0.11                        | 0.21 | 0.31 | 0.39 | 1.08               | 1.80 |
| Constructions                              | 25            | 0.22                        | 0.32 | 0.42 | 0.51 | 0.51               | 1.24 |
| Mean                                       | 30            | 0.25                        | 0.36 | 0.45 | 0.53 | 1.94               | 2.06 |
| Median                                     | 30            | 0.21                        | 0.30 | 0.40 | 0.50 | 1.85               | 1.95 |

Furthermore, we find that the market shares of the top two or three auditors in the most populated industries are very close (not tabulated) and that no single audit firm dominates a particular industry. Following prior research (Kwon 1996, Cahan et al. 2008), we examine auditor industry dominance using two measures, *SISD* and *SICA*. *SISD* is a measure of the dispersion of auditors in an industry.<sup>9</sup> If all auditors serve an equal number of clients in industry, *SISD* will equal zero. *SICA* measures the average number of clients served by auditors in an industry. If each auditor audits only one client, then *SICA* will have a value of 1. As an auditor becomes more dominant and captures more clients in an industry, both *SISD* and *SICA* will increase.

The last two columns of Table 3 show that the mean *SISD* for our sample is 1.94, which is lower than 3.412 reported by Cahan et al. (2008, p. 1413) for three-digit SIC code industries in the U.S. The mean *SICA* is 2.06, which is again low when compared to 4.635 reported by Cahan et al. (2008, p. 1413). The significantly lower magnitude of these two measures consistently suggests that no single auditor is likely to dominate an industry and capture more clients in the Chinese setting.



## Research Design

Using a standard audit fee model (Craswell and Francis 1999; Mayhew and Wilkins 2003; Chen et al. 2007; Cahan et al. 2008), we examine the determinants of audit pricing after controlling for the effects of client size, audit complexity, auditor-client risk sharing, and ownership structure that is unique to the Chinese Market.

To test our hypotheses on differential audit pricing, experimental variables measuring industry specialization are added to the audit fee model. Prior research argues that the Big 4 audit firms earn fee premiums because clients value their general brand name as well as differential service quality such as industry expertise. Therefore, we estimate the OLS regression model as follows in an attempt to separate the effect of auditor industry specialization from the general brand name for both Big 4 and non-Big 4 audit firms. Non-Big 4 audit firms include both second tier international auditors (e.g., Horwath and BDO) and the Chinese local CPA firms. Specifically, we select 6 non-Big 4 auditors that are ranked as the top 10 audit firms by CICPA in addition to the Big4 firms (refer to Table 1). Second tier international auditors are operating in China mainly through acquisition or partnerships with local audit firms. The audit fee model is as follows:

$$\begin{aligned} \text{Audfee} = & b_0 + b_1 \text{Assets} + b_2 \text{Invrec} + b_3 \text{Sub} + b_4 \text{ROA} + b_5 \text{Opinion} + b_6 \text{Tenure} + b_7 \text{Leverage} \\ & + b_8 \text{Stateshr} + b_9 \text{Legalshr} + b_{10} \text{Big4spec} + b_{11} \text{Big4nspec} + b_{12} \text{Localspec} \\ & + b_{13} \text{Blocalnspec} + r_1 \text{Fixedindustry} + e \end{aligned}$$

where:

Audfee = natural log of total audit fee.

Assets = natural log of total assets.

Invrec = (accounts receivables + inventory)/total assets.

Sub = square root of number of consolidated subsidiaries.

ROA = return on assets.

Opinion = indicator variable (1 if modified opinion, 0 otherwise).

Tenure = natural log of auditors' tenure in years.

Leverage = total liabilities/total assets.

Stateshr = the % ownership of the state government.

Legalshr = the % ownership of the legal person.

Big4spec = indicator variable (1 if the Big 4 firm is an industry specialist, 0 otherwise).

Big4nspec = indicator variable (1 if the Big 4 firm is not an industry specialist, 0 otherwise).

Localspec = indicator variable (1 if the non-Big 4 firms is an industry specialist, 0 otherwise).

Localnspec = indicator variable (1 if the non-Big 4 firm is not an industry specialist, 0 otherwise).

e = error term with a normal distribution.

Prior studies use arbitrary market share (typically 10-20 percent) and apply these percentages across all industries to denote industry experts (DeFond et al. 2000; Ferguson et al. 2003; Mayhew and Wilkins 2003; Casterella et al. 2004). Our industry specialization measure captures audit firms that have more than 10 percent of the market share in each industry (two-digit SIC codes). Each auditor's market share is based on the clients' total assets. Based on this cutoff, 21.37 percent of the sample companies hire specialized auditors. In Table 4, we report all of the audit firms that are defined as industry specialists and their specialized industries, respectively. The results show that Horwath is the leading audit firm that offers broad industry expertise. Its specialized service covers 13 different industries. Given the measurement variation for industry specialization in prior research, we perform additional sensitivity tests to evaluate the robustness of our results to alternative measures of industry specialization.

