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Auditor human capital and financial misstatement: Evidence from China ☆

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ABSTRACT

In this study, we examine whether education, as an important component of the human capital of auditors, is related to the occurrence of financial misstatement, and investigate the moderating effect of professional experience. Using a sample of 16,651 firm-year observations from the Chinese stock market from 2003 to 2014, we find that the education level of signing auditors is significantly negatively associated with the likelihood of financial misstatement, which suggests that higher education can enhance the ethics and independence of auditors and mitigate the risk of financial misstatement. In addition, professional experience attenuates the negative relation between the education level of signing auditors and financial misstatement. Our findings are also robust to a variety of sensitivity tests, and our conclusions still hold after using a two-stage OLS-logistic regression to address the endogeneity problem. Lastly, the negative effect of education level on financial misstatement holds only for 985 Project universities, low individual-level (audit-firm-level) client importance, and state-owned enterprises.

1. Introduction

Auditor human capital is of fundamental importance in the auditing industry (a human-capital-intensive industry) (Chang et al., 2011; Pennings et al., 1998). In this study, we examine whether auditor human capital

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(proxied by the education level of the signing auditors) affects the likelihood of financial misstatement, and further investigate whether professional experience moderates the relation between education level and financial misstatement.

According to the framework proposed by DeFond and Zhang (2014), audit quality is jointly affected by the demand from the client, the supply of the auditor, and regulatory intervention. Research on the supply of the auditor has focused on how audit quality is affected by the demographic characteristics of auditors, such as industry expertise, gender, the client importance at both the audit firm and individual auditor levels, the interpersonal relations between auditors and CEOs (directors, top executives), and auditor religiosity (Aobdia et al., 2015; Carcello and Li, 2013; Carey and Simnett, 2006; Chen et al., 2010; Chin and Chi, 2009; Chi et al., 2012; Guan et al., 2016; Hardies et al., 2016; Zerni, 2012). However, the question remains as to whether auditor human capital influences audit quality. In this regard, the literature provides insufficient evidence because researchers have been unable to obtain data on the demographic characteristics of individual auditors.[1] Fortunately, the Chinese audit market provides a unique research setting in which public information on demographic characteristics of individual auditors can be obtained from the official website of the China Institute of Certified Public Accountants (CICPA; http://cmis.cicpa.org.cn).[2] Thus, in this study, we address this research gap by investigating the relation between the education level of signing auditors and financial misstatement using a unique dataset comprising the characteristics of individual auditors.

According to human capital theory (Becker, 1962; Schultz, 1960), human capital can be accumulated through education. Accordingly, we focus on the education level of auditors in developing our research hypotheses. Studies have shown that education can improve people's cognitive abilities (Barker and Mueller, 2002), affect the quality of outcomes (Kallunki et al., 2016), and result in better ethical judgment (Rest and Thoma, 1985). Therefore, we hypothesize that the education level of signing auditors is significantly negatively (positively) associated with financial misstatement (audit quality). Furthermore, signing auditors accumulate knowledge through their professional experience, which can help them better understand the error patterns in their client firms' financial statements, find potential financial misstatement, and enhance their independence (Libby and Frederick, 1990; Nelson, 2009). Therefore, we further test whether the professional experience and education level of signing auditors have substitutive effects on audit quality.

We focus on the Chinese context for several reasons. First, China provides a unique research setting in which data on the demographic characteristics of signing auditors are available (Guan et al., 2016). Second, China's highly competitive audit market (Choi and Wong, 2007; Wang et al., 2008; Yang, 2013) may weaken the ethics of auditors and created more significant cross-sectional variations in the levels of auditor independence. Finally, the changing characteristics of the Chinese audit market and the increasing regulations on external audits and signing auditors have produced time-series variations in audit quality (Guan et al., 2016).

Using a sample of 16,651 firm-year observations from the Chinese stock market from 2003 to 2014, we examine whether the education level of auditors as an important form of human capital affects the levels of financial misstatement, and further investigate whether professional experience attenuates the negative association between education and financial misstatement. Our analyses reveal the following findings. First, the education level of signing auditors is significantly negatively related with the risk of financial misstatement. Second, professional experience attenuates the negative relation between education and financial misstatement. Third, these findings are robust to various sensitivity tests using different measures of education level and financial misstatement. Fourth, our findings remain valid after using a two-stage OLS-logistic regression to address the endogeneity. Finally, cross-sectional analyses show that the negative effect of education on financial misstatement depends on the quality of the school, the importance of the client, and the type of ownership. In sum, the above relations hold only for 985 Project schools, low client importance, and state-owned enterprises.

This study contributes to the literature in several ways. First, to the best of our knowledge, this study is the first to use archival data on individual auditors and examine whether the education level of signing auditors, as a crucial form of auditor human capital, affects audit quality. Studies have investigated the effects of various

[1] Only a few economies provide data on individual auditors such as mainland China and Australia.
[2] The official website provides data on the educational background and professional experience of individual auditors.

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auditor-specific characteristics (e.g., auditor industry expertise, auditor gender, the number of client firms, client importance, and cultural factors) on audit quality (C.Y. Chen et al., 2008; Y.S. Chen et al., 2008; Chin and Chi, 2009; Goodwin and Wu, 2014; Guan et al., 2016; Gul et al., 2013; Hardies et al., 2016; Ittonen et al., 2015). However, the literature provides insufficient evidence on whether auditor human capital, proxied by education level (Becker, 1962; Schultz, 1960), affects audit quality. This study fills this research gap by examining the relation between the education level of auditors and financial misstatement. In this regard, this study contributes to the growing body of research on the analysis of audit quality at the individual auditor level and provides additional evidence on the determinants of audit quality (DeFond and Zhang, 2014).

Second, extending the literature on human capital at the audit firm level, our study presents empirical evidence showing that the education level of signing auditors reduces the level of financial misstatement. Our results demonstrate that auditor human capital can play a crucial role in ensuring high quality audits and thus provide important support for human capital theory (Schultz, 1960).

Third, we examine the professional experience of individual auditors as a moderating variable. Cahan and Sun (2015), Sonu et al. (2016), and Wang et al. (2015) find that the professional experience of individual auditors reduces discretionary accruals and the likelihood of beating earnings benchmarks. However, few studies have focused on the moderating role of professional experience. In this regard, our study adds to the literature on the relation between professional experience and audit quality.

Finally, we use cross-sectional analyses to address the potential channels through which financial misstatement is affected by the education level of signing auditors. Specifically, the mitigating effect of auditor human capital on financial misstatement depends on the quality of the school, importance of the client, and type of ownership. Thus, our findings contribute to the literature on the determinants of audit quality and the relation between the demographic characteristics of auditors and audit quality.

The remainder of this study is organized as follows. In the second section, we discuss the institutional background, review the literature, and develop our hypotheses. The third section provides the specifications of the empirical model, variables, research sample, and data source. The fourth section reports the results of our hypothesis testing and robustness checks. In the fifth section, we present the endogeneity tests and additional analyses. The final section concludes the study and presents the managerial implications of our findings.

2. Institutional background, literature review, and hypothesis development

2.1. Auditor human capital and auditor independence in the Chinese audit market

According to the Law of the People's Republic of China on Certified Public Accountants, an individual can become a signing auditor only if he or she has passed the unified national examination for certified public accountants[3] and has engaged in auditing for more than two years.[4] In addition, the unified national examination for certified public accountants is only open to Chinese citizens who have graduated from college or university, earned the professional title of accountant, or gained an intermediate or higher professional title in a relevant field of study. Thus, in the past two decades, only 160,000 applicants have qualified as auditors out of more than 10 million examinees (25 million subjects of examination).[5] Accordingly, signing auditors (i.e., auditors qualified to sign audit statements), who are statutorily required to have both a certain level of education and professional experience, are a relatively scarce form of human capital in the Chinese audit market.

[3] An individual can obtain the certificate or diploma only if he or she has passed all examination subjects. Before 2009, there were five examination subjects: accounting, auditing, financial and cost management, tax law, and economic law. However, in 2009, two new examination subjects, that is, corporate strategic and risk management and comprehensive tests, were included, thus increasing the number of examination subjects to seven.

[4] "Whoever has passed the unified national examination for certified public accountants and has engaged in auditing business for more than two years may apply to the institute of certified public accountants of the province, autonomous region or municipality directly under the Central Government for registration" [Article # 9 of the Law of the People's Republic of China on Certified Public Accountants (revised and effective from January 1, 1994)].

[5] See the official website: http://www.cicpa.org.cn/topnews/201106/t20110602_28979.htm.

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According to Shleifer (2004), "Competition destroys ethics and results in unethical behaviors among economic agents." In line with this, serious ethical problems relating to auditors have arisen in the less concentrated and highly competitive Chinese audit market (Wang et al., 2008; Yang, 2013) further impairs the level of auditor independence. In addition, due to the incomplete formal institutions and weak investor protection laws in China (Allen et al., 2005; Xin and Pearce, 1996), the reputation and litigation effects do not work well in the audit market. As a result, under pressure to retain clients, some audit firms and signing auditors have to compromise with CEOs (senior executives and directors), thus leading to collusion between the auditors and CEOs.

Education, an important component of human capital, can help people improve their cognitive ability (Wally and Baum, 1994) and address ethical concerns (Cacioppe et al., 2008). Accordingly, we expect to find that the education level of signing auditors plays a role in improving auditor independence and enhancing the audit quality in the highly competitive Chinese audit market.

2.2. Literature review

Human capital can be formed through education and the professional experience gained from on-the-job training to medical care, vitamin intake, and an intimate knowledge of the economic system (Mincer, 1962; Becker, 1962; Schultz, 1960). Among these factors, education and professional experience are viewed as two crucial dimensions of human capital. Moreover, research suggests that human capital can improve the capacity to work and the quality of the work completed (Mincer, 1962; Schultz; 1961). Furthermore, human capital has been shown to be associated with sustained economic growth (Benhabib and Spiegel, 1994; Islam, 1995; Mankiw et al., 1992). As a result, human capital has been included in the framework of economic growth (Lucas, 1988; Romer, 1990).

With regard to auditor-specific features, studies have investigated how audit quality is affected by auditor industry expertise (Chin and Chi, 2009; Chi and Chin, 2011; Zerni, 2012; Goodwin and Wu, 2014), the number of client firms (Ittonen et al., 2015), auditor tenure (Carey and Simnett, 2006; C.Y. Chen et al., 2008; Y.S. Chen et al., 2008), client importance at the audit firm and individual auditor levels (Chen et al., 2010; Chi et al., 2012), auditor gender (Ittonen et al., 2013; Hardies et al., 2016), and cultural factors such as religion and social ties (Aobdia et al., 2015; Gul et al., 2013; Guan et al., 2016; Omer et al., 2010).

The literature on auditor human capital has focused on the ways in which it affects financial performance, revenue, and the size of audit firms. For example, Pennings et al. (1998) document that the likelihood of an audit firm being dismissed is negatively related to its human capital, as proxied by industry experience and educational background. Bröcheler et al. (2004) validate the positive effect of human capital on the performance of audit firms. In addition, C.Y. Chen et al. (2008) and Y.S. Chen et al. (2008) find that professional experience gained from on-the-job training can improve the performance of an audit firm. Moreover, Cheng et al. (2009) find that education and professional experience are positively related to the size of an audit firm. Chang et al. (2011) find that human capital contributes about 14.3% of the revenue growth of audit firms. Furthermore, Kang et al. (2016) find that investment in the education of auditors is significantly positively related to accounting conservatism. Samagaio and Rodrigues (2016) find a positive relation between human capital and performance in younger audit firms.

To sum up, although education is a crucial source of auditor-specific human capital, the impact of an auditor's education level on audit quality has not been sufficiently investigated, which motivates us to examine the relation between education and financial misstatement.

