Article

Signing Auditors’ Foreign Experience and Debt Financing Costs: Evidence for Sustainability of Chinese Listed Companies

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Abstract: This study investigates whether signing auditors with foreign experience influence debt financing costs. Using a sample of Chinese listed firms for the period of 2001–2016, this study hand-collects the information of signing auditors’ foreign experience and empirically examines the relationship between signing auditors’ foreign experience and debt financing costs. The empirical results show that signing auditors’ foreign experience is significantly and negatively correlated with debt financing costs, suggesting that signing auditors’ foreign experience improves audit quality, reduces information risk and thereby lowers the cost of debt financing. Further analyses show that the negative effect of signing auditors’ foreign experience on the cost of debt financing is more pronounced in audit firms without industry expertise, suggesting that audit firm industry expertise mitigates the negative relationship between signing auditors’ foreign experience and debt financing costs. These results imply that signing auditors who have foreign experience could serve a significant role in debt financing, which would strengthen firms’ sustainability.

Keywords: signing auditors; foreign experience; audit quality; debt financing costs; industry expertise

1. Introduction

This paper examines whether signing auditors with foreign experience have an effect on debt financing costs. Firm’s sustainable ability differs when outside financing resource is different. For firms with an insufficient financing source, economic and environmental risk can easily corrode the ability to survive and grow sustainably [1]. Debt financing serves a valuable role in firms’ external financing and growth. How to obtain low-cost debt capital is crucial to a firm’s financial success and sustainable development. Prior studies verify that the debt financing cost is positively associated with information asymmetry between borrowers and lenders [2–4]. It is widely acknowledged that auditors, as external monitors, could contribute to the credibility and accuracy of financial disclosure and thereby mitigate information risk [5–7]. If capital providers perceive the high assurance of financial information that auditors provide, then they would require low rates of return for the reduced uncertainty. The evidence in the current research is generally consistent with higher-quality auditors and lower debt financing costs [8–11].

Prior literature investigating the extent of the benefits from audit quality differences mainly focuses on the characteristics of audit firms such as size, industry expertise and tenure [12–14]. It is noteworthy that the auditing process is characterized by complex human endeavors, which are inevitably affected...
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by the characteristics of the decision makers [15]. As the audit team leader, signing auditors are ultimately responsible for judgment and decision-making in the audit engagement process and thus exert significant influence on the audit reporting outcomes [16]. Understanding whether and how the characteristics of signing auditors impact decision making and ultimately affect audit outcomes is of great concern to regulators, investors and academics [17,18]. A growing number of literature using available data (mainly from Australia, China, Sweden and the United Kingdom) has examined the effect of signing auditors’ characteristics such as tenure, gender, industry expertise and client importance on audit quality [19–24]. However, little of the existing research has systematically examined the effect of signing auditors’ foreign experience. In this paper, we extend the previous literature by analyzing the audit outcome from the perspective of the signing auditors’ foreign experience.

This paper tests whether signing auditors with foreign experience lead to high audit quality, which in turn lowers debt financing costs. To tackle this research question, we used a sample of Chinese listed firms from 2001 to 2016 and manually collected each signing auditors’ demographic information from the Chinese Institute of Certified Public Accountants (CICPA) to conduct the empirical tests. Our regression results showed that signing auditors with foreign experience are significantly negatively related with debt financing costs, implying that signing auditors with foreign experience are more inclined to provide a high quality audit, reduce information asymmetry and eventually diminish debt financing costs. Moreover, audit firm industry specialization mitigates the relationship between signing auditors with foreign experience and the cost of debt. Specially, the negative influence of signing auditors’ foreign experience on the cost of debt financing is more pronounced in audit firms without industry specialization.

We also conducted a number of supplementary tests to add persuasiveness to our results. We conducted our tests using alternative measures of signing auditors with foreign experience and debt financing costs. The results remain unchanged. Our findings are still valid after controlling for audit firm fixed effects. Furthermore, above conclusions still stand when addressing potential endogeneity issues employing the fixed effects model and propensity score matching approach. Additionally, we investigated the relationship between signing auditors with foreign experience and audit quality. The empirical results showed that firms who engage signing auditors with foreign experience have low management earnings and a small profit, which lends additional support to our conclusions.

This paper makes several contributions to the existing literature in the following ways: first, to our knowledge and literature in hand, this study is one of few studies to use archival data on signing auditors and investigate the effect of signing auditors with foreign experience on the cost of debt. Existing literature has examined the impacts of signing auditors’ attributes such as tenure, gender, industry expertise and experience on audit quality or perceived audit quality [19–24], but they provide insufficient evidence on the economic consequences of signing auditors’ foreign experience. This study fills the above gap by examining the relationship between signing auditors with foreign experience and cost of debt. In this regard, this study also echoes the call of DeFond et al. [17] and Church et al. [18] for research on the effect of signing auditors’ characteristics on audit outcome by documenting that signing auditors with foreign experience lower the cost of debt financing, which adds to the small but growing literature on the analysis of audit quality at the signing auditors level.

Second, a branch of studies in accounting and finance stress that managers and directors with foreign experience affect organizational behavior and outcomes [25–28]. Our study focuses on a fresh perspective, namely, signing auditors and tests the effect of signing auditors’ foreign experience on audit outcomes. The findings suggest that signing auditors’ foreign experience indeed influences audit quality and thereby impacts the debt financing contract, which lends important support to extant literature.

Third, prior research has validated that auditors play a critical role in debt financing [8–11]. Specially, that high-quality auditors could lead to high-quality financial reporting. This paper verifies that high-quality auditors (signing auditors with foreign experience) mitigate the information risk
between managers and lenders, and thus reduce the debt financing costs, contributing to the existing studies on the effect of auditor quality on debt financing costs.

Fourth, this paper investigates whether audit firm industry specialization attenuates the relationship between signing auditors with foreign experience and the cost of debt. We find that the negative effect of signing auditors’ foreign experience on debt financing costs is less pronounced in firms audited by industry expertise, validating that the reputable auditors (industry specialization) can act as an external monitoring mechanism [13] and therefore attenuate the inverse effect of signing auditors with foreign experience on the cost of debt financing, adding to the relevant literature.

We organize the reminder of the paper as follows. Section 2 introduces the institutional background. Section 3 reviews related literature and develops testable hypotheses. Section 4 presents the research sample, data source, empirical model specifications, and variables. Section 5 reports the empirical results. The final section contains the conclusions, managerial implications, and limitations.