**TABLE 4**  
**AUDIT FIRM INDUSTRY SPECIALIZATION**

| Audit Firms                | Industries                                 | Mean Audit<br>Market Share<br>% |
|----------------------------|--|---------------------------------|
| Ernst & Young              | Primary and Fabricated Metal               | 32.79                           |
|                            | Transportation                             | 22.14                           |
| Deloitte & Touche          | Mining                                     | 20.29                           |
|                            | Transportation Equipment                   | 36.53                           |
|                            | Transportation                             | 10.11                           |
| KPMG                       | Petroleum and Chemicals                    | 13.63                           |
|                            | Transportation                             | 12.10                           |
| Price Waterhouse & Coopers | Construction                               | 13.60                           |
|                            | Utilities                                  | 31.20                           |
| Horwath                    | Food and Beverages                         | 21.16                           |
|                            | Mining                                     | 29.52                           |
|                            | Construction                               | 19.10                           |
|                            | Textile Mill Products                      | 10.18                           |
|                            | Apparels                                   | 80.37                           |
|                            | Petroleum and Chemicals                    | 13.96                           |
|                            | Rubber and Plastic Products                | 10.84                           |
|                            | Primary and Fabricated Metal               | 10.21                           |
|                            | Electronics and Other Electrical Equipment | 12.08                           |
|                            | Retails                                    | 24.80                           |
|                            | Real Estates                               | 16.14                           |
|                            | Social Services                            | 60.61                           |
|                            | Pharmaceuticals                            | 14.48                           |
|                            | Beijing Yuehua                             | Utilities                       |
| BDO                        | Industrial and Commercial Machinery        | 11.93                           |
|                            | Retails                                    | 10.50                           |
|                            | Real Estates                               | 17.80                           |
|                            | Business Services                          | 10.60                           |
| Ascenda                    | Utilities                                  | 12.81                           |
|                            | Whole Sales                                | 38.74                           |
| JingDu                     | Business Services                          | 21.89                           |
|                            | Pharmaceuticals                            | 10.17                           |
| Hunan Kaiyuan              | Agriculture                                | 10.36                           |
| Sichuan Huaxin             | Food and Beverages                         | 10.78                           |
| Jiansu Gongzheng           | Textile Mill Products                      | 13.90                           |
| Jiansu Tianheng            | Textile Mill Products                      | 11.34                           |

|                       |                                     |       |
|-----------------------|-------------------------------------|-------|
| Shandong              |                                     |       |
| Zhengyuanhexin        | Paper and Allied Products           | 28.16 |
| Fujian Huaxin         | Paper and Allied Products           | 10.01 |
| Shenzhen Pengcheng    | Rubber and Plastic Products         | 13.02 |
| Guangdong Hengxindelu | Rubber and Plastic Products         | 12.36 |
| Zhengzhongzhujiang    | Rubber and Plastic Products         | 10.44 |
| Zhongruihuahengxin    | Industrial and Commercial Machinery | 10.61 |
| Shanghai Shangkuai    | Retails                             | 10.26 |

With respect to the control variables, *Assets* is a proxy for client size, *Invrec* is a proxy for audit risk, and *Sub* is a proxy for audit complexity. We expect audit fee to have positive relationships with client size, audit risk, and audit complexity since higher values of these variables increase the workload and riskiness of the audit work. Unlike studies in the U.S., we do not use # of foreign operations because Chinese A share companies seldom have foreign subsidiaries. *ROA* is a proxy for firm profitability and we expect audit firms to require higher fees if the company has a lower return on assets. While the association between audit fee and *Opinion* is inconclusive for the developed audit market (Craswell et al. 1995; Craswell and Francis 1999), we predict the association to be negative for the Chinese market because Chen et al. (2007) found Chinese listed companies receiving modified opinions tend to be smaller, poor financial performers, and unable to pay higher fees. We are unclear about the sign of *Tenure* because prior literature recognizes two opposing effects on audit fees from auditor tenure. On one hand, auditors with longer tenure tend to extract higher fees (i.e., future quasi-rents) from clients to recover losses incurred due to low-balling. On the other hand, longer tenure enhances auditors' understanding of the clients, enabling auditors to design efficient audit procedures and enjoy cost savings. *Leverage* is a proxy for audit risk and is calculated as the ratio of total liabilities and total assets. The audit fees are expected to be higher when companies have higher leverage ratio.