2.3. Education level of signing auditors and financial misstatement

Education can be used to reflect a person's cognitive ability (Wally and Baum, 1994; Barker and Mueller, 2002; Bantel and Jackson, 1989; Wiersema and Bantel, 1992). Furthermore, cognitive ability is primarily embodied as the ability to process information (Christelis et al., 2010; Wally and Baum, 1994; Wiersema and Bantel, 1992). However, in most cases, people receive far more information than they can handle

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(Tyler and Steensma, 1998). As such, the ability to filter information is crucial and different interpretations of the received information lead to different judgments. Thus, an individual's cognitive ability is closely related to the decisions he or she eventually makes. In this regard, studies have shown that people with better cognitive ability can quickly and precisely identify potential problems and come up with the corresponding solutions (Wally and Baum, 1994; Banks and Mazzonna, 2011; Bantel and Jackson, 1989; Dohmen et al., 2010).

Thus, better-educated signing auditors are likely to think more comprehensively and carefully (Lichtenstein and Fischhoff, 1977). Overall, the cognitive ability that originates from education has an important effect on the quality of outcomes, especially in complex tasks such as external audits (Kallunki et al., 2016). Accordingly, the cognitive ability of signing auditors can be considered to affect audit quality because complex external audits require the auditors to make numerous judgments on issues such as financial misstatement. In this regard, Alleyne and Amaria (2013) find that the education level of an auditor can increase the likelihood of the auditor discovering corporate misconduct.

Higher or elite education can increase the accumulation of human capital and create social prestige (Davies and Hammack, 2005; Finkelstein, 1992; Hitt et al., 2001; Tihanyi et al., 2000). More importantly, education has been shown to be positively associated with people's concerns about individual ethics and business ethics (Cacioppe et al., 2008; Deshpande, 1997; Rest and Thoma, 1985). For example, Cacioppe et al. (2008) find that managers with a reputable education are more likely to be hired by socially responsible firms. Rest and Thoma (1985) verify that a higher level of education can lead to better ethical judgment. In an experimental study, Deshpande (1997) reveals that respondents with a bachelor degree or above are more likely to consider false expense reimbursements as a type of immoral behavior, compared with those without an undergraduate education.

The morality of auditors is reflected in their sensitivity and judgment about ethical issues and further affects auditor independence (Sweeney and Roberts, 1997). A high sensitivity to the honesty and integrity of managers and client firms can help signing auditors to identify corporate misconduct, reduce the likelihood of catering to client firms, and maintain professional skepticism and auditor independence (Bernardi, 1994; Nelson, 2009; Ponemon, 1993; Ponemon and Gabhart, 1993).

To sum up, the education level of signing auditors is associated with their cognitive ability, strengthens their information processing abilities, enhances their sensitivity to ethical concerns, improves auditor independence, and eventually increases the likelihood of auditors' discovering misstatement in their client firms' financial statements. Therefore, Hypothesis 1 is developed in an alternative form as follows.

Hypothesis 1. Ceteris paribus, the education level of signing auditors is negatively related to financial misstatement.

2.4. The moderating role of auditors' professional experience

Studies have found that professional experience is positively associated with audit quality (Cahan and Sun, 2015; Sonu et al., 2016; Wang et al., 2015; Yuan and Han, 2012). Extending this line of research, we further examine how the professional experience of individual auditors moderates the negative relation between education and financial misstatement.

Individual auditors with vast professional experience can obtain both industry- and task-based experience (Moroney and Carey, 2011); have comprehensive knowledge about common or specific errors in financial statements (Libby and Frederick, 1990); and thus make more accurate audit judgments (Bonner, 1990; Shelton, 1999; Wright, 2001), find potential misstatement (Ashton, 1991; Libby, 1985; Tubbs, 1992), and produce high quality audits. Moreover, professional experience can strengthen professional skepticism of signing auditors (Bonner and Lewis, 1990; Nelson, 2009) and reduce the likelihood of auditor-manager compromise (Brown and Johnstone, 2009; Kaplan et al., 2008), thus leading to higher audit quality. Furthermore, professional experience can serve as a sign of auditor capability and audit service quality (Zerni, 2012). Thus, signing auditors with rich experience have valuable reputational capital, which is likely to encourage them to be more independent and ensure the quality of financial statements (Ittonen et al., 2015; Yuan and Han, 2012). As

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such, it can be inferred that with regard to the reduction in financial misstatement as a result of auditors' abilities (DeAngelo, 1981; Rice and Weber, 2012),[6] because professional experience can improve the capabilities of signing auditors in identifying potential misstatement and enhance their independence, it may mitigate the negative effect of education on financial misstatement.

The predicted mitigating effect of professional experience is supported by the literature. For example, Hitt et al. (2001) show that the articulable knowledge gained from a university education can substitute for the tacit knowledge gained from experience. Moreover, Ferguson et al. (2000) find that the education level and professional experience of individual auditors have substitutive effects. Based on the above discussion, Hypothesis 2 is developed as follows.

Hypothesis 2. Ceteris paribus, professional experience attenuates the negative association between education and financial misstatement.

3. Research design

3.1. Empirical model specification for Hypothesis 1

Hypothesis 1 states that an auditor's education level is negatively associated with financial misstatement after controlling for other determinants. To test Hypothesis 1, we estimate Model (1) using a logistic regression that links financial misstatement (MIS_DUM) with the education level of signing auditors (EDU), auditor-specific variables, firm-specific characteristics, and other determinants.

$$\begin{aligned} MIS\_DUM = {} & \alpha_0 + \alpha_1 EDU + \alpha_2 EXP + \alpha_3 GENDER + \alpha_4 AGE + \alpha_5 CI\_IA + \alpha_6 IND\_SPEC_IA + \alpha_7 CI\_AF \\ & + \alpha_8 IND\_SPEC\_AF + \alpha_9 BIG10 + \alpha_{10} ANALYST + \alpha_{11} BLOCK + \alpha_{12} BOARD + \alpha_{13} INDR \\ & + \alpha_{14} DUAL + \alpha_{15} MAN\_SHR + \alpha_{16} SIZE + \alpha_{17} LEV + \alpha_{18} ROA + \alpha_{19} OCF + \alpha_{20} OR/TA \\ & + \alpha_{21} BTM + \alpha_{22} STATE + Industry, Year\ and\ Audit\ Firm\ Dummies + \mu \end{aligned} \quad \text{(Model 1)}$$

In Model (1), the dependent variable is the likelihood of financial misstatement (MIS_DUM), which is an indicator variable that equals 1 if a firm's financial statements are restated in future years and 0 otherwise. The main variable of interest (independent variable) is the education level (EDU) of a signing auditor, which is an important component of auditor human capital. An auditor's education level is measured as 4, 3, 2, and 1 for PhD, master, bachelor, and other qualifications, respectively. EDU denotes the average education level of the signing auditors.[7] In Model (1), if the coefficient on EDU (α_1) is negative and significant, then Hypothesis 1 is supported by the empirical evidence.

To isolate the incremental effect of the education level of signing auditors on financial misstatement, we include a set of control variables in Model (1) (please refer to Appendix A for the variable definitions). First, to address the effects of auditor-specific and audit-firm-specific characteristics on audit quality, in Model (1), we follow the literature and include various characteristics of signing auditors, such as their professional experience (EXP) (Cahan and Sun, 2015; Wang et al., 2015; Sonu et al., 2016), gender (GENDER) (Ittonen et al., 2013; Hardies et al., 2016), age (AGE) (Sundgren and Svanström, 2014), client importance at the audit firm level (CI_AF), client importance at the individual auditor level (CI_IA) (Chen et al., 2010; Chi et al., 2012; Gul et al., 2013), industry expertise at the audit firm level (IND_SPEC_AF), industry expertise at the individual auditor level (IND_SPEC_IA) (Chin and Chi, 2009; Zerni, 2012; Goodwin and Wu, 2014), and an indicator for the big 10 auditors (BIG10) (Becker et al., 1998; Chen et al., 2016).

[6] According to DeAngelo (1981), audit quality refers to "the joint probability of auditors' ability to detect material misstatement in client firms' financial reports and their willingness to disclose detected misstatements."

[7] In the Chinese audit market, at least two auditors (three signing auditors in some cases) are statutorily required to sign the audited financial statements of client firms. One is called the engagement auditor and the other is known as the review auditor. Therefore, the auditor-specific variables in this study are measured as the average value of two (or more) signing auditors.

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Second, research shows that external and internal governance mechanisms can influence audit quality (Abbott et al., 2004; Agrawal and Chadha, 2005; Farber, 2005; Yu, 2008). Thus, Model (1) includes analyst coverage (ANALYST), the percentage of shares owned by the controlling shareholder (BLOCK), board size (BOARD), the ratio of independent directors (INDR), an indicator of CEO-chairman duality (DUAL), and managerial ownership (MAN_SHR).

Third, following the literature, firm-specific variables such as firm size (SIZE), the ratio of long-term liabilities to total assets (LEV), return on assets (ROA), operating cash flow (OCF), the ratio of other account receivables to total assets (OR/TA), and the book-to-market ratio (BTM) are included in Model (1) (Chen et al., 2016; Caskey and Hanlon, 2013; Dechow et al., 2011; Du, 2015; Francis et al., 2013; Jiang et al., 2010; Lobo and Zhao, 2013).

Fourth, an indicator variable, STATE, is included in Model (1) to determine whether the influence of auditor human capital on financial misstatement is different between state-owned and non-state-owned enterprises (Du, 2015; Guan et al., 2016).

Finally, to control for the fixed effect of industries (CSRC classification), calendar years, and audit firms, a set of dummy variables measuring the industry, year, and audit firm are included in Model (1).

3.2. Empirical model specifications for Hypothesis 2

Hypothesis 2 states that professional experience attenuates the negative association between education and financial misstatement. To test Hypothesis 2, we estimate the logistic regression Model (2) to link financial misstatement (MIS_DUM) with education level (EDU), professional experience (EXP), an interactive item of EDU × EXP, and other determinants.

$$\begin{aligned} MIS\_DUM = {} & \beta_0 + \beta_1 EDU + \beta_2 EXP + \beta_3 EDU \times EXP + \beta_4 GENDER + \beta_5 AGE + \beta_6 CI\_IA + \beta_7 IND\_SPEC\_IA \\ & + \beta_8 CI\_AF + \beta_9 IND\_SPEC\_AF + \beta_{10} BIG10 + \beta_{11} ANALYST + \beta_{12} BLOCK + \beta_{13} BOARD \\ & + \beta_{14} INDR + \beta_{15} DUAL + \beta_{16} MAN\_SHR + \beta_{17} SIZE + \beta_{18} LEV + \beta_{19} ROA + \beta_{20} OCF + \beta_{21} OR/TA \\ & + \beta_{22} BTM + \beta_{23} STATE + Industry, Year, and\ Audit\ Firm\ Dummies + \xi \end{aligned} \quad \text{(Model 2)}$$

In Model (2), the dependent variable is the likelihood of financial misstatement (MIS_DUM), and the independent variable is education level (EDU). A positive and significant coefficient on EDU × EXP ($\beta_3 > 0$) is consistent with Hypothesis 2. Moreover, a negative and significant coefficient on EDU ($\beta_1 < 0$) supports Hypothesis 1. The control variables in Model (2) are the same as those in Model (1).

3.3. Identification of the sample

The initial sample consists of all Chinese listed firms between 2003 and 2014. The sample period begins from 2003 because the original information about financial misstatement is unavailable before that year.[8] We then select our sample as follows (see Panel A of Table 1 for details): (1) we delete firm-year observations in which data on individual auditors are unavailable; (2) we exclude firm-year observations with missing data on the education level and professional experience of the signing auditors; (3) we eliminate firms pertaining to the banking, insurance, and other financial industries; and (4) we delete firm-year observations with missing data on the firm-specific control variables. Finally, we obtain a research sample of 16, 651 observations covering 2499 unique firms.