2. Institutional Background

The Chinese auditing profession has started to recover since the early 1980s. With the entry of foreign investment and establishment of the Shanghai and Shenzhen stock exchanges, the auditing profession has undergone a rapid expansion in the demand of publicly listed firms [29]. Most of the audit firms were initially affiliated with government agencies, which was detrimental to auditor independence. To enhance the effectiveness of auditor’s monitoring role, the reform that required audit firms to disaffiliate from their sponsoring government bodies or universities was launched by the government in 1998 [30]. Since then, the Chinese auditing profession has entered a phase of stable development. Notably, the economy and capital market have abruptly gone through growth since China gained membership with the World Trade Organization in 2001, which further stimulated the development of audit market. According to the Chinese Institute of Certified Public Accountants (CICPA), the number of audit firms (certified public accountants) grew from 80 (500) in 1986 to 8460 (103081) in 2016. In recent years, the Chinese Auditing Standards Board (CASB) has made great efforts to revise the Chinese independent auditing standards (CIAS) in order to be more compatible with International Standards on Auditing (ISA) and to converge with International Financial Reporting Standards (IFRS) [31].

The Chinese audit market is marked by ineffective law enforcement and weak investor protection [32] and thus auditors face low litigation risks [33]. As a result, it is usually difficult for Chinese audit firms to achieve consistent audit quality across different signing auditors of the same audit firm because of the weak quality control mechanisms in place, leading to significant heterogeneity in audit quality across signing auditors in China [34]. In addition, China’s auditing standards require that signing auditors who administer the audit process sign the audit reports and have responsibility for the audit outcomes [16].

Overall, the unique institutional arrangement provides us with a powerful setting to explore the influence of signing auditors’ characteristics on audit outcomes. In this paper, we examine the relationship between signing auditors with foreign experience and the cost of debt financing.

3. Literature Review and Hypotheses Development

3.1. Signing Auditors’ Foreign Experience and Debt Financing Costs

Financial sustainability can be defined as the ability to generate value for investors and ensure the long-term survival and development of the company. Alternatively, financial sustainability links the value and sustained development of business to an optimal combination of financing sources and investments [35]. Financial sustainability is a crucial aspect of firms’ sustainable development. Meanwhile, it concerns the existence and growth of the enterprise directly and is a key to ensure enterprises’ performance and sustainability [36].
The audit of financial statements refers to auditors’ execution of the necessary audit procedures to obtain sufficient appropriate audit evidence on the financial statements in accordance with the requirements of the Independent Auditing Standards, and expression of an audit opinion on whether the financial statements are true and reliable. Auditing provides reasonable assurance for the quality of financial information and enhances the quality of information disclosure, which improves the efficiency of resource allocation and contracting [37]. Moreover, with the changing environment and growing complexity of business transactions, the role of auditing will be more prominent [38]. Auditors can serve as an important corporate governance mechanism that constrains the manipulation of information by the management and safeguards financial information [39]. The increase in transparency on reporting could benefit investors by mitigating information risk. Therefore, audits of financial statements could contribute to the firms’ financial sustainability and business performance [36].

Previous literature suggests that auditors serve a pivotal function in debt contracting [8–11]. Financial statements are essential in reducing the information asymmetry between informed managers and uninformed investors [40–42]. As the external monitors, auditors provide reasonable assurance to the quality of financial reports [5,6]. High audit quality is often related to more credible and transparent financial information, which could decrease information risk and thus help lenders better evaluate the performance of the borrowers [43–45]. In other words, enhancing the reliability of the firms’ accounting statements, high-quality auditors mitigate creditors’ uncertainty and lower the perceived risk. Consequently, the higher the audit quality, the lower the rate of interest that debt holders would require.

Some studies point out that the benefit from auditing varies with the quality of the auditor. Existing literature overwhelmingly uses audit firm characteristics as a proxy for audit quality [13,14] and has generally documented the evidence that client firms audited by Big N auditors and industry expertise auditors have higher-quality accounting information, and thus have larger earnings response coefficients [12], lower cost of debt [46–49], and lower cost of equity capital [44].

Recently, more and more researchers have started to push the audit-quality analysis down to the signing auditors level for the reason that signing auditors are the decision-makers in the audit process and responsible for the audit outcomes [17,18]. Nelson et al. [15] point out that signing auditors who perform a variety of tasks influence the audit outcomes with their various personal characteristics. However, only a few studies provide direct empirical evidence on the effect of signing auditors characteristics on audit outcomes. These studies have used listed firms in an empirical setting where data of the signing auditors is available to discuss the audit quality at the signing auditors level and verify that signing auditors have a significant effect on audit quality [16,23] and the influence of each of the signing auditors on audit quality can be explained by certain characteristics such as tenure [19], industry expertise [20], gender [20,21], and clients’ numbers [24].

Prior literature has shown that migrants who are returning to their home countries after moving to developed countries in the past could help to reduce the large productivity gaps in emerging markets with their sophisticated skills and knowledge, a process known as “brain circulation” [25]. In recent years, researchers have started to focus on the economic influence of returnee managers on organizational decisions and behaviors. It has been argued that individuals with foreign experience have high-quality education, advanced knowledge, creative capabilities, global-orientated mindsets and rich social capital, and therefore play a crucial role in innovation [28], technology progress [50], corporate governance [27], corporate social responsibility performance [51] and so on.

Accordingly, since foreign experience is an important dimension of individual characteristics, we propose that signing auditors’ foreign experience is a significant influencing factor of audit quality. On one hand, foreign experience optimizes signing auditors’ knowledge structure and improves signing auditors’ information processing ability, which is conducive to the improvement of professional competence. Auditing is a complex task and meanwhile it requires auditors to exercise a great deal of professional judgment [52,53]. Consequently, auditors’ adequate knowledge and abilities are important determinants to ensure audit quality. Foreign experience can effectively help signing auditors learn
advanced audit knowledge and practices [54], thereby enabling signing auditors to make more accurate judgments in the audit process and timely discover client firms’ earnings manipulation. Moreover, the high-quality education obtained in developed countries or regions can help signing auditors improve their cognitive ability and information processing ability [55,56]. As a result, signing auditors with foreign experience can better understand the client firms’ complex environment and business problems, and thus precisely identify potential problems in financial statements.