We also control two ownership variables that are unique to the institutional environment of the Chinese stock market. *Stateshr* is the percent ownership from the state agencies. Prior studies argue state ownership representatives lack a direct personal stake in the company's profits, and they are more likely to hire small local auditors because they don't have high demand of audit quality (Wang, Wong, and Xia 2008). As a result, we expect audit fees will be lower if the company has more state ownership. On the other hand, *Legalshr* is the percent ownership from legal person(s) that are more motivated to monitor firms because they are geared more toward profit-making than fulfilling political and social goals. This inference is supported by empirical evidence that legal person ownership is positively associated with corporate performance and voluntary disclosure on the Internet (Xiao, Yang, and Chow 2004). As legal person(s) have more resources and expertise to monitor the firm management, they are more like to hire high quality auditors and pay higher audit fees.

### Descriptive Statistics

Table 5 presents descriptive statistics for the sample firms that have complete information (1,028 firms). In the A share audit market, the mean and median total assets (*Assets*) are RMB 2,546 million and RMB 1,485 million, respectively. The mean and median total audit fee (*Audfee*) charged by the audit firms are RMB 474 thousand and RMB 400 thousand, respectively. In addition, the data show that accounts receivables and inventory (*Invrec*) are about 30% of total assets and that an average sample firm has 8.1 consolidated subsidiaries (*Sub*). The findings on *ROA* show the average return on assets for the sample companies are 2.4%. Untabulated data also show that about 9.3% of the firms experienced financial loss. During the sample period, 10% of the companies received modified opinions (*Opinion*), and the average tenure period for engaged auditors (*Tenure*) is 6.12 years. The total liabilities of the sample companies are about 52% of the total assets as indicated by *Leverage*. The state and legal person account for 11% and 19% of the total ownership of the companies, respectively. Finally, around 2% of the sample firms has a Big 4 industry specialist auditor, 4% has a Big 4 non specialist auditor, 10% has a top

local industry specialist auditor, and 11% has a top local non specialist auditor. Pearson's correlation matrices (untabulated) indicate some relations between audit fee and the interested variables. We defer further discussion of these relationships to our multivariate section.

**TABLE 5**  
**DESCRIPTIVE STATISTICS**

| Variables*   | Mean      | Median    | Quartile 1 | Quartile 3 |
|--------------|-----------|-----------|------------|------------|
| Audfee (000) | 474.43    | 400.00    | 300.00     | 600.00     |
| Assets (000) | 2,545,545 | 1,484,716 | 795,508    | 3,044,931  |
| Invrec       | 0.300     | 0.240     | 0.130      | 0.370      |
| Sub          | 8.110     | 5.000     | 3.000      | 10.000     |
| Tenure       | 6.120     | 6.000     | 3.000      | 8.000      |
| ROA          | 0.024     | 0.025     | 0.048      | 0.009      |
| Opinion      | 0.100     | 0.000     | 0.000      | 0.000      |
| Leverage     | 0.522     | 0.535     | 0.644      | 0.393      |
| Stateshr     | 0.110     | 0.000     | 0.029      | 0.000      |
| Legalshr     | 0.185     | 0.090     | 0.344      | 0.000      |
| Big4spec     | 0.02      | 0.00      | 0.00       | 0.10       |
| Big4nspec    | 0.04      | 0.09      | 0.05       | 0.14       |
| Localspec    | 0.10      | 0.00      | 0.00       | 0.01       |
| Localnspec   | 0.11      |           |            |            |

## EMPIRICAL RESULTS AND ANALYSES

### Brand-name and Industry Specialization for the Full Sample

In Table 6, we present the multivariate results for the association between audit fee and auditor industry specialization. The  $F$ -statistics are significant at  $p < 0.00$ , implying that the independent variables explain a significant portion of the variance in audit fee. The adjusted  $R^2$  for the model is 0.59, which is similar to that reported for U.S. and Australia (Craswell et al. 1995; Mayhew and Wilkins 2003; Casterella et al. 2004), and China's B share market in Charles et al. (2007).

To examine potential multicollinearity in the regression model, we regress all the explanatory variables on *Audfee*. These results indicate that the variance inflation factor ( $VIF$ ) is below 2.13 and tolerance levels are above 0.82 for all the explanatory variables. This result suggests that multicollinearity between the explanatory variables is not likely to pose a serious problem in our interpretation of the regression results. We also remove outliers from the sample firms if they have extreme variable values (i.e.,  $rstudent \geq 3$ ).