Panel B of Table 1 reports the sample distribution by year and industry. As Panel B shows, industry clustering exists in some industries such as C4, C6, and C7. Therefore, we report all of the z statistics based on standard errors adjusted for clustering at the firm and year levels (Petersen, 2009).

[8] The Correction of Financial Information and its Disclosure (Rule #19) was issued in 2003. Rule #19 first statutorily required Chinese listed firms to file an official report with the CSRC regarding any material events, including the correction of financial statements, and submit a revised and audited annual report within 45 days if the most recent annual report is incorrect (Wang and Wu, 2011).

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Table 1
Sample selection and sample distribution.

Panel A: Sample selection														
Initial sample													22,371	
Eliminate firm-years in which data on individual auditors are unavailable													(781)	
Eliminate firm-years in which data on education level and professional experience are unavailable													(289)	
Eliminate firms pertaining to the banking, insurance, and other financial industries													(457)	
Eliminate firm-years in which the data required to measure the firm-specific control variables are unavailable													(4193)	
Available firm-year observations													16,651	
Unique firms													2499	
Industry code	Year												Total by industry	%
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		
Panel B: Sample distribution by year and industry														
A	5	8	13	14	18	20	20	23	30	35	37	36	259	1.56
B	12	18	31	39	38	47	49	52	55	65	69	68	543	3.26
C0	11	25	45	53	52	54	58	66	77	90	92	90	713	4.28
C1	6	16	18	26	28	34	30	41	50	59	63	62	433	2.60
C2	1	2	5	7	6	7	8	8	10	13	14	13	94	0.56
C3	3	5	13	14	17	21	24	30	30	38	41	36	272	1.63
C4	21	45	90	111	115	123	139	150	179	225	231	222	1651	9.92
C5	14	20	34	42	45	61	63	74	98	125	132	129	837	5.03
C6	20	32	67	88	101	109	110	131	160	180	194	183	1375	8.26
C7	36	62	107	151	174	203	213	261	349	439	475	468	2938	17.64
C8	19	27	53	68	72	78	82	96	112	135	136	135	1013	6.08
C9	3	4	4	3	4	5	5	8	11	15	13	16	91	0.55
D	24	29	54	72	72	69	74	74	80	84	86	83	801	4.81
E	4	10	19	23	29	34	39	42	51	64	66	64	445	2.67
F	13	25	33	48	51	56	57	60	66	74	78	75	636	3.82
G	8	17	44	57	59	72	76	105	140	186	197	193	1154	6.93
H	32	49	72	96	96	102	106	115	124	133	137	124	1186	7.12
J	25	43	80	87	84	102	104	117	115	123	121	116	1117	6.71
K	10	20	29	40	42	49	52	61	70	81	79	74	607	3.65
L	5	8	13	14	11	18	20	22	33	37	41	42	264	1.59
M	7	9	16	22	18	23	22	21	20	21	22	21	222	1.33
Total by year	279	474	840	1075	1132	1287	1351	1557	1860	2222	2324	2250	16,651	
%	1.68	2.85	5.04	6.46	6.80	7.73	8.11	9.35	11.17	13.34	13.96	13.51		100

Note: A = agriculture, forestry, husbandry, and fishery; B = mining; C0 = food and beverage; C1 = textile, garment manufacturing, and products of leather and fur; C2 = wood and furniture; C3 = papermaking and printing; C4 = petroleum, chemical, plastics, and rubber products; C5 = electronics; C6 = metal and non-metal; C7 = machinery, equipment, and instrument manufacturing; C8 = medicine and biological products manufacturing; C9 = other manufacturing; D = production and supply of electricity, steam, and tap water; E = construction; F = transportation and warehousing; G = information technology; H = wholesale and retail; J = real estate; K = social services; L = communication and culture; M = conglomerates.

3.4. Data source

The data sources are reported below (see Appendix A for details). (1) We manually collect data on financial misstatement from the "causes for and effects of significant accounting errors" subsection in the financial statements. Specifically, we exclude restatements due to changes in accounting standards or government tax rules, or other reasons unrelated to accounting misconduct. In addition, we specify the periods of misstatement and the misstated amounts for each firm. Furthermore, we identify whether a firm's financial statements are restated in the future years (*MIS_DUM*) (Gul et al., 2013; Du and Lai, 2015; Guan et al., 2016)). (2) We hand-collect data on audit firms from a firm's annual report. More specifically, by inputting each individual auditor's full name into the enquiry system compiled by the CICPA (http://cmis.cicpa.org.cn), we obtain the signing auditors' education level and other demographic information.[9] (3) Data on *BIG10* are

[9] To ensure the accuracy of the above information, we cross-check the identities of signing auditors against the *CICPA* search website before we collect the auditors' demographic information (Gul et al., 2013; Guan et al., 2016).

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obtained from the official website of the CICPA (http://www.cicpa.org.cn). (4) Other data on the control variables are collected (calculated) based on the China Stock Market and Accounting Research (CSMAR) database.

4. Empirical results

4.1. Descriptive statistics

Table 2 reports the descriptive statistics. The mean value of MIS_DUM is 0.054, which suggests that about 5.4% of Chinese listed firms restated their financial statements during the sample period. EDU has a mean value of 1.897, indicating that the average education level of signing auditors in the Chinese audit market is below the level of bachelor, which suggests that signing auditors in China have a relatively low level of education. The mean value of EXP is 5.992, which indicates that, on average, an individual auditor has had just under six years' experience signing audit reports.

With regard to the auditor-specific variables, approximately 30.2% of signing auditors are women (GENDER), the average age of the signing auditors (AGE) is 40.049, 31.6% of clients are important at the individual auditor level (CI_IA), 2.5% of auditors are industry experts at the individual auditor level (IND_SPEC_IA), 2.7% of clients are important at the audit firm level (CI_AF), 16.5% of auditors are industry experts at the audit firm level (IND_SPEC_AF), and 42.4% of Chinese listed firms are audited by Big 10 auditors (BIG10). Second, regarding the governance mechanisms, the average number of analysts covering a firm (ANALYST) is 2.85 ($e^{1.350}$-1), the percentage of shares held by the controlling shareholder (BLOCK) is 36.5%, the number of directors on corporate boards (BOARD) is 8.86 ($e^{2.182}$), the ratio of independent directors (INDR) is 36.5%, CEO-chairman duality (DUAL) exists in 19.6% of firms, and managerial ownership (MAN_SHR) is 3.5%. Third, with respect to the firm-specific financial features, the average firm size (SIZE) is RMB2.73 billion, the ratio of long-term liabilities to total assets (LEV) is 5.6%, the average return on total assets (ROA) is 3.8%, the ratio of cash flow from operations to the lagged total assets (OCF) is 5.1%, the ratio

Table 2
Descriptive statistics.

Variable	N	Mean	S. D.	Min	Q1	Median	Q3	Max
MIS_DUM	16,651	0.054	0.226	0.000	0.000	0.000	0.000	1.000
EDU	16,651	1.897	0.490	1.000	1.500	2.000	2.000	3.000
EXP	16,651	5.992	3.244	0.000	3.500	6.000	8.000	14.500
GENDER	16,651	0.302	0.346	0.000	0.000	0.000	0.500	1.000
AGE	16,651	40.049	4.994	30.000	36.500	39.500	43.000	55.000
CI_IA	16,651	0.316	0.250	0.065	0.149	0.240	0.349	1.000
IND_SPEC_IA	16,651	0.025	0.156	0.000	0.000	0.000	0.000	1.000
CI_AF	16,651	0.027	0.031	0.002	0.007	0.019	0.036	0.200
IND_SPEC_AF	16,651	0.165	0.371	0.000	0.000	0.000	0.000	1.000
BIG10	16,651	0.424	0.494	0.000	0.000	0.000	1.000	1.000
ANALYST	16,651	1.350	1.164	0.000	0.000	1.099	2.303	3.689
BLOCK	16,651	0.365	0.155	0.086	0.241	0.345	0.480	0.751
BOARD	16,651	2.182	0.202	1.609	2.079	2.197	2.197	2.708
INDR	16,651	0.365	0.051	0.273	0.333	0.333	0.385	0.571
DUAL	16,651	0.196	0.397	0.000	0.000	0.000	0.000	1.000
MAN_SHR	16,651	0.035	0.103	0.000	0.000	0.000	0.001	0.555
SIZE	16,651	21.726	1.246	19.008	20.862	21.585	22.410	25.585
LEV	16,651	0.056	0.090	0.000	0.000	0.008	0.076	0.424
ROA	16,651	0.038	0.064	-0.237	0.012	0.036	0.067	0.225
OCF	16,651	0.051	0.099	-0.276	0.002	0.049	0.102	0.381
OR/TA	16,651	0.026	0.047	0.000	0.004	0.010	0.025	0.314
BTM	16,651	0.561	0.250	0.089	0.363	0.544	0.748	1.125
STATE	16,651	0.525	0.499	0.000	0.000	1.000	1.000	1.000

Note: All of the variables are defined in Appendix A.

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of other accounts receivable to total assets (OR/TA) is 2.6%, and the book-to-market ratio (BTM) is 56.1%. Finally, 52.5% of Chinese listed firms are state-owned enterprises (STATE).

4.2. Pearson correlation analysis

Table 3 reports the results of Pearson correlation analyses. As shown in Table 3, there is a negative and significant correlation between MIS_DUM and EDU, suggesting that the education level of signing auditors is associated with reduced financial misstatement, thus providing preliminary support for Hypothesis 1. In addition, EXP is significantly negatively correlated with MIS_DUM, implying that the increasing professional experience of signing auditors is associated with reduced financial misstatement. Furthermore, MIS_DUM is negatively (positively) and significantly correlated with AGE, IND_SPEC_AF, BIG10, ANALYST, BLOCK, INDR, DUAL, MAN_SHR, SIZE, ROA, and OCF (CI_IA, CI_AF, BOARD, LEV, OR/TA, BTM, and STATE), which suggests that it is appropriate to include these variables in the regression models.

Most of the correlation coefficients of the control variables are relatively low (<0.30). In addition, untabulated results show that all of the variance inflation factors (VIFs) are less than 10. Taken together, the above findings confirm that our results are unlikely to be affected by multicollinearity.

4.3. Multivariate tests of Hypothesis 1

Hypothesis 1 states that the education level of signing auditors is negatively related to the likelihood of financial misstatement. Table 4 reports the results for Hypothesis 1. All of the z-statistics are based on standard errors adjusted for clustering at the firm and year levels (Petersen, 2009).

As shown in Table 4, the coefficient on EDU is negative and significant at the 1% level (−0.143 with $z = -2.60$), thus validating Hypothesis 1. This also suggests that the likelihood of financial misstatement is reduced in line with the increased education level of the signing auditors. Based on the coefficient estimate on EDU, the marginal effect of education level on the likelihood of financial misstatement is about 9.26%. In addition to being statistically significant, this percentage is clearly economically significant.

With respect to the signs and significance of the control variables: (1) the coefficient on EXP is significantly negative, suggesting that the professional experience of signing auditors reduces the level of financial misstatement. (2) The coefficient on AGE is significantly positive, implying that the risk of financial misstatement increases with the average age of the signing auditors. (3) The coefficient on BIG10 is negative and significant at the 1% level, which suggests that the likelihood of financial misstatement is significantly lower for BIG10-audited firms than for non-BIG10-audited firms. (4) ANALYST and BLOCK both have significantly negative coefficients, indicating that greater analyst coverage (an external monitoring mechanism) and higher blockholder ownership (an internal monitoring mechanism) can mitigate the risk of financial misstatement to some extent. (5) SIZE has a positive and significant coefficient, suggesting that larger-scale firms have a higher risk of financial misstatement than smaller ones. (6) The coefficients on ROA and OCF are both significantly negative, implying that better financial performance on the basis of both accruals and cash flow are associated with lower risk of financial misstatement. Finally, (7) OR/TA has a significantly positive coefficient, meaning that the risk of financial misstatement increases with the increase in the ratio of other accounts receivable to total assets.