On the other hand, foreign experience enhances signing auditors’ independence. Overseas developed capital markets have strong investor protection, effective legal systems, strict information disclosure requirements [57,58]. After staying abroad for a long period of time, signing auditors are deeply influenced by such values and beliefs and develop a strong sense of justice and rules [59]. As a result, signing auditors with foreign experience are more likely to protect the interests of investors, maintain professional skepticism and independence, and have more motivation to identify corporate misconduct.

Based on the above discussion, we expect that signing auditors with foreign experience provide a high-quality audit. Thus, lenders would require lower cost of debt for the reason that a high-quality audit can lead to the diminished information risk. That is, if debt holders regard signing auditors with foreign experience as delivering higher audit quality, we would expect that firms audited by these auditors obtain lower debt financing costs. Hence, we formulate Hypothesis 1 as below:

**Hypothesis 1 (H1).** Ceteris paribus, signing auditors’ foreign experience is negatively associated with debt financing costs.

### 3.2. Signing Auditors’ Foreign Experience, Audit Firm Industry Expertise and Debt Financing Costs

There is evidence in the existing literature that audit firm industry specialization can improve audit quality [13], thus lowering the cost of capital [44]. Since the audit firm industry is an important influencing factor of debt financing costs, this study further addresses whether audit firm industry specialization can mitigate the relationship between signing auditors with foreign experience and the cost of debt.

Audit firms industry specialization are believed to have greater knowledge and capabilities [60] and thus are better able to detect errors [61], which indicates that industry specialists with their greater competency can deliver high quality audits. Moreover, industry specialists can serve as a sign of auditor competence and audit service quality, leading to a higher market share and audit fee premium [62]. Thus, audit firms industry specialization have higher reputational capital at stake, which is likely to encourage them to maintain independence and ensure the quality of audit work. As such, it can be inferred that industry specialization could lead to more transparent and reliable financial information, and thus weakens the positive effect of signing auditors’ foreign experience on cost of debt. In summary, we take the Hypothesis 2:

**Hypothesis 2 (H2).** Ceteris paribus, audit firm industry specialization mitigates the negative relationship between signing auditors’ foreign experience and debt financing costs.

### 4. Research Method

#### 4.1. Sample and Data

The initial sample is comprised of all Chinese A-share listed firms between 2001 and 2016. We selected our sample as follows: (1) we excluded firms that belong to the banking, insurance, and other financial industries; (2) we eliminated firm-year observations with transaction statuses of ST (special treatment), *ST (suspension from trading), or PT (particular transfer); (3) we deleted the
firm-year observations whose listed age is below one year; and (4) we excluded firm-year observations with missing data on the variables used. Finally, a research sample of 21,307 observations were obtained.

The data sources are reported below. (1) Data of signing auditors’ characteristics were manually collected from the official website of Chinese Institute of Certified Public Accountants (CICPA) (http://cmis.cicpa.org.cn). (2) We obtain data of audit firm size from the official website of the CICPA. (3) Other data except for above variables were collected (calculated) from the China Stock Market and Accounting Research database (CSMAR).

4.2. Empirical Model

Hypothesis 1 states that signing auditors’ foreign experience is negatively associated with debt financing costs after controlling for other determinants. To test Hypothesis 1, we set Model (1) using a regression that links debt financing costs (DFC) with signing auditors’ foreign experience (FOR), auditor characteristics, firm-specific features, and other determinants.

\[
DFC = \alpha_0 + \alpha_1 \text{FOR} + \alpha_2 \text{BIG10} + \alpha_3 \text{SIZE} + \alpha_4 \text{LEV} + \alpha_5 \text{ROS} + \alpha_6 \text{LISTAGE} + \alpha_7 \text{ACCA} + \alpha_8 \text{TANG} + \alpha_9 \text{STATE} + \text{Industry Dummies} + \text{Year Dummies} + \text{AF Dummies} + 1
\]  

(Model 1)

In Model (1), the dependent variable is the debt financing costs (DFC). Referring to relevant studies [47,63], we measured the cost of debt financing as the interest expenses scaled by the total debt (DFC). The main variable of interest (independent variable) is the signing auditors’ foreign experience (FOR), equaling one if signing auditors have foreign study experience and zero otherwise. If the coefficient on FOR is significantly negative, Hypothesis 1 is supported by the empirical evidence.

To isolate the incremental influence of signing auditors with foreign experience on debt financing costs, Model (1) includes a set of control variables: first, audit firm size (BIG10) is included to control for the impacts of audit firm characteristics on debt financing costs [46]. Second, extant studies show that some firm-specific characteristics affect the cost of debt financing [47,48,63], and thus firm size (SIZE), firm leverage (LEV), return on sales (ROS), firm listed age (LISTAGE), account receivable intensity (ACCA) and tangible asset intensity (TANG) are employed in Model (1). Third, Model (1) controls for the effect of state ownership nature (STATE) on debt financing costs [63]. Finally, in order to control for the fixed effect of industries (the CSRC classification), calendar years and audit firms, year, industry and audit firm dummy variables are incorporated into Model (1).

As for the predicted signs of the control variables, previous studies found that larger audit firms can improve the quality of accounting information, leading to lower cost of debt financing [46,47]. Therefore, we predict that the coefficient on BIG10 is negative. Van Binsbergen et al. [64] point out that the influence of firm size on the costs of debt varies in different settings and samples and their empirical results document that larger firms have a higher cost of debt. Bharath et al. [65] examine the relationship between accounting quality and debt financing costs and find that firm size is positively related with debt financing costs. Shailer et al. [63] investigate the impact of government ownership on the debt financing costs based on the Chinese listed firms. The empirical results show that firm size is negatively related with cost of debt. Therefore, we are uncertain about the sign of the firm size. Firm leverage (LEV) is a proxy for financial risk and high financial risk increases debt financing costs [44,63]. Thus, we predict that LEV has a positive impact on the cost of debt financing. We expect a negative coefficient on ROS as better financial performance reduces firms’ business risk [66,67]. Prior literature shows that interest rates are increasing in collateral and thus the coefficient on tangible asset intensity (TANG) is positively related with debt financing costs [47,65]. We therefore predict a positive coefficient on TANG. Because a high ratio of account receivables may provide greater opportunities for earnings management and lead to higher information risk [68,69], we expect a positive relationship between account receivable intensity (ACCA) and debt financing costs. Previous studies indicate that firm listed age is positively related to the cost of debt [63] and thus a positive coefficient is expected for LISTAGE. State ownership nature (STATE) is expected to have a negative coefficient for the reason that
state-owned firms are inclined to obtain low debt financing costs \[63,67\]. A summary of the predicted signs will be exposed in our main tests.