**TABLE 6**  
**REGRESSION RESULTS FOR THE FULL SAMPLE**

|                         | Expected signs | Full Sample | Companies with Non-Big 4 Auditors | Industries where Horwath Leads |
|-------------------------|----------------|-------------|-----------------------------------|--------------------------------|
| F-statistics            |                | 43.48       | 27.57                             | 18.64                          |
| Sample size             |                | 1,028       | 970                               | 305                            |
| Adjusted R <sup>2</sup> |                | 0.59        | 0.47                              | 0.50                           |
| Independent variables*  |                |             |                                   |                                |
| Intercept               | ?              | 1.60        | 1.79                              | 1.53                           |
|                         |                | 8.36*       | 9.12*                             | 3.61*                          |
| Assets                  | +              | 0.29        | 0.28                              | 0.31                           |
|                         |                | 20.77*      | 19.24*                            | 9.77*                          |
| Invrec                  | +              | 0.03        | 0.04                              | 0.23                           |
|                         |                | 0.37        | 0.5                               | 1.45                           |
| Sub                     | +              | 0.08        | 0.08                              | 0.07                           |
|                         |                | 8.72*       | 8.8*                              | 3.12*                          |
| Tenure                  | ?              | 0.02        | 0.024                             | -0.02                          |
|                         |                | 1.16        | 1.57                              | -0.67                          |
| ROA                     | -              | -0.39       | -0.47                             | -0.21                          |
|                         |                | -2.18**     | -2.61*                            | -0.65                          |
| Opinion                 | +              | -0.02       | -0.01                             | -0.06                          |
|                         |                | -0.37       | -0.11                             | -0.57                          |
| Leverage                | +              | 0.04        | 0.01                              | -0.02                          |
|                         |                | 0.56        | 0.16                              | -0.19                          |
| Stateshr                | -              | 0.018       | 0.018                             | -.14                           |
|                         |                | 1.02        | 1.1                               | 1.67                           |
| Legalshr                | +              | 0.18        | 0.19                              | 0.28                           |
|                         |                | 3.18*       | 3.41*                             | 2.59**                         |
| Big4spec                | ?              | 0.67        |                                   |                                |
|                         |                | 7.66*       |                                   |                                |
| Big4nspec               | ?              | 0.60        |                                   |                                |
|                         |                | 9.59*       |                                   |                                |
| Localspec               | ?              | 0.08        | 0.077                             |                                |
|                         |                | 2.02**      | 2.07**                            |                                |
| Localnspec              | ?              | 0.003       | 0.007                             |                                |
|                         |                | 0.07        | 0.19                              |                                |
| Hlead                   | ?              |             |                                   | 0.12                           |
|                         |                |             |                                   | 2.06**                         |

\*, \*\*, \*\*\* indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

Audfee = natural log of total audit fee.

Assets = natural log of total assets.

Invrec = (accounts receivables + inventory)/total assets.

Sub = square root of number of consolidated subsidiaries.

ROA = return on assets.

Opinion = indicator variable (1 if modified opinion, 0 otherwise).

Tenure = natural log of auditors' tenure in years.

Leverage = total liabilities/total assets.

Stateshr = the % ownership of government.

Legalshr = the % ownership of the legal person(s).

Big4spec = indicator variable (1 if the Big 4 firm is an industry specialist, 0 otherwise).

Big4nspec = indicator variable (1 if the Big 4 firm is not an industry specialist, 0 otherwise).

Localspec = indicator variable (1 if the non-Big 4 firm is an industry specialist, 0 otherwise).

Localnspec = indicator variable (1 if the non-Big 4 firm is not an industry specialist, 0 otherwise).

Hlead = if a companies is audited by Horwath in the industries where Horwath is the leading auditor, 0 otherwise.

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Among the control variables, the coefficient of *Assets* is positive and significant, which is consistent with the findings on the positive firm size - audit fee relation documented in earlier studies (DeFond et al. 2000; Ferguson et al. 2003; Mayhew and Wilkins 2003). The coefficient for *Sub* is also positive and significant, suggesting that audit firms charge higher fees for clients with a large number of subsidiaries. The coefficient for *ROA* is negative and significant, indicating that audit firms lower their prices if the clients are more profitable in the audited period. We fail to find any conclusive evidence on the percentage of inventory and receivables (*Invrec*), auditor opinion (*Opinion*), auditor tenure (*Tenure*), and *Leverage*. For the two ownership variables, state ownership (*Stateshr*) is slightly positive, suggesting the influence of state agencies on auditor choice and audit fees is not significant. The legal person ownership (*Legalshr*), however, is substantially associated with increased audit fees. This result implies Chinese listed companies are motivated to select higher quality auditors in order to retain the investment from legal person shareholders.