4.4. Multivariate tests of Hypothesis 2

Table 5 reports the logistic regression results for Hypothesis 2, which states that professional experience attenuates the negative association between education level and financial misstatement.

As shown in Table 5, the coefficient on EDU × EXP is positive and significant at the 5% level (0.060 with $z = 2.40$), thus verifying Hypothesis 2. This also shows that the negative association between education level and financial misstatement is attenuated by professional experience. In addition, EDU has a significantly negative coefficient, thus lending additional support to Hypothesis 1.

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Table 3
Pearson correlation analysis.

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
MIS_DUM	(1)	1.000											
EDU	(2)	−0.021***	1.000										
EXP	(3)	−0.067***	0.033***	1.000									
GENDER	(4)	0.001	−0.026***	−0.027***	1.000								
AGE	(5)	−0.013*	−0.083***	0.364***	−0.020***	1.000							
CI_IA	(6)	0.021***	−0.045***	−0.300***	0.066***	−0.001	1.000						
IND_SPEC_IA	(7)	−0.003	0.029***	−0.042***	0.027***	−0.024***	0.053***	1.000					
CI_AF	(8)	0.092***	−0.010	−0.161***	0.025***	0.036***	0.195***	0.027***	1.000				
IND_SPEC_AF	(9)	−0.040***	0.019**	0.007	0.029***	−0.010	0.034***	0.329***	−0.209***	1.000			
BIG10	(10)	−0.084***	0.017**	0.028***	0.010	−0.036***	0.038***	0.089***	−0.442***	0.398***	1.000		
ANALYST	(11)	−0.103***	0.033***	0.054***	0.002	0.005	0.054***	0.106***	−0.124***	0.090***	0.175***	1.000	
BLOCK	(12)	−0.037***	0.040***	−0.054***	0.024***	−0.062***	0.037***	0.082***	0.006	0.051***	0.047***	0.126***	1.000
BOARD	(13)	0.019**	0.018**	−0.029***	0.000	−0.065***	0.042***	0.081***	0.061***	0.028***	0.006	0.120***	0.018**
INDR	(14)	−0.027***	0.007	0.030***	0.013	0.054***	0.025***	0.033***	−0.066***	0.035***	0.051***	0.049***	0.026***
DUAL	(15)	−0.014*	−0.015*	0.004	−0.016**	−0.008	−0.047***	−0.035***	−0.084***	−0.003	0.042***	0.039***	−0.071***
MAN_SHR	(16)	−0.038***	−0.008	0.003	−0.022***	−0.003	−0.050***	−0.049***	−0.132***	0.003	0.074***	0.145***	−0.066***
SIZE	(17)	−0.045***	0.063***	0.049***	0.024***	0.002	0.139***	0.254***	−0.039***	0.224***	0.205***	0.460***	0.263***
LEV	(18)	0.029***	0.017**	−0.021***	0.002	−0.016**	0.056***	0.081***	0.036***	0.056***	0.013*	0.029***	0.074***
ROA	(19)	−0.125***	0.035***	0.048***	0.027***	−0.017**	−0.013*	0.009	−0.057***	0.021***	0.060***	0.438***	0.114***
OCF	(20)	−0.037***	0.015*	0.008	0.022***	−0.037***	−0.002	0.034***	0.024***	0.027***	0.007	0.200***	0.083***
OR/TA	(21)	0.113***	−0.025***	−0.087***	0.004	−0.030***	−0.016**	0.002	0.142***	−0.052***	−0.133***	−0.260***	−0.110***
BTM	(22)	0.025***	0.036***	−0.023***	0.001	−0.033***	0.042***	0.114***	0.081***	0.086***	0.010	−0.078***	0.123***
STATE	(23)	0.042***	0.048***	−0.067***	0.041***	−0.034***	0.104***	0.066***	0.105***	0.018**	−0.035***	−0.038***	0.230***

Variable		(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
BOARD	(13)	1.000										
INDR	(14)	−0.399***	1.000									
DUAL	(15)	−0.159***	0.091***	1.000								
MAN_SHR	(16)	−0.141***	0.104***	0.402***	1.000							
SIZE	(17)	0.256***	0.047***	−0.142***	−0.159***	1.000						
LEV	(18)	0.134***	0.002	−0.119***	−0.152***	0.359***	1.000					
ROA	(19)	0.027***	−0.005	0.031***	0.129***	0.115***	−0.114***	1.000				
OCF	(20)	0.073***	−0.041***	−0.034***	−0.019**	0.068***	−0.042***	0.340***	1.000			
OR/TA	(21)	−0.037***	−0.021***	−0.016**	−0.098***	−0.203***	−0.030***	−0.275***	−0.119***	1.000		
BTM	(22)	0.170***	−0.046***	−0.138***	−0.172***	0.512***	0.290***	−0.227***	−0.104***	−0.029***	1.000	
STATE	(23)	0.252***	−0.090***	−0.256***	−0.342***	0.291***	0.194***	−0.089***	0.057***	−0.017**	0.244***	1.000

Notes: *: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$; All of the variables are defined in Appendix A.

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Table 4
Influence of signing auditors' education level on the likelihood of financial misstatement.

Variable	Dependent variable: Likelihood of financial misstatement (MIS_DUM)	
	Coefficient	z-value
EDU	−0.143***	−2.60
EXP	−0.040***	−2.85
GENDER	−0.030	−0.29
AGE	0.017**	2.37
CI_IA	0.218	1.28
IND_SPEC_IA	0.007	0.02
CI_AF	2.210	1.22
IND_SPEC_AF	−0.083	−0.50
BIG10	−0.351***	−3.34
ANALYST	−0.200***	−3.43
BLOCK	−1.252***	−4.30
BOARD	−0.083	−0.29
INDR	−0.636	−0.70
DUAL	0.103	0.95
MAN_SHR	0.882	1.38
SIZE	0.228***	3.66
LEV	0.323	0.73
ROA	−4.443***	−5.39
OCF	−0.950**	−2.09
OR/TA	1.403**	1.99
BTM	−0.212	−0.98
STATE	0.141	1.20
INTERCEPT	−5.373***	−4.19
Industry		Yes
Year		Yes
Audit firm		Yes
Observations		16,651
Pseudo R^2		0.115
LR_Chi^2 value		806.414***

Notes: *: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$ (two-tailed). All reported z-statistics are based on standard errors adjusted for clustering at the firm and year levels (Petersen, 2009). All of the variables are defined in Appendix A.

4.5. Robustness checks using the dummy variable for the average education level of the signing auditors

To test whether our findings in Tables 4 and 5 are robust, we construct an additional variable for education level (EDU_M). EDU_M is an indicator variable for the average education level of signing auditors, which equals 1 for master and above and 0 otherwise (Gul et al., 2013). As shown in Column (1) of Table 6, the coefficient on EDU_M is significantly negative (−0.232 with z = −1.75), thus confirming Hypothesis 1. In Column (2), EDU_M×EXP has a positive and significant coefficient (0.109 with z = 1.97), thus lending additional support to Hypothesis 2.

4.6. Robustness checks using the maximum value of signing auditors' education level

In the main tests, we use the mean value of the education level of the signing auditors. To further verify our results, we calculate the maximum value of the education level of signing auditors.[10] The results in Table 7 show that EDU_MAX has a significantly negative coefficient and EDU_MAX× EXP_MAX has a significantly positive coefficient, thus further validating Hypotheses 1 and 2.

[10] To ensure consistency, we also calculate the maximum values of the signing auditors' other characteristics [professional experience (EXP_MAX), gender (GENDER_MAX), and age (AGE_MAX)].

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Table 5
Effects of the signing auditors' education level, professional experience, and other determinants on the likelihood of financial misstatement.

Variable	Dependent variable: Likelihood of financial misstatement (MIS_DUM)	
	Coefficient	z-value
EDU	−0.452***	−3.32
EXP	−0.153***	−3.11
EDU × EXP	0.060**	2.40
GENDER	−0.032	−0.31
AGE	0.016**	2.27
CI_IA	0.212	1.26
IND_SPEC_IA	−0.013	−0.05
CI_AF	2.141	1.14
IND_SPEC_AF	−0.091	−0.54
BIG10	−0.357***	−3.46
ANALYST	−0.200***	−3.45
BLOCK	−1.219***	−4.17
BOARD	−0.079	−0.27
INDR	−0.636	−0.71
DUAL	0.099	0.92
MAN_SHR	0.838	1.33
SIZE	0.235***	3.65
LEV	0.316	0.74
ROA	−4.443***	−5.39
OCF	−0.948**	−2.12
OR/TA	1.408**	2.04
BTM	−0.239	−1.09
STATE	0.139	1.16
INTERCEPT	−4.905***	−4.02
Industry		Yes
Year		Yes
Audit firm		Yes
Observations		16,651
Pseudo R^2		0.115
LR_Chi^2 value		808.493***
Coefficient difference test:		
Coef.(EXP)+ Coef. (EDU × EXP)=0		12.52***

Notes: *: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$ (two-tailed). All reported z-statistics are based on standard errors adjusted for clustering at the firm and year levels (Petersen, 2009). All of the variables are defined in Appendix A.

4.7. Robustness checks after differentiating the roles of review auditors and engagement auditors

Review and engagement auditors perform distinct roles in the audit process, with review auditors providing quality reviews of audits and engagement auditors conducting the actual audits. Thus, as a further robustness check, we differentiate the roles of review auditors and engagement auditors. Following Chen et al. (2016), we treat the first signing partner for each financial report as the review auditor and the second signing partner as the engagement auditor. The results in Table 8 show that the coefficient on EDU_REV is insignificant while the coefficient on EDU_ENG is significantly negative, which suggests that the engagement auditors play the pivotal function in the audit work, which echoes the findings of Wang et al. (2015) and Yuan and Han (2012). The coefficient on EDU_ENG×EXP is also significantly positive, which suggests that education and professional experience have substitutive effects on audit quality.

4.8. Robustness checks using other measures of financial misstatement

Table 9 presents the results using the magnitude of financial misstatement (MIS_MAG) and the likelihood of overstatement (OVER_DUM) as the other dependent variables. MIS_MAG is measured as the amount of financial misstatement in a firm's financial statements in year t scaled by the absolute value of the net profit.

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Table 6
Robustness checks using the dummy variable for the average education level of the signing auditors.

Variable	Dependent variable: Likelihood of financial misstatement (MIS_DUM)			
	(1)		(2)	
	Coefficient	z-value	Coefficient	z-value
EDU_M	−0.232*	−1.75	−0.833***	−2.78
EXP	−0.040***	−2.85	−0.057***	−3.42
EDU_M×EXP			0.109**	1.97
GENDER	−0.029	−0.28	−0.029	−0.28
AGE	0.019***	2.61	0.018**	2.48
CI_IA	0.229	1.34	0.225	1.33
IND_SPEC_IA	0.008	0.03	−0.019	−0.08
CI_AF	2.211	1.23	2.166	1.17
IND_SPEC_AF	−0.082	−0.49	−0.094	−0.55
BIG10	−0.347***	−3.31	−0.351***	−3.40
ANALYST	−0.200***	−3.44	−0.200***	−3.44
BLOCK	−1.248***	−4.31	−1.218***	−4.19
BOARD	−0.081	−0.28	−0.075	−0.26
INDR	−0.642	−0.71	−0.625	−0.69
DUAL	0.104	0.96	0.098	0.90
MAN_SHR	0.877	1.38	0.832	1.32
SIZE	0.225***	3.58	0.232***	3.57
LEV	0.335	0.76	0.346	0.81
ROA	−4.438***	−5.41	−4.426***	−5.41
OCF	−0.960**	−2.11	−0.967**	−2.15
OR/TA	1.390**	1.98	1.376**	2.01
BTM	−0.208	−0.97	−0.241	−1.10
STATE	0.138	1.18	0.137	1.15
INTERCEPT	−5.614***	−4.43	−5.655***	−4.50
Industry		Yes		Yes
Year		Yes		Yes
Audit firm		Yes		Yes
Observations		16,651		16,651
Pseudo R^2		0.115		0.115
LR_Chi^2 value		805.504***		807.376***

Notes: *: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$ (two-tailed). All reported z-statistics are based on standard errors adjusted for clustering at the firm and year levels (Petersen, 2009). All of the variables are defined in Appendix A.