H2 predicts that audit firm industry specialization attenuates the effect of signing auditors with foreign experience on the cost of debt financing. In order to test hypothesis 2, we set Model (2) by incorporating the audit firm specialists (SPEC) and the interactive item FOR∗SPEC into Model (1):

\[ DFC = \beta_0 + \beta_1 \text{FOR} + \beta_2 \text{SPEC} + \beta_3 \text{FOR} \times \text{SPEC} + \beta_4 \text{BIG10} + \beta_5 \text{SIZE} + \beta_6 \text{LEV} \\
+ \beta_7 \text{ROS} + \beta_8 \text{LISTAGE} + \beta_9 \text{ACCA} + \beta_{10} \text{TANG} + \beta_{11} \text{STATE} \\
+ \text{Industry Dummies} + \text{Year Dummies} + \text{AF Dummies} + \mu \]  

(Model 2)

In Model (2), the dependent variable and the independent variable are DFC and FOR, respectively. The moderating variable is audit firm industry expertise. According to Balsam et al. \[13\] and Chin et al. \[20\], we define auditor specialization as “equaling one if the audit firm has the largest or second-largest market share based on the audit firm’s annual audit fees in each two-digit CSRC industry and zero otherwise”. Based on Hypothesis 2, we expect that the coefficient on \(\text{FOR} \times \text{SPEC}\) is significant and positive. All the control variables used in Model (2) are as same as those used in Model (1).

All of the variables in Models (1) and (2) are given detailed definitions in Appendix A. We winsorized the continuous variables at the top and bottom 1% level to control for the potential effect of outliers.

5. Empirical Results

5.1. Descriptive Statistics

Table 1 reports the descriptive statistics and univariate tests. As shown in Panel A of Table 1, the mean value of DFC is 2.329, suggesting that lenders require an interest rate of 2.329% for Chinese listed firms on average in our sample. Also, the distribution of DCF is not severely skewed. FOR has a mean value of 0.031, indicating that signing auditors with foreign experience in the Chinese capital market are scarce. The mean value of SPEC is 0.1851, which implies that the proportion of audit firms with industry expertise is relatively small. Forty-four point seven one percent of Chinese listed firms choose BIG10 audit firms, indicating that the Chinese audit market is less concentrated compared with the developed capital market. With regard to the firm-specific features, the average firm size (SIZE) is 21.882, the average firm leverage (LEV) is 5.9%, the average return on sales revenue (ROS) is 6.8%, the average listed age is 9.050, the mean value of account receivable intensity (ACCA) and tangible asset intensity (TANG) is 0.114 and 0.258, respectively. Regarding the governance mechanisms, the mean value of state is 0.538, suggesting that more than half of Chinese listed firms are owned by the government.

The results of univariate tests are reported in Panel B of Table 1. We partitioned the full sample into the signing auditors with foreign experience subsample and the signing auditors without foreign experience subsample. We can see from Panel B of Table 1 that the mean and median values of the debt financing costs are both lower for the signing auditors with foreign experience subsample than for the signing auditors without foreign experience subsample, implying that firms that engage signing auditors with foreign experience are charged with a lower debt financing costs and providing preliminary evidence to our Hypothesis 1.
Table 1. Descriptive statistics and univariate tests.

Panel A: Descriptive Statistics

| Variables | N     | MEAN  | SD    | MIN  | p25   | p50   | p75   | MAX  |
|-----------|-------|-------|-------|------|-------|-------|-------|------|
| DFC(%)    | 21375 | 2.329 | 1.586 | 0.000| 1.011 | 2.233 | 3.432 | 6.579|
| FOR       | 21375 | 0.031 | 0.174 | 0.000| 0.000 | 0.000 | 0.000 | 1.000|
| SPEC      | 21375 | 0.185 | 0.388 | 0.000| 0.000 | 0.000 | 0.000 | 1.000|
| BIG10     | 21375 | 0.447 | 0.497 | 0.000| 0.000 | 0.000 | 1.000 | 1.000|
| SIZE      | 21375 | 21.882| 1.229 | 19.551|21.000|21.719|22.577|25.726|
| LEV       | 21375 | 0.059 | 0.089 | 0.000| 0.000 | 0.016 | 0.084 | 0.413|
| ROS       | 21375 | 0.068 | 0.165 | −0.790|0.019 |0.061 |0.130 |0.413|
| LISTAGE   | 21375 | 9.050 | 5.813 | 1.000|4.000 |8.000 |14.000|22.000|
| ACCA      | 21375 | 0.114 | 0.101 | 0.000|0.032 |0.089 |0.167 |0.460|
| TANG      | 21375 | 0.258 | 0.177 | 0.003|0.118 |0.225 |0.369 |0.750|
| STATE     | 21375 | 0.538 | 0.499 | 0.000|0.000 |1.000 |1.000 |1.000|

Panel B: Univariate Tests

| Variables | FOR = 0 (20708) | FOR = 1 (667) | MEANDIFF | MEDIANDIFF |
|-----------|-----------------|---------------|-----------|------------|
| DFC       | 0.023           | 0.022         | 0.022     | 0.021      | 0.002 *    | 2.857 *    |

* , ** , and *** indicate significance levels of 10%, 5% and 1%, respectively.

5.2. Pearson Correlation Test

The results of the Pearson correlation analyses are presented in Table 2. As shown in Table 2, the coefficient on FOR is negative and significant at the 10% level, meaning that signing auditors with foreign experience lower the cost of debt financing, thus providing preliminary support for Hypothesis 1. DFC is negatively related to SPEC, which indicates that costs of debt are decreased when firms are audited by industry expertise. In addition, DFC is negatively (positively) and significantly correlated with BIG10, ROS, ACCA (LEV , LISTAGE, TANG, STATE). The above findings suggest the necessity to include these variables in the multivariate regression.

Table 2. Pearson correlation test.