Based on the full sample, we first examine the industry specialization of Big 4 auditors in addition to their general brand reputation. This allows a baseline comparison with other studies and document whether Chinese companies pay premiums to the Big 4 auditors. The implicit comparison group for both of the Big 4 indicators is the 850 companies having non-Big 4 and non top local auditors. The results indicate that the coefficients on industry specialist variable (*Big4spec*) and non-industry specialist (*Big4nspec*) are both positive and statistically significant ( $p < 0.01$ ), but the magnitude of *Big4spec* (0.67) is larger than that of the *Big4nspec* (0.6). On average, this result translates to Big 4 industry specialists having a premium of 95 percent and Big 4 non-specialists having a premium of 82 percent over the comparison group.<sup>10</sup> Both of the premiums are higher than the average brand premium and industry specialization premium paid to Big 4 auditors using data from the U.S., Australia, and Hong Kong.<sup>11</sup> These larger Big 4 premia found using Chinese data may be caused by the fact that Big 4 auditors have the largest and most profitable public companies as their clients in the A share market. These companies are willing and capable to pay higher fees for the higher service quality. These results also explain why the revenue of Big 4 auditors reported in the Chinese market are substantially higher than any of the second tier international auditors and local CPAs. Thus, the overall findings indicate Big 4 firms with industry expertise earn additional fee premiums from higher service quality as compared to Big 4 firms equipped only with general brand reputation.

### **Industry Specialization of Top Non-Big 4 Auditors**

Turning to the industry specialization of Chinese top non-Big 4 auditors, we find the coefficient for non industry specialists (*Localnspec*) is positive but insignificant ( $p = 0.07$ ), indicating general brand name as top 10 auditors does not award local audit firms higher fees as compared to other non-Big 4 competitors. The coefficient on industry specialists (*Localspec*), however, is positive and significant ( $p < 0.05$ ). This result suggests that non-Big 4 auditors with industry specialization earn a fee premium of

8.3%. But the magnitude of this premium is much smaller than the premium earned by Big 4 audit firms with or without industry expertise. This result indicates the industry specialized services provided by non-Big 4 auditors is valued less by the clients than Big 4 industry specialists.

To further explore the local auditor industry specialization without confounding factors from Big 4 firms, we re-examine the audit fee model using only the 971 companies audited by non-Big 4 auditors. The results, presented in the second columns in Table 6, are consistent with the observations from the full model. The parameter on general brand name remains insignificant ( $p = 0.19$ ) and the parameter on industry specialization is significantly positive ( $p < 0.05$ ). It confirms that audit fee premiums for top local auditors are associated with the existence of industry expertise rather than general reputation as compared to other non-Big 4 auditors.

Among the top non-Big 4 audit firms in China, Horwath is a unique second tier international firm because of its rapid growing market share in recent years. It is the largest audit firm measured by the number of clients in the A-share market and audits more than 20 percent of all of the public companies listed on stock exchanges in China. Its total revenue ranks fifth among all audit firms in China and immediately follows the Big 4 auditors. Based on Table 4, Horwath also has the largest number of industries where it is defined as the industry specialist than any of the other audit providers. Therefore, a further exploration of the audit fee for Horwath will shed more light on the impact of industry specialization on the pricing behavior of the non-Big4 audit firms.

To this end, we re-estimate the fee model for the sample of 299 companies in the seven industries where Horwath is the market leader. The industries involved are Agriculture, Mining, Construction, Petroleum and Chemicals, Retails, Social services, and Pharmaceuticals. In the modified model, we add *Hlead* that is an indicator variable with the value of one if Horwath is the engaged auditor and zero for other non-Big 4 auditors. The regression results are presented in the last column of Table 6. The coefficient on *Hlead* is 0.12 ( $t = 2.06$ ). It indicates that Horwath earn fee premium for their market specialization/dominance over other non-Big 4 auditors in the same industries ( $p < 0.05$ ) after controlling for Big 4 firms.

## FURTHER ANALYSES FOR LARGE AND SMALL CLIENTS

Casterella et al. (2004) argue that the fee premiums earned by industry specialized auditors is attributable to smaller clients. They find large clients do not pay higher fees since they have sufficient bargaining power to negotiate any specialist premium away. To examine whether our findings in the Chinese market are also driven by clients size, we partition the sample into large and small companies by median total assets of RMB 1,485 millions and repeat the regression analysis. Since only 57 companies select Big 4 auditors and these companies are all large clients, we focus on the sample having non-Big 4 auditors to pursue the size effect.