OVER_DUM is an indicator variable that equals 1 if a firm's financial statements are restated downward in future years and 0 otherwise. The results in Columns (1) and (3) of Table 9 show a significantly negative relation between MIS_MAG (OVER_DUM) and EDU; thus, Hypothesis 1 is supported. In addition, in Columns (2) and (4), the coefficients on EDU × EXP are both positive and significant, thus providing additional support for Hypothesis 2.

5. Endogeneity and additional tests

5.1. Endogeneity tests using the two-stage OLS-logistic regression approach

Our findings in Tables 4 and 5 may be contingent on whether firms with less risk are more likely to appoint signing auditors who have a higher level of education. To address this potential endogenous selection problem, we conduct a two-stage OLS-logistic regression. In the first stage, we identify three instrumental variables: LNGDP, TRANS, and UNV. LNGDP is the natural logarithm of GDP *per capita* in the province in which a firm is located. TRANS is the transport status of the province in which a firm is located, measured as the natural logarithm of the total mileage of highway at the province level (in kilometers). UNV denotes the educational atmosphere, measured as the number of finance and economic universities within a radius of 100 km around a firm's registered address.

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Table 7
Robustness checks using the maximum value of signing auditors' education level.

Variable	Dependent variable: Likelihood of financial misstatement (MIS_DUM)			
	(1)		(2)	
	Coefficient	z-value	Coefficient	z-value
EDU_MAX	−0.098**	−2.16	−0.411***	−3.90
EXP_MAX	−0.032***	−3.33	−0.120***	−4.30
EDU_MAX×EXP_MAX			0.041***	2.94
GENDER_MAX	0.007	0.07	0.006	0.06
AGE_MAX	0.012**	2.13	0.011**	2.01
CI_IA	0.203	1.31	0.189	1.19
IND_SPEC_IA	0.013	0.05	0.017	0.07
CI_AF	1.949	1.19	1.959	1.16
IND_SPEC_AF	−0.073	−0.44	−0.077	−0.46
BIG10	−0.305***	−4.21	−0.303***	−4.19
ANALYST	−0.197***	−3.35	−0.199***	−3.41
BLOCK	−1.270***	−4.18	−1.279***	−4.21
BOARD	−0.085	−0.29	−0.090	−0.30
INDR	−0.722	−0.79	−0.699	−0.77
DUAL	0.087	0.81	0.084	0.79
MAN_SHR	0.789	1.23	0.809	1.28
SIZE	0.224***	3.43	0.226***	3.47
LEV	0.380	0.89	0.367	0.86
ROA	−4.491***	−5.37	−4.494***	−5.36
OCF	−0.987**	−2.19	−0.972**	−2.15
OR/TA	1.398**	2.00	1.337*	1.92
BTM	−0.194	−0.87	−0.209	−0.92
STATE	0.134	1.12	0.137	1.13
INTERCEPT	−5.219***	−3.91	−4.544***	−3.53
Industry		Yes		Yes
Year		Yes		Yes
Audit firm		Yes		Yes
Observations		16,651		16,651
Pseudo R^2		0.112		0.114
LR_Chi^2 value		789.317***		798.486***

Notes: *: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$ (two-tailed). All reported z-statistics are based on standard errors adjusted for clustering at the firm and year levels (Petersen, 2009). All of the variables are defined in Appendix A.

Following Sargan (1958), Basmann (1960), and Wooldridge (1995), we perform three over-identification tests to analyze whether the chosen instrumental variables are suited to the data. In Panel A of Table 10, all of the χ^2—values are insignificant, suggesting that three instruments are not correlated with the error items and thus are suitable for use as instrumental variables in this study.

Panel A of Table 10 reports the results of the first-stage OLS regression. The coefficients on LNGDP and TRANS are significantly positive, consistent with our theoretical expectations. Panel B of Table 10 reports the results of the second-stage logistic regression. In Column (1) of Panel B, the coefficient on EDU* (the fitted value of EDU) is significantly negative (−5.932 with z = −4.53), thus confirming Hypothesis 1. Moreover, in Column (2) of Panel B, EDU* × EXP has a positive and significant coefficient (0.203 with z = 2.61), thus further validating Hypothesis 2.

In summary, the results in Table 10 are qualitatively similar to those in Tables 4 and 5, which suggests that our main findings are unlikely to be affected by endogeneity.

5.2. Additional tests considering school quality, client importance, and type of ownership

Hitt et al. (2001) argue that individuals who graduate from the best universities are likely to have more and better knowledge and greater intellectual potential. Research has also shown that client importance and the type of ownership can affect audit quality (Guan et al., 2016; Gul et al., 2013). To address these issues, we

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Table 8
Robustness checks differentiating review auditors from engagement auditors.

Variable	Dependent variable: Likelihood of financial misstatement (MIS_DUM)			
	(1)		(2)	
	Coefficient	z-value	Coefficient	z-value
EDU_REV	0.009	0.12	0.060	0.69
EDU_ENG	−0.191**	−2.57	−0.155**	−2.14
EXP	−0.040***	−2.71	−0.097***	−2.65
EDU_ REV × EXP			0.033**	2.11
EDU_ ENG × EXP			0.035*	1.72
GENDER	−0.099	−0.59	−0.128	−0.77
AGE	0.020**	2.16	0.021**	2.40
CI_IA	0.207	1.43	0.233	1.57
IND_SPEC_IA	−0.264	−0.82	−0.270	−0.85
CI_AF	0.544	0.31	0.339	0.18
IND_SPEC_AF	0.082	0.50	0.081	0.50
BIG10	−0.403***	−4.39	−0.627***	−6.14
ANALYST	−0.215***	−3.52	−0.226***	−3.81
BLOCK	−1.265***	−3.98	−1.306***	−4.15
BOARD	−0.034	−0.11	−0.094	−0.31
INDR	−0.402	−0.41	−0.361	−0.36
DUAL	0.192*	1.77	0.205*	1.86
MAN_SHR	0.768	1.21	0.816	1.34
SIZE	0.195***	2.95	0.252***	3.69
LEV	0.657	1.37	0.393	0.81
ROA	−4.098***	−4.10	−4.073***	−4.15
OCF	−0.924	−1.43	−0.932	−1.49
OR/TA	0.887	1.24	0.686	0.92
BTM	−0.252	−1.02	−0.412	−1.63
STATE	0.180	1.37	0.185	1.48
INTERCEPT	−4.790***	−3.27	−5.530***	−3.83
Industry		Yes		Yes
Year		Yes		Yes
Audit firm		Yes		Yes
Observations		14,630		14,630
Pseudo R^2		0.117		0.127
LR_Chi^2 value		705.030***		767.580***

Notes: *: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$ (two-tailed). All reported z-statistics are based on standard errors adjusted for clustering at the firm and year levels (Petersen, 2009). All of the variables are defined in Appendix A.

conduct subsample tests to determine whether the effect of education level on financial misstatement depends on the school quality, client importance, and type of ownership.

First, in China, 985 Project schools are often recognized as the top universities (Zhang et al., 2013). Thus, we divide the full sample into 985 schools and non-985 schools based on whether a signing auditor graduated from a 985 Project school. The findings in Panel A of Table 11 suggest that Hypotheses 1 and 2 hold for the 985 schools subsample (see Columns (1) and (3) of Panel A), but not for the non-985 schools subsample (see Columns (2) and (4) of Panel A).

Second, we partition the full sample into high CI_IA and low CI_IA subsamples to consider the effects of client importance at the individual auditor level. As Panel B of Table 11 shows, Hypotheses 1 and 2 hold for the low CI_IA subsample (see Columns (1) and (3) of Panel B), but not for the high CI_IA subsample (see Columns (2) and (4) of Panel B).

Third, to consider client importance at the audit firm level, we divide the full sample into high CI_AF and low CI_AF subsamples. Similar to the findings in Panel B of Table 11, the results in Panel C, taken together, suggest that Hypotheses 1 and 2 are valid only for the low CI_AF subsample but not for the high CI_AF subsample.

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Table 9
Robustness checks using other measures of financial misstatement.

Variable	Dependent variable: Magnitude of financial misstatement (MIS_MAG)				Dependent variable: Likelihood of overstatement (OVER_DUM)			
	(1)		(2)		(3)		(4)	
	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value
EDU	−0.017***	−3.15	−0.072***	−7.38	−0.135*	−1.71	−0.378**	−2.34
EXP	−0.007***	−7.01	−0.026***	−14.43	−0.046***	−2.90	−0.143**	−2.39
EDU × EXP			0.010***	8.16			0.052*	1.76
GENDER	0.001	0.07	0.000	0.04	−0.043	−0.35	−0.047	−0.38
AGE	0.003***	4.36	0.003***	4.21	0.014	1.25	0.013	1.16
CI_IA	0.024**	2.05	0.023*	1.93	0.156	0.79	0.165	0.83
IND_SPEC_IA	−0.010	−0.35	−0.011	−0.38	−0.020	−0.05	−0.089	−0.25
CI_AF	0.403	1.44	0.403	1.44	3.868*	1.71	3.544	1.52
IND_SPEC_AF	−0.009	−0.65	−0.009	−0.67	−0.020	−0.09	−0.033	−0.15
BIG10	−0.065***	−6.51	−0.065***	−6.55	−0.224	−1.52	−0.279*	−1.94
ANALYST	−0.034***	−5.85	−0.034***	−5.88	−0.153**	−2.09	−0.149**	−2.06
BLOCK	−0.190***	−6.78	−0.190***	−6.81	−1.388***	−3.67	−1.301***	−3.30
BOARD	−0.020	−0.70	−0.021	−0.72	−0.000	−0.00	0.001	0.00
INDR	−0.070	−0.45	−0.071	−0.46	−0.500	−0.61	−0.528	−0.63
DUAL	0.020*	1.78	0.019*	1.72	0.139	1.04	0.132	0.99
MAN_SHR	0.089	0.90	0.091	0.93	1.579**	2.24	1.505**	2.16
SIZE	0.028***	3.96	0.028***	3.99	0.188**	2.35	0.201**	2.35
LEV	0.050	0.92	0.046	0.86	0.007	0.02	−0.003	−0.01
ROA	−0.758***	−5.09	−0.757***	−5.10	−4.421***	−4.83	−4.389***	−4.72
OCF	−0.143*	−1.94	−0.141*	−1.92	−1.581***	−2.92	−1.574***	−2.95
OR/TA	0.346***	2.69	0.342***	2.70	2.033**	2.54	2.064***	2.61
BTM	−0.017	−0.71	−0.017	−0.75	0.219	0.64	0.156	0.46
STATE	0.023**	2.19	0.023**	2.21	0.162	1.24	0.162	1.24
INTERCEPT	−0.805***	−5.55	−0.693***	−4.98	−5.212***	−3.04	−4.901***	−2.74
Industry		Yes		Yes		Yes		Yes
Year		Yes		Yes		Yes		Yes
Audit firm		Yes		Yes		Yes		Yes
Observations		16,651		16,651		16,651		16,651
Pseudo R^2		0.139		0.141		0.118		0.118
LR_Chi^2 value		774.153***		780.725***		625.398***		621.530***

Notes: *: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$ (two-tailed). All reported z-statistics are based on standard errors adjusted for clustering at the firm and year levels (Petersen, 2009). All of the variables are defined in Appendix A.

Table 10
Endogeneity tests using two-stage OLS-logistic regressions.