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|
| DFC       | 1.000|     |     |     |     |     |     |     |     |      |      |
| FOR       | 0.013 | 1.000|     |     |     |     |     |     |     |      |      |
| SPEC      | −0.028 | −0.003 | 1.000|     |     |     |     |     |     |      |      |
| BIG10     | −0.067 | −0.021 | 0.436 | 1.000|     |     |     |     |     |      |      |
| SIZE      | −0.011 | 0.027 | 0.121 | 0.260 | 1.000|     |     |     |     |      |      |
| LEV       | 0.176 | 0.031 | 0.034 | 0.024 | 0.062 | 1.000|     |     |     |      |      |
| ROS       | 0.151 | 0.125 | 0.030 | 0.020 | 0.020 | 1.000|     |     |     |      |      |
| LISTAGE   | 0.081 | 0.091 | 0.033 | 0.063 | 0.232 | 0.178 | 1.000|     |     |      |      |
| ACCA      | 0.063 | 0.077 | 0.021 | 0.232 | 0.277 | 0.151 | 0.094 | 1.000|     |      |      |
| TANG      | 0.241 | 0.035 | 0.022 | 0.042 | 0.125 | 0.030 | 0.020 | 0.020 | 1.000|      |      |
| STATE     | 0.048 | 0.029 | −0.066 | −0.084 | 0.201 | 0.177 | 0.036 | 0.226 | 0.142 | 0.222 | 1.000|

* , ** , and *** indicate significance levels of 10%, 5% and 1%, respectively.

It can be seen that the pair-wise correlation coefficients of the control variables are generally low. Moreover, the untabulated results show that all of the variance inflation factors (VIFs) are far below 10. Taken together, these results validate that our regression results are unlikely to suffer from serious multicollinearity.

5.3. Main Results

5.3.1. Signing Auditors’ Foreign Experience and Debt Financing Costs

Hypothesis 1 predicts that signing auditors with foreign experience are negatively related to the cost of debt. Table 3 reports the results for Hypothesis 1. As shown in Table 3, the coefficients on FOR are negative and significant at the 1% level (−0.192 with t = −3.43), which suggests that the debt financing cost is reduced when firms engage signing auditors with foreign experience and validates Hypothesis
1. In addition, the coefficient estimate on FOR means that debt financing costs are about 0.192 lower for firms with signing auditors’ foreign experience than for their counterparts, equaling about 8% of the mean value of DFC (2.329). Contrasted with the relevant literature, the economic significance of our results are reasonable. For example, Du et al. [70] examine the relationship between corporate environmental performance and cost of debt financing based on a sample of Chinese private-owned firms and the empirical results of their main test show that the coefficient on corporate environmental performance is −0.0564, equaling about 10% of the mean value of the debt financing costs. Bliss et al. [71] investigate the impact of political connection on the cost of debt. Their empirical results show that the coefficient on political connection is 0.005, equaling about 8% of the mean value of debt financing costs. Lorca et al. [72] investigate the relationship between the board characteristics and debt financing costs and show that the economic significance of the board size and board activity on debt financing costs is −0.33% and −0.21%, equaling about 4% and 3% of the mean value of the debt financing costs. Causholli et al. [73] examine the impact of auditor quality on debt financing costs and show that the coefficient on the big six auditors is −0.0078, equaling about 2% of the debt financing costs. These analyses show that our results are statistically and economically significant and provide support to Hypothesis 1.

Table 3. Signing auditors’ foreign experience and debt financing costs.

| Variables | Predicted Sign | DFC (%) | coefficient | t-Value |
|-----------|----------------|---------|-------------|---------|
| FOR       | −              | −0.192 *** | −3.43       |
| BIG10     | −              | −0.123 *** | −3.97       |
| SIZE      | or +          | 0.007   | 0.64        |
| LEV       | +             | 3.162 *** | 22.29       |
| ROS       | −              | −1.462 *** | −19.18      |
| LISTAGE   | +             | 0.035 *** | 16.91       |
| ACCA      | +             | 1.438 *** | 12.47       |
| TANG      | +             | 2.297 *** | 30.75       |
| STATE     | −              | −0.320 *** | −13.54      |
| CONSTANT  | or +          | −0.206 *** | 11.48       |

T-statistics are reported in parentheses. *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.

Notably, signing auditors with foreign experience only account for 3% in our sample. The 3% of signing auditors reduce debt financing costs by 0.19%, equaling about 8% of the mean value of debt financing costs. Therefore, we think that the impact of signing auditors’ foreign experience on debt financing costs is important and meaningful. Moreover, with the continuous development of economic globalization and the continuous opening of the Chinese economy, the number of signing auditors with foreign experience will gradually increase, so that their role in reducing the cost of debt financing will also increase.

As for the signs and significance of the control variables, we find that larger auditors (BIG10) are negatively related with debt financing costs [46]. Return on total sales (ROS) is negatively correlated with debt financing costs [66,67]. The firm size (SIZE) is insignificance, which is consistent with the finding of Li et al. [49]. Leverage (LEV) has a positive effect on the cost of debt financing [63,67]. Firms listed age is positively related with debt financing costs [63]. Tang asset intensity (TANG) and account receivable intensity (ACCA) are positively associated with debt financing costs [47,65]. State-owned firms (STATE) have low cost of debt financing [63,67].
5.3.2. Signing Auditors’ Foreign Experience, Audit Firm Industry Expertise and Debt Financing Costs

Table 4 tabulates the regression results for Hypothesis 2 that audit firm industry expertise attenuates the negative association between signing auditors’ foreign experience and the cost of debt. The coefficient on FOR is significantly negative at the 1% level, further supporting Hypothesis 1. SPEC is significantly negative at the 5% level, which is consistent with prior studies that audit firm specialists lower debt financing costs. More importantly, the coefficient on the interactive term FOR*SPEC is significantly positive (0.298 with t = 2.07) and thus lend support to Hypothesis 2. Above results suggest that the negative effect of signing auditors’ foreign experience on the cost of debt financing is less pronounced for firms that are audited by audit firm industry specialization.

Table 4. Signing auditors’ foreign experience, audit firm industry expertise and debt financing costs.

| Variables   | Predicted Sign | DFC (%)       |
|-------------|----------------|---------------|
|             |                | Coefficient   | t-Value       |
| FOR         | –              | –0.249 ***    | –4.06         |
| SPEC        | –              | –0.069 **     | –2.24         |
| FOR*SPEC    | +              | 0.298 **      | 2.07          |
| BIG10       | –              | –0.114 ***    | –3.63         |
| SIZE        | –or+           | 0.008         | 0.75          |
| LEV         | +              | 3.158 ***     | 22.29         |
| ROS         | –              | –1.463 ***    | –19.19        |
| LISTAGE     | +              | 0.035 ***     | 16.81         |
| ACCA        | +              | 1.444 ***     | 12.52         |
| TANG        | +              | 2.300 ***     | 30.82         |
| STATE       | –              | –0.321 ***    | –13.54        |
| CONSTANT    | –or+           | 2.792 ***     | 11.41         |

YEAR YES
IND YES
AF YES

Observations 21375
Adj R² 0.235
F 84.433 ***

T-statistics are reported in parentheses. *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.