The results are reported in Table 7. It shows that the industry specialization coefficient in the small clients sample is positive and significant at the conventional level ( $p < 0.00$ ) while the coefficient in the large clients group is positive but insignificant ( $p = 0.15$ ). These findings, therefore, suggest that specialized auditors do not charge substantially higher fees for large clients that have more bargaining power to negotiate. In order to retain large companies in a competitive auditing environment, non-Big 4 auditors are likely to pass along a portion of their cost savings because of production economy. Casterella et al. (2004) report similar results that bargaining power of large clients could neutralize fee premiums for Big 4 industry specialists using U.S. data.

**TABLE 7**  
**REGRESSION FOR LARGE AND SMALL COMPANIES IN THE SAMPLE**

|                         | Expected | Large   | Small   |
|-------------------------|----------|---------|---------|
| F-statistics            |          | 8.08    | 5.96    |
| Sample size             |          | 486     | 485     |
| Adjusted R <sup>2</sup> |          | 0.32    | 0.25    |
| Independent variables*  |          |         |         |
| Intercept               | ?        | 1.69    | 2.42    |
|                         |          | 3.63*   | 5.83*   |
| Assets                  | +        | 0.3     | 0.23    |
|                         |          | 9.29*   | 7.37*   |
| Invrec                  | +        | 0.1     | -0.08   |
|                         |          | 0.92    | -0.7    |
| Sub                     | +        | 0.08    | 0.08    |
|                         |          | 6.51*   | 4.89*   |
| Tenure                  | ?        | -0.0001 | 0.05    |
|                         |          | -0.00   | 2.32**  |
| ROA                     | -        | -0.13   | -0.58   |
|                         |          | -0.30   | -3.09*  |
| Opinion                 | +        | -0.04   | 0.02    |
|                         |          | -0.51   | 0.03    |
| Leverage                | +        | -0.014  | 0.05    |
|                         |          | -0.11   | 0.71    |
| Stateshr                | -        | -0.07   | 0.03    |
|                         |          | -0.77   | 1.8***  |
| Legalshr                | +        | 0.16    | 0.16    |
|                         |          | 1.70**  | 2.23**  |
| Localspec               | ?        | 0.04    | 0.10    |
|                         |          | 0.79    | 1.77*** |
| Localnspec              | ?        | -0.01   | 0.01    |
|                         |          | -0.15   | 0.21    |

\* , \*\* , \*\*\* indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

### Sensitivity Analysis

We perform sensitivity analyses to test the robustness of our results. First, we re-estimate the full model in Table 8 using cutoff of 15 percent market share to define industry specialized auditors. By this definition, 11.7 percent of the sample has specialized auditors. We did not use higher cutoffs to avoid having small samples. For example, a 20 percent cut off reduced the sample of audit specialists to below 6 percent. Column 1 of Table 8 shows the coefficients on *Big4spec*, *Big4nspec*, and *Localspec* are statistically significant, and *Localnspec* remains insignificant. This confirms that the results in Table 6 are not driven by the cutoff percentage for industry specialists.



**TABLE 8**  
**REGRESSION RESULTS FOR THE ROBUST ANALYSES**

|                         | Expected<br>signs | AUDIND15 | Weighted Share | Industries without<br>SIC 28 and 36 |
|-------------------------|-------------------|----------|----------------|-------------------------------------|
| F-statistics            |                   | 44.31    | 38.9           | 40.17                               |
| Sample size             |                   | 1,028    | 966            | 808                                 |
| Adjusted R <sup>2</sup> |                   | 0.59     | 0.55           | 0.61                                |
| Independent variables   |                   |          |                |                                     |
| Intercept               | ?                 | 1.57     | 1.25           | 1.47                                |
|                         |                   | 8.14*    | 5.86*          | 6.72*                               |
| Assets                  | +                 | 0.3      | 0.33           | 0.30                                |
|                         |                   | 20.77*   | 20.74*         | 18.64*                              |
| Invrec                  | +                 | 0.02     | -0.03          | 0.002                               |
|                         |                   | 0.27     | -0.4           | 0.02                                |
| Sub                     | +                 | 0.08     | 0.08           | 0.07                                |
|                         |                   | 8.66*    | 8.26*          | 6.94*                               |
| Tenure                  | ?                 | 0.02     | 0.01           | 0.02                                |
|                         |                   | 1.04     | 0.42           | 1.17                                |
| ROA                     | +                 | -0.43    | -0.58          | -0.48                               |
|                         |                   | -2.35**  | -2.94*         | -2.26**                             |
| Opinion                 | +                 | -0.03    | -0.02          | -0.03                               |
|                         |                   | -0.49    | -0.35          | -0.44                               |
| Leverage                | +                 | 0.06     | -0.001         | 0.12                                |
|                         |                   | 0.84     | -0.01          | 1.56                                |
| Stateshr                | -                 | 0.02     | 0.02           | 0.02                                |
|                         |                   | 1.11     | 1.12           | 1.13                                |
| Legalshr                | +                 | 0.18     | 0.23           | 0.13                                |
|                         |                   | 3.13*    | 3.79*          | 1.95***                             |
| Big4spec                | ?                 | 0.73     |                | 0.82                                |
|                         |                   | 6.78*    |                | 8.42*                               |
| Big4nspec               | ?                 | 0.62     |                | 0.60                                |
|                         |                   | 10.66*   |                | 8.65*                               |
| Localspec               | ?                 | 0.11     |                | 0.09                                |
|                         |                   | 1.95***  |                | 1.81***                             |
| Localnspec              | ?                 | 0.02     |                | -0.003                              |
|                         |                   | 0.47     |                | -0.09                               |
| Share#                  | ?                 |          | 7.49           |                                     |
|                         |                   |          | 6.51*          |                                     |