Variable	Dependent variable: Signing auditors' education level	
	Coefficient	z-value
Panel A: Results of the first-stage OLS regression		
LNGDP	0.074***	3.78
TRANS	0.041***	3.42
UNV	0.002	0.46
GENDER	−0.026	−0.94
AGE	−0.004***	−3.41
CI_IA	−0.102***	−3.78
IND_SPEC_IA	0.033	0.82
CI_AF	0.826**	2.36
IND_SPEC_AF	0.025	1.57
BIG10	−0.011	−0.55
ANALYST	−0.004	−0.72
BLOCK	−0.042	−0.94
BOARD	−0.031	−0.92
INDR	0.113	0.87
DUAL	−0.022	−1.53
MAN_SHR	0.063	1.24
SIZE	0.006	0.67
LEV	0.057	0.71
ROA	0.158*	1.89
OCF	−0.008	−0.20
OR/TA	−0.062	−0.58
BTM	0.029	0.89
STATE	0.054***	3.05
INTERCEPT	0.864***	3.14
Industry/Year		Yes
Audit firm		Yes
Observations		16,579
Adj R^2		0.109
F value		27.668***
Over identification test:		
Sargan(Chi2)		1.032(p = 0.60)
Basmann(Chi2)		1.026(p = 0.60)
Wooldridge (Chi2)		1.036(p = 0.60)

Variable	Dependent variable: MIS_DUM			
	Hypothesis 1 (1)		Hypothesis 2 (2)	
	Coefficient	z-value	Coefficient	z-value
Panel B: Results of the second stage logistic regression				
EDU*	−5.932***	−4.53	−7.037***	−4.47
EXP	−0.041***	−2.87	−0.423***	−2.83
EDU*×EXP			0.203***	2.61
GENDER	−0.147	−1.43	−0.149	−1.44
AGE	−0.008	−0.82	−0.009	−0.96
CI_IA	−0.384	−1.47	−0.412	−1.55
IND_SPEC_IA	0.208	0.69	0.214	0.71
CI_AF	7.085***	3.21	7.691***	3.35
IND_SPEC_AF	0.058	0.32	0.067	0.36
BIG10	−0.400***	−3.72	−0.407***	−3.82
ANALYST	−0.225***	−3.84	−0.226***	−3.85
BLOCK	−1.461***	−5.24	−1.491***	−5.37
BOARD	−0.265	−0.89	−0.273	−0.92
INDR	0.156	0.16	0.195	0.20

(*continued on next page*)

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Table 10 (*continued*)

Variable	Dependent variable: MIS_DUM			
	Hypothesis 1 (1)		Hypothesis 2 (2)	
	Coefficient	z-value	Coefficient	z-value
DUAL	−0.017	−0.15	−0.022	−0.19
MAN_SHR	1.452**	2.42	1.454**	2.43
SIZE	0.294***	4.39	0.296***	4.43
LEV	0.444	1.01	0.466	1.06
ROA	−3.551***	−4.41	−3.511***	−4.35
OCF	−1.062**	−2.33	−1.094**	−2.37
OR/TA	0.972	1.40	0.884	1.30
BTM	−0.134	−0.59	−0.150	−0.66
STATE	0.419***	3.18	0.418***	3.19
INTERCEPT	4.612*	1.94	6.689**	2.41
Industry/Year/Audit firm		Yes		Yes
Observations		16,579		16,579
Pseudo R^2		0.120		0.121
LR_Chi^2 value		839.149***		845.586***

Notes: *: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$ (two-tailed). All reported t/z-statistics are based on standard errors adjusted for clustering at the firm and year levels (Petersen, 2009). All of the variables are defined in Appendix A.

Finally, the results in Columns (1) and (3) of Panel D show that Hypotheses 1 and 2 are supported for state-owned enterprises. However, the results in Columns (2) and (4) of Panel C do not support Hypotheses 1 and 2 for non-state-owned enterprises.

Overall, the results in Table 11 reveal that the effect of education on financial misstatement depends on the quality of the school, different levels of client importance, and the type of ownership.

6. Conclusion

Our findings on the Chinese audit market show that the education level of signing auditors is associated with reduced financial misstatement. Furthermore, professional experience attenuates above negative relation. Finally, the effects of education and professional experience on financial misstatement depend on the school quality, client importance, and type of ownership, such that our findings only hold for 985 Project schools, low client importance (at both the individual and audit firm levels), and state-owned enterprises.

In addition to the theoretical contributions documented in the Introduction, our study has several managerial implications. First, our finding that education has a negative (positive) effect on financial misstatement (audit quality) suggests that steps should be taken to systematically increase the education level of signing auditors to reduce the risk of financial misstatement and enhance audit quality. In most cases, in the Chinese audit market, applicants must pass all of the required examinations to qualify as a signing auditor. In this regard, the CICPA as the regulatory body should encourage highly educated people (e.g., those with bachelor, master, and higher degrees) to take the qualification exams. Second, considering the negative (positive) association between the professional experience of signing auditors and financial misstatement (audit quality), the China Securities Regulatory Commission (CSRC) and CICPA should introduce statutory requirements on the professional experience of signing auditors and set a minimum threshold for the number of years before an auditor can sign the financial statements of Chinese listed firms. Third, the financial statements of Chinese listed firms must be signed by two or more auditors. Therefore, given our findings on the substitutive effects of education and experience in mitigating the risk of financial misstatement, we suggest that to better improve audit quality, audit firms should consider the combination of experience and education when assigning two or more signing auditors. Finally, given that the association between education and financial misstatement depends on the importance of the client and type of ownership, the CSRC and CICPA should keep a careful eye on the inverse effects of client importance (at both the individual auditor and audit firm levels) and state ownership on auditor independence and audit quality.

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Table 11
Subsample tests considering school quality, client importance, and the nature of the ultimate owner.

Variable	Dependent variable: MIS_DUM							
	Hypothesis 1				Hypothesis 2			
	(1) 985 Project school subsample		(2) Non-985 school subsample		(3) 985 Project school subsample		(4) Non-985 school subsample	
	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value
Panel A: Subsample tests considering signing auditors' school quality								
EDU	−0.344**	−2.55	−0.058	−1.05	−0.890***	−2.64	−0.267	−1.53
EXP	−0.042	−1.13	−0.038**	−2.33	−0.257***	−3.31	−0.112**	−2.03
EDU × EXP					0.107**	2.02	0.039	1.27
GENDER	−0.222	−0.81	0.010	0.08	−0.266	−1.00	0.014	0.12
AGE	0.043**	2.30	0.009	1.55	0.043**	2.27	0.010	1.63
CI_IA	0.292	0.92	0.165	1.20	0.287	0.89	0.162	1.20
IND_SPEC_IA	−0.153	−0.26	−0.010	−0.04	−0.131	−0.23	0.102	0.36
CI_AF	−0.632	−0.19	1.697	1.04	−0.586	−0.18	1.761	1.02
IND_SPEC_AF	−0.246	−0.85	−0.005	−0.03	−0.236	−0.82	0.014	0.08
BIG10	−0.029	−0.13	−0.398***	−3.57	−0.036	−0.16	−0.393***	−3.41
ANALYST	−0.372***	−3.49	−0.153**	−2.26	−0.365***	−3.44	−0.152**	−2.22
BLOCK	−1.894***	−2.67	−1.053***	−3.20	−1.916***	−2.65	−1.106***	−3.33
BOARD	−0.655***	−2.61	0.087	0.23	−0.659***	−2.66	0.076	0.21
INDR	0.169	0.13	−1.110	−0.98	0.231	0.17	−1.152	−1.02
DUAL	0.014	0.06	0.102	0.93	0.004	0.02	0.103	0.92
MAN_SHR	2.102***	2.68	0.227	0.29	2.127***	2.77	0.291	0.36
SIZE	0.267**	2.19	0.227***	2.76	0.262**	2.16	0.212***	2.59
LEV	0.153	0.17	0.504	1.21	0.093	0.10	0.559	1.37
ROA	−2.232**	−2.11	−5.366***	−5.13	−2.199**	−2.02	−5.385***	−5.21
OCF	−2.024**	−2.39	−0.550	−0.96	−1.944**	−2.27	−0.532	−0.91
OR/TA	1.241	0.87	1.534	1.59	1.248	0.88	1.463	1.50
BTM	−0.561	−1.09	−0.120	−0.58	−0.527	−1.01	−0.082	−0.40
STATE	0.193	1.04	0.142	1.01	0.194	1.03	0.146	1.06
INTERCEPT	−20.632***	−8.36	−5.884***	−3.16	−18.053***	−7.00	−5.187***	−2.87
Industry		Yes		Yes		Yes		Yes
Year		Yes		Yes		Yes		Yes
Audit firm		Yes		Yes		Yes		Yes
Observations		4960		11,691		4960		11,691
Pseudo R^2		0.151		0.117		0.153		0.119
LR_Chi^2 value		305.880***		584.251***		310.677***		594.239***
Chow tests				99.85**				99.60**

Variable	Dependent variable: MIS_DUM							
	Hypothesis 1				Hypothesis 2			
	(1) Low CI_IA subsample		(2) High CI_IA subsample		(3) Low CI_IA subsample		(4) High CI_IA subsample	
	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value
Panel B: Subsample tests considering client importance at the individual auditor level								
EDU	−0.191*	−1.89	−0.012	−0.13	−0.780***	−3.58	−0.144	−0.97
EXP	−0.037**	−2.10	−0.010	−0.55	−0.232***	−3.49	−0.070	−1.16
EDU×EXP					0.100***	2.99	0.032	1.07
GENDER	0.039	0.25	−0.071	−0.37	0.036	0.24	−0.075	−0.39
AGE	0.012	1.37	0.019	1.43	0.010	1.10	0.019	1.45
CI_IA	2.501***	2.81	−0.029	−0.17	2.397***	2.70	−0.036	−0.21
IND_SPEC_IA	−0.066	−0.22	0.205	0.49	−0.075	−0.25	0.213	0.51
CI_AF	−2.665	−1.35	2.650	1.25	−2.661	−1.11	2.633	1.24
IND_SPEC_AF	−0.077	−0.40	−0.241	−1.19	−0.068	−0.35	−0.242	−1.19
BIG10	−0.533***	−3.18	−0.380**	−2.39	−0.526***	−3.05	−0.382**	−2.40

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Table 11 (*continued*)

Variable	Dependent variable: MIS_DUM							
	Hypothesis 1				Hypothesis 2			
	(1) Low CI_IA subsample		(2) High CI_IA subsample		(3) Low CI_IA subsample		(4) High CI_IA subsample	
	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value
ANALYST	−0.247***	−3.33	−0.144**	−2.22	−0.247***	−3.34	−0.143**	−2.20
BLOCK	−0.980**	−2.52	−1.783***	−4.47	−0.948**	−2.46	−1.782***	−4.43
BOARD	0.118	0.32	−0.429	−1.09	0.129	0.34	−0.428	−1.08
INDR	−0.240	−0.19	−0.883	−0.57	−0.182	−0.14	−0.887	−0.57
DUAL	0.238*	1.73	−0.156	−0.65	0.217	1.59	−0.157	−0.64
MAN_SHR	0.205	0.28	2.021**	2.37	0.242	0.33	2.019**	2.37
SIZE	0.374***	5.09	0.047	0.53	0.378***	5.13	0.045	0.50
LEV	0.305	0.51	0.319	0.59	0.285	0.47	0.311	0.57
ROA	−5.320***	−6.59	−3.493***	−2.98	−5.353***	−6.57	−3.501***	−2.99
OCF	−1.647***	−2.80	−0.019	−0.02	−1.622***	−2.83	−0.019	−0.02
OR/TA	0.325	0.41	3.447***	2.73	0.200	0.26	3.443***	2.73
BTM	−0.667***	−3.20	0.377	0.76	−0.694***	−3.20	0.378	0.75
STATE	0.111	0.77	0.189	1.51	0.118	0.80	0.189	1.50
INTERCEPT	−8.176***	−4.52	−2.755**	−2.08	−7.183***	−4.31	−2.460*	−1.72
Industry		Yes		Yes		Yes		Yes
Year		Yes		Yes		Yes		Yes
Audit firm		Yes		Yes		Yes		Yes
Observations		10,897		5754		10,897		5754
Pseudo R^2		0.122		0.144		0.124		0.144
LR_Chi^2 value		526.185***		388.026***		535.811***		388.670***
Chow tests				106.51***				112.59***