5.4. Robustness Checks

5.4.1. Using Other Measure of Foreign Experience

Following Yuan et al. [28], we redefine the signing auditors with foreign experience (FOR_1). As Hong Kong, Macau, and Taiwan have relatively similar culture and linguistics, we exclude signing auditors who obtained their foreign experience from these three regions. The results in Table 5 show that FOR_1 has a significantly negative coefficient at the 1% level and the coefficient on the interactive term FOR_1*SPEC is significantly positive, showing that firms that are audited by the signing auditors’ foreign experience have a lower cost of debt and audit firms industry specialists mitigate the above relationship. These results further support Hypotheses 1 and 2.
Table 5. Robustness tests using other measures of signing auditors’ foreign experience.

| Variables      | DFC (%) |               |               |
|----------------|---------|---------------|---------------|
|                | (1)     | Coefficient   | t-Value       |
|                |         |               |               |
| FOR_1          | -0.308  | -3.77         | -3.71         |
| SPEC           | -0.057  | -1.87         | -1.79         |
| FOR*SPEC       | 0.339   | 1.79          |               |
| BIG10          | -0.126  | -4.05         | -1.73         |
| SIZE           | 0.007   | 0.001         | 0.07          |
| LEV            | 3.162   | 22.30         | 21.52         |
| FOR*SPEC       | 0.339   | 1.79          |               |
| BIG10*SPEC     | 0.401   | 2.19          |               |
| SIZE           | -0.007  | -0.57         | -0.47         |
| LEV            | 2.155   | 13.34         | 13.32         |
| FOR*SPEC       | 0.401   | 2.19          |               |
| BIG10*SPEC     | 0.401   | 2.19          |               |
| SIZE           | -0.007  | -0.57         | -0.47         |
| LEV            | 2.155   | 13.34         | 13.32         |
| LISTAGE        | 0.035   | 16.84         | 16.61         |
| ACCA           | 1.438   | 12.47         | 16.35         |
| TANG           | 2.300   | 30.81         | 28.19         |
| STATE          | -0.319  | -13.47        | -13.70        |
| CONSTANT       | 2.790   | 11.43         | 12.47         |

T-statistics are reported in parentheses. *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.

5.4.2. Using Other Measures of Debt Financing Costs

To further verify our results, we redefine debt financing costs as the interest expenses scaled by the interest-bearing debt (DCF_1) [3, 74]. The results of Table 6 show that FOR has a significantly negative coefficient and FOR*SPEC is significantly positively related with DFC_1, further validating Hypotheses 1 and 2.

Table 6. Robustness tests using other measures of debt financing costs.

| Variables      | DFC_1 (%) |               |               |
|----------------|-----------|---------------|---------------|
|                | (1)       | Coefficient   | t-Value       |
|                |           |               |               |
| FOR            | -0.222    | -3.32         | -4.14         |
| SPEC           | -0.073    | -1.94         |               |
| FOR*SPEC       | 0.401     | 2.19          |               |
| BIG10          | -0.128    | -3.43         | -3.14         |
| SIZE           | -0.007    | -0.57         | -0.47         |
| LEV            | 2.155     | 13.34         | 13.32         |
| FOR*SPEC       | 0.401     | 2.19          |               |
| BIG10*SPEC     | 0.401     | 2.19          |               |
| SIZE           | -0.007    | -0.57         | -0.47         |
| LEV            | 2.155     | 13.34         | 13.32         |
| LISTAGE        | 0.047     | 18.46         | 18.36         |
| ACCA           | 0.772     | 5.49          | 5.54          |
| TANG           | 2.212     | 24.67         | 24.74         |
| STATE          | -0.362    | -12.68        | -12.69        |
| CONSTANT       | 4.022     | 13.58         | 13.53         |

T-statistics are reported in parentheses. *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.
5.4.3. Using the Propensity Score Matching (PSM) Approach

Our main results in Tables 3 and 4 may be contingent on whether firms with less risk have more probability to appoint signing auditors who have foreign experience. Therefore, we use the propensity score matching approach to tackle this potential endogenous selection problem.

Referring to Giannetti et al. [27], Yuan et al. [28], we select the following variables to conduct the first stage of the propensity score matching process: SEA_FIRM, SEA_ACC, FORSHR, SIZE, LEV, ROS, STATE. SEA_FIRM is a dummy variable, equaling one if the firms are located in the coastal area and zero otherwise. SEA_ACC is measured as one if the accounting firms are located in the coastal area and zero otherwise. FORSHR is defined as the percentage of foreign shareholding.

Specifically, we follow the one-to-one non-repeated matching principle, use ±0.5% as the caliper of the propensity score, and match firms that select signing auditors with foreign experience (the treated sample) to those without selecting signing auditors with foreign experience (the matching sample). As the column (1) of Table 7 shows, consistent with theoretical expectation and extant studies, the likelihood of firms engaging signing auditors with foreign experience is significantly positively related with SEA_FIRM, SEA_ACC, FORSHR, SIZE.

Table 7. Robustness tests using PSM method.