\*, \*\*, \*\*\* indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

# Share = market share \* portfolio share

Neal and Riley (2004) suggest that the market and portfolio share measures act as complements, and that auditor industry specialization should be measured accordingly. As such, we re-estimate the model using a weighted market share ( $Share = \text{Market share} * \text{Portfolio Share}$ ) as the proxy for auditor industry specialization (Romanus, Maher, and Fleming 2008). The coefficient on this continuous specialization measure, shown in the second column of Table 8, is significant positive ( $p < 0.001$ ). This result confirms audit firms with larger market share earn fee premiums due to industry expertise.

In addition, the fixed industry effect variables reveal there are variations of audit fees among different industries. Specifically, the top two industries in our sample, Electronics and Petroleum's/Chemicals that comprise 20 percent of the sample firms, could have affected the regression results. To further control the industry influence, we re-estimate the fee model with these two industries removed from the sample. The findings reported in the last column of Table 8 show that, the signs and magnitudes on all of the experimental variables basically remain unchanged with the smaller sample size. It suggests that main results are not driven by particular industries in the sample. Finally, we expand the tests to include all of the industry specialized non-Big 4 audit firms rather than only the top 6 auditors in Table 6, 7, and 8, the results remain the same (not tabulated).

## CONCLUSIONS AND LIMITATIONS

This study investigates the audit market in China's transitional economy by using data from annual reports prepared by publicly traded companies. We examine variables that explain audit fees for Chinese local audit firms with a focus on auditor industry specialization. We sought answers to two research questions: RQ1: What is the pricing strategy of Big 4 firms related to industry specialization in the emerging market of China? and RQ2: How will non-Big 4 audit fees be affected by the industry specialized service in the emerging market of China?

Findings show that Big 4 audit firms are able to charge higher fees for industry specialization and also for general firm reputation. Non-Big 4 specialized auditors are able to charge higher fees due to industry specialization, but non-Big 4 fee premiums associated with industry expertise are much smaller than the specialization premium earned by Big 4 firms. Further, non-Big 4 specialist auditors are able to charge higher audit fees only for smaller clients.

Results support our expectations that the development of industry specialization for Chinese local audit firms have unique features, different from audit firms in the world's western regions. In general, the audit market in China is competitive and a single auditor is unlikely to dominate an industry. Audit firms that have specialized knowledge of particular industries earn higher fees because of differentiated service quality. This is true especially for small clients. The results of our study enhance understanding of the audit markets in China, and help Chinese standard setters in their efforts to nurture a robust and efficient audit market.

This study is not without limitations. First, since hand-collecting data for the Chinese audit market was a long and tedious process, we limited our sample to the most recent year, which was 2006 at the time of data collection. This excluded new mergers and acquisitions among top local audit firms and new branches set up by the Big 4 firms after 2006. Our findings, therefore, do not reflect new changes in the market position and ranking of the accounting firms and their impacts on auditor industry specialization and audit pricing. Second, like most previous studies, this study has examined only two specifications for industry specialization. Future studies can check the robustness of our findings using other measures of industry expertise developed in the literature. Finally, since both audit firms and public companies in the Chinese environment have unique features, such as the stronger government and regional/geographical influences in the selection of audit firms, our findings may not be generalized to other audit markets. Replications of audit fee models in other national settings warrant potential research extensions of this paper.

## ENDNOTES

<sup>1</sup> For example, statistics show for Big 4 firms, the revenue from the Asia-related market accounts for more than 11% of their annual revenue, and the revenue growth is around 20% each year. This growth rate is almost twice that of their revenue growth in the mature markets (Esnai 2009).