Variable	Dependent variable: MIS_DUM							
	Hypothesis 1				Hypothesis 2			
	(1) Low CI_AF subsample		(2) High CI_AF subsample		(3) Low CI_AF subsample		(4) High CI_AF subsample	
	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value
Panel C: Subsample tests considering client importance at the audit firm level								
EDU	−0.175*	−1.95	−0.115	−0.92	−0.672***	−3.88	−0.011	−0.05
EXP	−0.058***	−3.86	0.004	0.21	−0.251***	−3.95	0.042	0.53
EDU×EXP					0.100***	3.15	−0.020	−0.55
GENDER	−0.111	−0.77	0.233*	1.68	−0.102	−0.73	0.237*	1.71
AGE	0.038***	4.43	−0.018*	−1.68	0.037***	4.25	−0.017*	−1.66
CI_IA	0.146	0.88	0.245	1.02	0.130	0.78	0.248	1.03
IND_SPEC_IA	−0.049	−0.14	0.045	0.08	−0.021	−0.06	0.048	0.09
CI_AF	19.720***	2.65	3.598	1.19	20.277***	2.59	3.589	1.19
IND_SPEC_AF	−0.045	−0.26	−0.498*	−1.67	−0.066	−0.39	−0.497*	−1.67
BIG10	−0.368***	−2.90	−0.006	−0.01	−0.341***	−2.71	0.003	0.01
ANALYST	−0.235***	−2.62	−0.181**	−2.48	−0.232***	−2.59	−0.181**	−2.48
BLOCK	−1.100***	−3.31	−1.611***	−3.15	−1.125***	−3.37	−1.613***	−3.17
BOARD	0.161	0.45	−0.811*	−1.77	0.188	0.54	−0.808*	−1.76
INDR	−0.403	−0.38	−1.291	−0.81	−0.345	−0.32	−1.301	−0.81
DUAL	0.231	1.54	−0.210	−1.25	0.237	1.59	−0.207	−1.22
MAN_SHR	0.954	1.21	0.723	0.63	1.025	1.33	0.711	0.62
SIZE	0.241***	3.20	0.143*	1.71	0.235***	3.14	0.141*	1.68
LEV	0.685	1.10	−0.354	−0.58	0.472	0.73	−0.365	−0.60
ROA	−5.526***	−5.80	−2.308**	−2.08	−5.516***	−5.78	−2.314**	−2.07
OCF	−0.783	−1.52	−1.244*	−1.84	−0.815	−1.55	−1.248*	−1.85
OR/TA	0.590	0.76	2.711**	2.47	0.553	0.72	2.721**	2.48

(*continued on next page*)

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Table 11 (*continued*)

Variable	Dependent variable: MIS_DUM							
	Hypothesis 1				Hypothesis 2			
	(1) Low CI_AF subsample		(2) High CI_AF subsample		(3) Low CI_AF subsample		(4) High CI_AF subsample	
	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value
BTM	−0.132	−0.47	−0.233	−0.62	−0.141	−0.49	−0.225	−0.61
STATE	0.039	0.25	0.317	1.41	0.047	0.31	0.316	1.41
INTERCEPT	−7.517***	−4.78	−2.036	−1.55	−6.175***	−3.57	−2.232	−1.63
Industry		Yes		Yes		Yes		Yes
Year		Yes		Yes		Yes		Yes
Audit firm		Yes		Yes		Yes		Yes
Observations		11,192		5459		11,192		5459
Pseudo R^2		0.130		0.126		0.134		0.126
LR_Chi^2 value		598.974***		302.898***		616.607***		303.154***
Chow tests				123.90***				131.47***

Variable	Dependent variable: MIS_DUM							
	Hypothesis 1				Hypothesis 2			
	(1) State-owned enterprises		(2) Non-state-owned enterprises		(3) State-owned enterprises		(4) Non-state-owned enterprises	
	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value
Panel D: Subsample tests considering the nature of the ultimate owner								
EDU	−0.126*	−1.78	−0.150	−1.44	−0.396***	−2.64	−0.061	−0.57
EXP	−0.037**	−2.09	−0.032	−1.21	−0.139**	−2.55	−0.127	−1.37
EDU×EXP					0.053*	1.93	0.057	1.30
GENDER	0.052	0.38	−0.101	−0.72	0.045	0.32	−0.071	−0.49
AGE	0.018**	2.17	0.007	0.48	0.018**	2.13	0.007	0.43
CI_IA	0.033	0.17	0.504**	2.04	0.023	0.12	0.507**	2.17
IND_SPEC_IA	−0.258	−0.66	0.288	0.70	−0.271	−0.69	0.521	1.10
CI_AF	4.232*	1.71	−4.087	−1.44	4.142*	1.68	0.859	0.28
IND_SPEC_AF	0.018	0.09	−0.246	−1.09	0.013	0.07	−0.343*	−1.69
BIG10	−0.270*	−1.79	−0.463**	−2.11	−0.272*	−1.81	−0.560***	−2.82
ANALYST	−0.141*	−1.72	−0.271***	−3.24	−0.139*	−1.69	−0.265***	−3.20
BLOCK	−1.032***	−2.73	−1.687***	−2.66	−1.032***	−2.73	−1.768***	−2.74
BOARD	0.127	0.40	−0.484	−1.32	0.117	0.37	−0.531	−1.47
INDR	−0.693	−0.49	−1.530	−0.99	−0.682	−0.48	−1.418	−0.90
DUAL	0.018	0.12	0.125	0.76	0.014	0.09	0.101	0.60
MAN_SHR	−0.414	−0.08	1.140	1.52	−0.248	−0.05	1.198	1.59
SIZE	0.150**	2.44	0.332***	2.82	0.152**	2.47	0.382***	3.11
LEV	0.470	0.76	−0.613	−0.80	0.441	0.71	−0.598	−0.80
ROA	−4.834***	−4.46	−3.992***	−4.32	−4.858***	−4.47	−3.984***	−4.05
OCF	−0.745*	−1.86	−1.363*	−1.83	−0.738*	−1.81	−1.309*	−1.72
OR/TA	1.415**	2.20	1.024	1.00	1.426**	2.18	0.911	0.90
BTM	0.227	0.69	−0.950**	−1.97	0.228	0.70	−1.079**	−2.24
INTERCEPT	−4.725***	−3.26	−5.255**	−2.26	−4.193***	−3.01	−20.445***	−7.93
Industry		Yes		Yes		Yes		Yes
Year		Yes		Yes		Yes		Yes
Audit firm		Yes		Yes		Yes		Yes
Observations		8734		7917		8734		7917
Pseudo R^2		0.106		0.146		0.107		0.160
LR_Chi^2 value		436.669***		417.989***		439.723***		459.655***
Chow tests				413.86***				441.89***

Note: ***, **, and * represent the 1%, 5%, and 10% levels of significance, respectively (two-tailed). All reported z-statistics are based on standard errors adjusted for clustering at the firm level and year level (Petersen, 2009). All of the variables are defined in Appendix A.

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This study has two limitations that can be further addressed by future research. First, our empirical analyses focus on the education level of the signing auditors. However, as human capital theory (Becker, 1962; Mincer, 1962; Schultz, 1960) suggests, medical care, vitamin intake, and an intimate knowledge of the economic system are also components of human capital. Accordingly, it is worth examining whether the other three dimensions of human capital, especially an intimate knowledge of the economic system, can reduce the risk of financial misstatement and enhance audit quality. Second, this study is conducted based on the Chinese context. Thus, future research should investigate whether our findings are applicable to other contexts. Until such research has been completed, caution should be taken when generalizing our findings to other economies.

Appendix A. Variable definitions

Variable		Definition	Data Source
Variables for main tests			
MIS_DUM	=	A dummy variable that equals 1 if a firm's financial statements are restated in the future years and 0 otherwise.	Hand-collected
EDU	=	The average education level of signing auditors (engagement and review auditors). An auditor's education level is measured as 4, 3, 2, and 1 for PhD, master, bachelor, and others, respectively).	Hand-collected
EXP	=	The average auditor experience of signing auditors. An auditor's experience is measured as the time lag between the current signing period and the first signing period (Wu, 2009).	Hand-collected
GENDER	=	The gender of signing auditors, measured using a dummy variable that equals 1 if an auditor is a woman and 0 otherwise (Gul et al., 2013).	Hand-collected
AGE	=	The average age of signing auditors.	Hand-collected
CI_IA	=	Client importance at an individual auditor level, measured as "$LN(TA_j^{AF})/\sum_{k=1}^{m}\sum_{t=1}^{n}LN(TA_t^{AF})$" (*LN* denotes the natural log; *TA* denotes a client's total assets; *IA* denotes an individual auditor; *n* denotes the number of an auditor's clients; *m* denotes the number of auditors signing the report; *j* denotes a client) (Gul et al., 2013).	Calculated based on CSMAR
IND_SPEC_IA	=	An indicator for auditor industry specialization at the individual auditor level, equaling 1 if the total assets of all of a signing auditor's clients in the industry rank the first or a signing auditor's market share is greater than 10% and 0 otherwise (Chen et al., 2010).	Calculated based on CSMAR
CI_AF	=	Client importance at the audit firm level, measured as "$LN(TA_j^{AF})/\sum_{t=1}^{n}LN(TA_t^{AF})$" (*LN* denotes the natural log; *TA* denotes a client's total assets; *AF* denotes audit firm; *n* denotes the number of an audit firm's clients; *j* denotes a client) (Gul et al., 2013).	Calculated based on CSMAR
IND_SPEC_AF	=	An indicator for auditor industry specialization at the audit firm level, equaling 1 if the total assets of all of an audit firm's clients in the industry rank the first or an audit firm's market share is greater than 10% and 0 otherwise (Chen et al., 2010).	Calculated based on CSMAR
BIG10	=	A dummy variable that equals 1 if an audit firm is a Big 10 accounting firm (including affiliated firms) and 0 otherwise (Chen et al., 2016).	www.cicpa.org.cn

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ANALYST	=	The natural log of (1 + the number of analysts following).	Calculated based on CSMAR
BLOCK	=	The percentage of shares held by the controlling shareholder.	CSMAR
BOARD	=	Board size, measured as the natural log of the number of directors on the board (Lobo and Zhao, 2013).	CSMAR
INDR	=	The percentage of independent directors (Lobo and Zhao, 2013).	CSMAR
DUAL	=	A dummy variable that equals 1 if one person serves as both the chairman and the CEO and 0 otherwise (Lobo and Zhao, 2013).	CSMAR
MAN_SHR	=	The percentage of shares held by the top managers.	CSMAR
SIZE	=	Firm size, measured as the natural log of total assets at the end of the year (Lobo and Zhao, 2013).	CSMAR
LEV	=	Financial leverage, measured as the ratio of long-term liabilities to total assets (Lobo and Zhao, 2013).	CSMAR
ROA	=	Returns on total assets, measured as net profit scaled by total assets at the end of the year.	CSMAR
OCF	=	The ratio of cash flow from operations to the lagged total assets.	CSMAR
OR/TA	=	The ratio of other accounts receivable to total assets (Chen et al., 2016).	CSMAR
BTM	=	The book-to-market ratio (Francis et al., 2013).	CSMAR
STATE	=	An indicator of the nature of the ultimate owner that equals 1 if a firm's ultimate owner is a (central or local) government agency or government controlled state-owned enterprise and 0 otherwise (Du, 2015; Guan et al., 2016).	CSMAR
Variables for the robustness checks and endogeneity tests			
OVER_DUM	=	An indicator variable for overstatement that equals 1 if a firm's financial statements are restated downward in future years and 0 otherwise.	Hand-collected
MIS_MAG	=	The amount of financial misstatement in a firm's financial statements in year t scaled by the absolute net profit.	Hand-collected
EDU_M	=	An indicator variable for the average education level of signing auditors, equaling 1 for master and above and 0 otherwise (Gul et al., 2013).	Hand-collected
EDU_MAX	=	The maximum education level of signing auditors (engagement and review auditors). An auditor's education level is measured as 4, 3, 2, and 1 for PhD, master, bachelor, and others, respectively).	Hand-collected
FEMALE_MAX	=	The gender of the signing auditors, measured using a dummy variable that equals 1 if an auditor is a woman and 0 otherwise.	Hand-collected
AGE_MAX	=	The maximum age of the signing auditors.	Hand-collected
EDU_REV	=	The education level of the review auditor.	Hand-collected
EDU_ENG	=	The education level of the engagement auditor.	Hand-collected
LNGDP	=	The natural logarithm of the GDP per capita in the province in which a firm is located.	China Statistical Yearbook
TRANS	=	The transport status of the province in which a firm is located, measured as the natural logarithm of the total highway mileage at the province level.	China Statistical Yearbook
UNV	=	The number of finance and economic universities within a radius of 100 km around a firm's registered address.	China Statistical Yearbook