| Variables  | FOR DFC (%) |  |  |  |
|------------|-------------|---------|---------|---------|
|            | (1) Coefficient z-Value | (2) Coefficient t-Value | (3) Coefficient t-Value |  |
| SEA_FIRM   | 0.600 ***  | 2.98    |         |         |  |
| SEA_ACC    | 0.340 * | 1.70    |         |         |  |
| FORSHR     | 1.009 ** | 2.08    |         |         |  |
| FOR        | −0.209 ** | −2.29   | −0.289 *** | −2.96   |  |
| SPEC       |           |         | −0.032  | −0.21   |  |
| FOR*SPEC   |           |         | 0.350*  | 1.76    |  |
| BIG10      | −0.257 ** | −2.16   | −0.236 ** | −1.98   |  |
| SIZE       | 0.202 *** | 4.78    | −0.036  | −0.89   | −0.012  | −0.30  |  |
| LEV        | −0.154  | −0.31   | 3.299 *** | 5.52    | 3.210 *** | 5.29    |  |
| ROS        | −0.325  | −1.45   | −1.547 *** | −4.95   | −1.559 *** | −5.02   |  |
| LISTAGE    | 0.014 *  | 1.72    | 0.014   | 1.63    |  |
| ACCA       | 1.165 ** | 2.35    | 1.298 *** | 2.63    |  |
| TANG       | 1.895 *** | 5.92    | 1.976 *** | 6.26    |  |
| STATE      | 0.094   | 0.96    | −0.177 * | −1.85   | −0.179 * | −1.87   |  |
| CONSTANT   | −8.118 *** | −9.09   | 4.234 *** | 4.35    | 3.863 *** | 4.07    |  |
| YEAR/IND   | YES      | YES     | YES     |         |  |
| AF         |           |         |         |         |  |
| Observations | 21375  | 1330    | 1330    |         |  |
| Pse R²/Adj R² | 0.052  | 0.242   | 0.245    |         |  |
| Chi²/F     | 308.821 *** | 6.426 *** | 6.986 *** |         |  |

Z, T-statistics are reported in parentheses. *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.

After conducting the propensity score matching process, we obtain a sample including 665 treated firms and 665 matching firms. The columns (2) and (3) of Table 7 report results of the second stage of the propensity score matching regression. These empirical results are qualitatively similar to those in Tables 3 and 4, which indicates that our main findings are less inclined to be influenced by the endogeneity issue.
5.4.4. Using Fixed Effects Model

Referring to prior studies, we include the variables that might affect the debt financing costs in model (1), but our results may still be influenced by the potential omitted variables. As the response, we adopt the fixed effects model to re-run model (1). Our hypothesis is reconfirmed by the results of Table 8, implying that the negative influence of signing auditors with foreign experience on the cost of debt financing is not qualitatively changed after considering the effect of other potential factors.

### Table 8. Robustness tests using fixed effects model.

| Variables | DFC (%) | Coefficient | t-Value |
|-----------|---------|-------------|---------|
| FOR       | -0.117 ** | -2.18       |
| BIG10     | 0.030   | 1.28        |
| SIZE      | 0.107 ***| 6.21        |
| LEV       | 0.673 ***| 4.96        |
| ROS       | -1.207 ***| -20.54      |
| LISTAGE   | 0.212 ***| 3.90        |
| ACCA      | 1.944 ***| 13.46       |
| TANG      | 2.590 ***| 30.00       |
| STATE     | -0.122 ***| -3.10       |
| CONSTANT  | -0.265  | -0.73       |
| YEAR YES  |          |             |         |
| Observations | 21375  |             |         |
| Adj R²    | 0.187   |             |         |
| F         | 116.204 ***|            |         |

T-statistics are reported in parentheses. *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.

The signs and significance of control variables are mostly similar to those in Tables 3–7. However, unlike the insignificance of firm size in Tables 3–7, the firm size has a positive and significant coefficient [47] in Table 8. Becker et al. [75] argue that firm size can be a surrogate for numerous omitted variables. After using the fixed effects model and control the effect of potential omitted variables, the firm size has a positive effect on debt financing costs in our sample.

5.5. Further Tests

We speculate that signing auditors with foreign experience could provide high audit quality and thus improve financial information quality, which ultimately reduces the cost of debt financing. To validate our conjecture, we use earnings management to measure audit quality [16]. Specially, we use discretional accruals (DA, DA_RET) [76,77] and small profit (SP) [16] to proxy for earnings management (please refer to the Appendix B for a detailed calculation of the discretional accruals). We define firms as having a small profit (SP) if its earnings per share is between 0 and 2 percent. As shown in Table 9, signing auditors with foreign experience lead to lower earnings management and less likelihood of small profit, suggesting that signing auditors who have foreign experience enhance the audit quality and improve the quality of financial information. The above results lend further support to our results.
Table 9. Further tests: signing auditors’ foreign experience and audit quality.

| Variables  | DA (1) | DA_RET (2) | SP (3) |
|------------|--------|------------|--------|
|            | Coefficient | t-Value | Coefficient | t-Value | Coefficient | z-Value |
| FOR        | -0.007** | -1.98 | -0.008** | -2.04 | -0.533* | -1.91 |
| SPEC       | -0.007*** | -3.28 | -0.006*** | -2.75 | -0.221* | -1.79 |
| BIG10      | -0.004*  | -1.76 | -0.004*  | -1.85 | 0.184   | 1.55  |
| SIZE       | 0.002**  | 2.57  | 0.001*   | 1.67  | -0.492*** | -10.84 |
| LEV        | 0.168*** | 33.07 | 0.143*** | 27.54 | -0.563*** | -5.26 |
| FOR        | 0.074*** | 7.96  | 0.073*** | 7.77  | 0.515    | 0.98  |
| LISTAGE    | -0.000  | -0.39 | -0.000  | -0.76 | 0.052*** | 6.85  |
| ACCA       | 0.154*** | 17.86 | 0.122*** | 14.25 | 0.258    | 0.65  |
| STATE      | -0.002  | -1.48 | -0.002  | -1.33 | -0.059   | -0.70 |
| CONSTANT   | -0.065*** | -3.85 | -0.044*** | -2.63 | 6.812*** | 7.05  |

YEAR/IND   YES     YES     YES
AF         YES     YES     YES
Observations 19745 19745 21375
Adj R²/Pse R² 0.099 0.071 0.054
F/Ch²        20.694*** 13.536*** 691.146***

Z, T-statistics are reported in parentheses. *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.

6. Conclusions

Given that audit quality is essential to reduce the information asymmetry and ensure the well-functioning of capital markets, scholars have put the analysis from the audit firm level down to the signing auditor level. Prior studies have proved that auditors play an important role in debt contracting [8–11]. Hence, it is meaningful to investigate the effect of signing auditors’ characteristics on debt financing costs.

Using a sample of Chinese listed firms from the year 2001 to 2016, this study investigates the influence of signing auditors with foreign experience on cost of debt financing. In line with theoretical predictions, the findings show that signing auditors with foreign experience are significantly negatively associated with debt financing costs. Moreover, audit firm industry specialization negatively attenuates the negative effect of signing auditors’ foreign experience and cost of debt. We also conduct a series of robustness tests such as alternating the dependent and independent variables and the results remain unchanged. What is more, we use fixed effects model and propensity score matching method to control the potential endogeneity issue and the results are still valid. We further find that signing auditors with foreign experience have higher financial quality and thus reduce information risk and lower cost of debt. This study adds to the existing literature about individuals’ foreign experience on corporate behaviors and outcomes by exploring the impacts of signing auditors with foreign experience on cost of debt and provides additional empirical evidence of the influencing factors on debt financing cost.