<sup>2</sup> Currently, two types of shares are listed on the Chinese domestic exchanges: A- and B-share. A-share listings are offered only to domestic investors and are transacted in Chinese currency (RMB). B-share listings are offered, primarily, to foreign investors and transacted in U.S. dollars (Shanghai) or Hong Kong dollars (Shenzhen). Until 2001, B-shares were only offered to foreign investors. Approximately 7.8% of A-share firms are also authorized to issue B-shares (107 B shares out of 1,361 total list companies till the end of 2010). Very few (around 10) companies only issue B shares. Publicly listed companies that issue only domestic shares (A-shares) are required to undertake a statutory audit by any qualified audit firms in accordance with Chinese GAAP. The B-share companies with foreign investments are required to undergo a supplementary audit that follows the International Financial Reporting Standards (IFRS), in addition to the statutory audit. A company can hire difference auditors for the statutory audit and supplementary audit. Due to the information needs of foreign investors, most B-share companies prefer Big 4 audit firms in the supplementary market.

<sup>3</sup> Prior studies provide inconclusive results on the effect of auditor industry specialization on audit fees. For example, Craswell, Francis, & Wong et al. (1995) found audit fee premium for industry specialized auditors in Australia in 1987, but Ferguson and Stokes (2002) found no such fee premium in 1998. In light of these mixed findings, Ferguson, Francis, & Stokes (2003) studied auditors' firm-wide and office-level industry specialization in Australia. They found that the market perception and pricing of industry expertise in Australia is primarily based on office-level industry leadership in city-specific audit markets rather than nation-wide expertise. These results explain the mixed evidence on the impact of auditor's industry expertise on audit pricing.

<sup>4</sup> According to the most recent regulation released by Ministry of Finance (MOF) on June 10, 2000, a qualified firm has to be established for at least three years, with capital of no less than RMB 2 million for a limited liability firm and RMB 1 million for partnerships. The firm also needs to employ at least 20 CPAs who are qualified to audit public firms and at least 40 CPAs under the age 60. Furthermore, it must show a sales record of at least RMB 8 million in the previous year and no violation of law in the previous three years.

<sup>5</sup> CSRC news release on March 23, 2007.

<sup>6</sup> We use the 2009 data instead of the 2006 data because the ranking of the top 10 audit firms in the past five years is relatively consistent.

<sup>7</sup> To measure audit firms' market share based on total assets, we use the method employed by Hogan and Jeter (1999). In particular, each audit firm's market share is calculated, per year, as the sum of the square root of assets of all firms that it audited in a given two-digit SIC code divided by the sum of the square root of assets across all COMPUSTAT firms in the same two-digit SIC code. The following equation describes the measure:

$$MS_{ik} = \frac{\sum_{j=1}^{J_{ik}} \sqrt{A_{ijk}}}{\sum_{i=1}^{I_k} \sum_{j=1}^{J_{ik}} \sqrt{A_{ijk}}}$$

Where

i = an index of audit firms;

j = an index of client firms;

k = an index of client industries;

$I_k$  = number of audit firms in industry k; and

$J_{ik}$  = the number of clients served by audit firm i industry k.

The IPO literature has adopted the use of square root of the assets as a better measure of auditor industry concentration than the untransformed measure.

<sup>8</sup> In the U.S. market, Cahan et al. (2008) report an ACR2 of 0.61 for the sample period from 1986 to 2004.

<sup>9</sup>  $SISD_k = [(\sum_{i=1}^k (J_{ik} - \bar{J}_k)^2 / (I_k - 1))]^{1/2}$ , where  $J_{ik}$  is the number of clients served by audit firm  $i$  in industry  $k$ ,  $\bar{J}_k$  is the mean number of clients served by audit firms in industry  $k$ ,  $I_k$  is the number of auditors in industry  $k$ .

$SICA_k = [(\sum_{i=1}^k J_{ik}) / I_k]$ , where  $J_{ik}$  is the number of clients served by audit firm  $i$  in industry  $k$ ,  $I_k$  is the number of auditors in industry  $k$ .

<sup>10</sup> Because model (1) is linear in logarithms, the antilog of *BIG4*'s coefficient minus 1 is the percentage effect on audit fees of choosing a Big 4 auditor (Mayhew and Wilkins 2003).

<sup>11</sup> For example, Mayhew and Wilkins (2003) reported a 29 percent premium to industry specialized Big 4s in the U.S. market, and DeFond, Francis, and Wong (2000) reported Big 4 auditors earn 77 percent for industry specialization in Hong Kong.

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