In addition to the theoretical contributions documented in the introduction, this study may have several managerial implications. First, since 1990s, the Chinese government has adopted favorable talent schemes to attract talents with foreign experience. This study provides empirical evidence that signing auditors with foreign experience serve a positive role in debt financing costs. Returnees can transmit better skills, knowledge and management practice in emerging markets. In this regard, this study provides theoretical support to the policies in attracting talent with foreign experience. Second, this paper suggests that characteristics of signing auditors have an important impact on debt financing. Therefore, for audit firms, the characteristics of signing auditors should be taken into account in selection and training to provide high-quality audit services. Financial statement users should pay attention to the characteristics of signing auditors to make reasonable decisions for the reason that signing auditors have a significant role in ensuring financial report quality. Also, firms should consider the characteristics of signing auditors when they engage an auditor. Third, this paper
concludes that audit firm industry specializations have a positive impact on audit quality, and thereby on debt financing. The results provide a theoretical reference for the relevant departments to actively encourage the development of industry specialists in the audit market.

This study makes contributions to the signing auditors’ characteristics and debt financing literature in multiple ways. However, it still suffers some limitations. In our research, we focus on the debt financing cost. Future studies could also examine the effect of signing auditors’ foreign experience on the stock market, such as cost of equity or trading volume. In addition, signing auditors’ other characteristics could also be an interesting and important research perspective for future study. Finally, we use a sample of Chinese listed firms to conduct our empirical tests. Therefore, it is important for future research to test the results in other emerging countries.

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**Appendix A**

| Variables | Measurements |
|-----------|--------------|
| DFC | Debt financing costs, measured as the interest expenses divided by total debt; |
| FOR | An indicator variable for the signing auditors with foreign experience, equaling 1 if signing auditors have foreign experience and 0 otherwise; |
| SPEC | An indicator variable for audit firm industry specialization, equaling 1 if the audit firm is largest or second-largest supplier in the industry by market shares in terms of clients’ total audit fees and 0 otherwise; |
| BIG10 | An indicator variable, equaling 1 if the audit firm is one of the top 10 auditors or their affiliated firms (the CICPA annual ranking) and 0 otherwise; |
| SIZE | Firm size, measured as the natural logarithm of total assets; |
| LEV | Financial leverage, computed as the ratio of long-term liabilities to total assets; |
| ROS | Return on total sales, computed as the operating profit scaled by total revenue; |
| LISTAGE | The number of years a company has been listed; |
| ACCA | The account receivables scaled by total assets; |
| TANG | Net property, plant and equipment scaled by total assets; |
| STATE | A dummy variable, equaling 1 if a firm’s ultimate owner is a local (central) government or state-owned enterprise and 0 otherwise; |
| YEAR | Dummy variable that equals 1 if it belongs to the current year and 0 otherwise; |
| IND | Dummy variable that equals 1 if it belongs to this industry and 0 otherwise; |
| AF | Dummy variable that equals 1 if it belongs to this audit firm and 0 otherwise. |

**Appendix B**

The discretionary accruals based on the model of Dechow et al. [76] are calculated as follows:

\[
\frac{ACC_{jt}}{TA_{jt-1}} = \alpha_1 \frac{1}{TA_{jt-1}} + \alpha_2 \frac{\Delta REV_{jt}}{TA_{jt-1}} + \alpha_3 \frac{PPE_{jt}}{TA_{jt-1}} + \epsilon_{jt} \quad (A1)
\]

\[
\frac{NACC_{jt}}{TA_{jt-1}} = \alpha_1 \frac{1}{TA_{jt-1}} + \alpha_2 \frac{(\Delta REV_{jt} - \Delta REC_{jt})}{TA_{jt-1}} + \alpha_3 \frac{PPE_{jt}}{TA_{jt-1}} + \epsilon_{jt} \quad (A2)
\]

\[
DA_{jt} = ACC_{jt} - NACC_{jt} \quad (A3)
\]

In Equation (A1), j denotes for the firm and t denotes for the year. \(TA_{jt-1}\) denotes total assets in year \(t-1\). \(ACC_{jt}\) represents accrual earnings, computed as net income minus operating cash flows;
\( \Delta REV_{j,t} \) equals the change in revenues from year \( t-1 \) to year \( t \). \( PPE_{j,t} \) is the gross value of the property, plant and equipment at the end of year \( t \). We estimate the coefficients \( \alpha_1, \alpha_2, \alpha_3 \) using the Equation (A1) for each year and industry.

In Equation (A2), \( \Delta REC_{j,t} \) is the change in accounting receivables from year \( t-1 \) to year \( t \). We exclude changes in accounts receivable from total revenue and calculate non-discretionary accruals using the estimated coefficients \( \alpha_1, \alpha_2, \alpha_3 \) from Equation (A1) based on the Equation (A2).

Discretionary accruals are calculated using the Equation (A3). According to Equation (A3), Discretionary accruals are the difference between actual value of total accruals and the predicted value of non-discretionary accruals.

The discretionary accruals based on the model of Ball et al. [77] are calculated as follows:

\[
\frac{ACC_{j,t}}{TA_{j,t-1}} = \beta_1 \frac{1}{TA_{j,t-1}} + \beta_2 \frac{\Delta RET_{j,t}}{TA_{j,t-1}} + \beta_3 \frac{PPE_{j,t}}{TA_{j,t-1}} + \beta_4 \frac{ABRET_{j,t}}{TA_{j,t-1}} + \beta_5 DABRET + \beta_6 DABRET \times \frac{ABRET_{j,t}}{TA_{j,t-1}}
\] (A4)

The model of Ball et al. [77] take the consideration for the asymmetric timeliness in recognition of gains versus loss and therefore incorporate the nonlinear relationship between accruals and market return.

In Equation (A4), ABRET is the market-adjusted return, computed as the difference between the stock return and the market stock return. DABRET is a dummy variable, equals one if the ABRET is negative and zero otherwise. We estimate Equation (A4) by year and industry. The discretionary accruals is calculated as the actual total accruals minus the predicted value of normal accruals.

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