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References

Abbott, L.J., Parker, S., Peters, G.F., 2004. Audit committee characteristics and restatements. Auditing: J. Practice Theory 23 (1), 69–87.
Agrawal, A., Chadha, S., 2005. Corporate governance and accounting scandals. J. Law Econ. 48 (2), 371–406.
Allen, F., Qian, J., Qian, M., 2005. Law, finance, and economic growth in China. J. Financial Econ. 77 (1), 57–116.
Alleyne, B., Amaria, P., 2013. The effectiveness of corporate culture, auditor education, and legislation in identifying, preventing, and eliminating corporate fraud. Int. J. Bus., Account., Finance 7 (1), 34–62.
Aobdia, D., Lin, C.J., Petacchi, R., 2015. Capital market consequences of audit partner quality. Account. Rev. 90 (6), 2143–2176.
Ashton, A.H., 1991. Experience and error frequency knowledge as potential determinants of audit expertise. Account. Rev. 66 (2), 218–239.
Banks, J., Mazzonna, F., 2011. The effect of childhood education on old age cognitive abilities: evidence from a regression discontinuity design. Institute for Fiscal Studies Working Paper.
Bantel, K.A., Jackson, S.E., 1989. Top management and innovations in banking: does the composition of the top team make a difference? Strategic Manage. J. 10 (S1), 107–124.
Barker III, V.L., Mueller, G.C., 2002. CEO characteristics and firm R&D spending. Manage. Sci. 48 (6), 782–801.
Basmann, R.L., 1960. On finite sample distributions of generalized classical linear identifiability test statistics. J. Am. Stat. Assoc. 55 (292), 650–659.
Becker, C.L., DeFond, M.L., Jiambalvo, J., Subramanyam, K.R., 1998. The effect of audit quality on earnings management. Contemp. Account. Res. 15 (1), 1–24.
Becker, G.S., 1962. Investment in human capital: a theoretical analysis. J. Political Econ. 70 (5), 9–49.
Benhabib, J., Spiegel, M.M., 1994. The role of human capital in economic development evidence from aggregate cross-country data. J. Monetary Econ. 34 (2), 143–173.
Bernardi, R.A., 1994. Fraud detection: the effect of client integrity and competence and auditor cognitive style. Auditing: J. Practice Theory 13 (1), 68–84.
Bonner, S.E., 1990. Experience effects in auditing: the role of task-specific knowledge. Account. Rev. 65 (1), 72–92.
Bonner, S.E., Lewis, B.L., 1990. Determinants of auditor expertise. J. Account. Res. 28, 1–20.
Bröcheler, V., Maijoor, S., van Witteloostuijn, A., 2004. Auditor human capital and audit firm survival: the Dutch audit industry in 1930–1992. Account., Org. Soc. 29 (7), 627–646.
Brown, H.L., Johnstone, K.M., 2009. Resolving disputed financial reporting issues: effects of auditor negotiation experience and engagement risk on negotiation process and outcome. Auditing: J. Practice Theory 28 (2), 65–92.
Cacioppe, R., Forster, N., Fox, M., 2008. A survey of managers' perceptions of corporate ethics and social responsibility and actions that may affect companies' success. J. Bus. Ethics 82 (3), 681–700.
Cahan, S.F., Sun, J., 2015. The effect of audit experience on audit fees and audit quality. J. Account., Audit. Finance 30 (1), 78–100.
Carcello, J.V., Li, C., 2013. Costs and benefits of requiring an engagement partner signature: recent experience in the United Kingdom. Account. Rev. 88 (5), 1511–1546.
Carey, P., Simnett, R., 2006. Audit partner tenure and audit quality. Account. Rev. 81 (3), 653–676.
Caskey, J., Hanlon, M., 2013. Dividend policy at firms accused of accounting fraud. Contemp. Account. Res. 30 (2), 818–850.
Chang, H., Chen, J., Duh, R.R., Li, S.H., 2011. Productivity growth in the public accounting industry: the roles of information technology and human capital. Auditing: J. Practice Theory 30 (1), 21–48.
Chen, C.Y., Lin, C.J., Lin, Y.C., 2008. Audit partner tenure, audit firm tenure, and discretionary accruals: does long auditor tenure impair earnings quality? Contemp. Account. Res. 25 (2), 415–445.
Chen, F., Peng, S., Xue, S., Yang, Z., Ye, F., 2016. Do audit clients successfully engage in opinion shopping? Partner-level evidence. J. Account. Res. 54 (1), 79–112.
Chen, S., Sun, S.Y., Wu, D., 2010. Client importance, institutional improvements, and audit quality in China: an office and individual auditor level analysis. Account. Rev. 85 (1), 127–158.
Chen, Y.S., Chang, B.G., Lee, C.C., 2008. The association between continuing professional education and financial performance of public accounting firms. Int. J. Human Resour. Manage. 19 (9), 1720–1737.
Cheng, Y.S., Liu, Y.P., Chien, C.Y., 2009. The association between auditor quality and human capital. Manage. Auditing J. 24 (6), 523–541.
Chi, H.Y., Chin, C.L., 2011. Firm versus partner measures of auditor industry expertise and effects on auditor quality. Auditing: J. Practice Theory 30 (2), 201–229.
Chi, W., Douthett, E.B., Lisic, L.L., 2012. Client importance and audit partner independence. J. Account. Public Policy 31 (3), 320–336.
Chin, C.L., Chi, H.Y., 2009. Reducing restatements with increased industry expertise. Contemp. Account. Res. 26 (3), 729–765.
Choi, J.H., Wong, T.J., 2007. Auditors' governance functions and legal environments: an international investigation. Contemp. Account. Res. 24 (1), 13–46.
Christelis, D., Jappelli, T., Padula, M., 2010. Cognitive abilities and portfolio choice. Eur. Econ. Rev. 54 (1), 18–38.
Davies, S., Hammack, F.M., 2005. The channeling of student competition in higher education: comparing Canada and the US. J. Higher Educat. 76 (1), 89–106.
DeAngelo, L.E., 1981. Auditor size and audit quality. J. Account. Econ. 3 (3), 183–199.
Dechow, P.M., Ge, W., Larson, C.R., Sloan, R.G., 2011. Predicting material accounting misstatements. Contemp. Account. Res. 28 (1), 17–82.
DeFond, M., Zhang, J., 2014. A review of archival auditing research. J. Account. Econ. 58 (2–3), 275–326.

Please cite this article in press as: Du, X., et al. Auditor human capital and financial misstatement: Evidence from China. China Journal of Accounting Research (2018), https://doi.org/10.1016/j.cjar.2018.06.001

Deshpande, S.P., 1997. Managers' perception of proper ethical conduct: the effect of sex, age, and level of education. J. Bus. Ethics 16 (1), 79–85.
Dohmen, T., Falk, A., Huffman, D., Sunde, U., 2010. Are risk aversion and impatience related to cognitive ability? Am. Econ. Rev. 100 (3), 1238–1260.
Du, X., 2015. Does Confucianism reduce minority shareholder expropriation? Evidence from China. J. Bus. Ethics 132 (4), 661–716.
Du, X., Lai, S., 2015. Financial distress, investment opportunity, and the contagion effect of low audit quality: evidence from China. J. Bus. Ethics. https://doi.org/10.1007/s10551-015-2986-5.
Farber, D.B., 2005. Restoring trust after fraud: does corporate governance matter? Account. Rev. 80 (2), 539–561.
Ferguson, C.B., Richardson, G.D., Wines, G., 2000. Audit education and training: the effect of formal studies and work experience. Account. Horizons 14 (2), 137–167.
Finkelstein, S., 1992. Power in top management teams: dimensions, measurement, and validation. Acad. Manage. J. 35 (3), 505–538.
Francis, J.R., Michas, P.N., Yu, M.D., 2013. Office size of Big 4 auditors and client restatements. Contemp. Account. Res. 30 (4), 1626–1661.
Goodwin, J., Wu, D., 2014. Is the effect of industry expertise on audit pricing an office-level or a partner-level phenomenon? Rev. Account. Stud. 19 (4), 1532–1578.
Guan, Y., Su, L.N., Wu, D., Yang, Z., 2016. Do school ties between auditors and client executives influence audit outcomes? J. Account. Econ. 61 (2), 506–525.
Gul, F.A., Wu, D., Yang, Z., 2013. Do individual auditors affect audit quality? Evidence from archival data. Account. Rev. 88 (6), 1993–2023.
Hardies, K., Breesch, D., Branson, J., 2016. Do (fe)male auditors impair audit quality? Evidence from going-concern opinions. Eur. Account. Rev. 25 (1), 7–34.
Hitt, M.A., Biermant, L., Shimizu, K., Kochhar, R., 2001. Direct and moderating effects of human capital on strategy and performance in professional service firms: a resource-based perspective. Acad. Manage. J. 44 (1), 13–28.
Islam, N., 1995. Growth empirics: a panel data approach. Quart. J. Econ. 110 (4), 1127–1170.
Ittonen, K., Johnstone, K., Myllymäki, E.R., 2015. Audit partner public-client specialisation and client abnormal accruals. Eur. Account. Rev. 24 (3), 607–633.
Ittonen, K., Vähämaa, E., Vähämaa, S., 2013. Female auditors and accruals quality. Account. Horizons 27 (2), 205–228.
Jiang, G., Lee, C.M., Yue, H., 2010. Tunneling through intercorporate loans: the China experience. J. Financial Econ. 98 (1), 1–20.
Kallunki, J.P., Niemi, L., Nilsson, H., 2016. Do smarter auditors deliver better audit quality? Archival evidence based on unique IQ data on Swedish auditors. https://doi.org/10.2139/ssrn.2604948.
Kang, M., Lee, H.Y., Son, M., Stein, M., 2016. The association between human resource investment by audit firms and their audit quality. Asia-Pacific J. Account. Econ. 24 (3–4), 1–23.
Kaplan, S.E., O'Donnell, E.F., Arel, B.M., 2008. The influence of auditor experience on the persuasiveness of information provided by management. Auditing: J. Practice Theory 27 (1), 67–83.
Libby, R., 1985. Availability and the generation of hypotheses in analytical review. J. Account. Res. 23 (2), 648–667.
Libby, R., Frederick, D.M., 1990. Experience and the ability to explain audit findings. J. Account. Res. 28 (2), 348–367.
Lichtenstein, S., Fischhoff, B., 1977. Do those who know more also know more about how much they know? Org. Behav. Human Perform. 20 (2), 159–183.
Lobo, G.J., Zhao, Y., 2013. Relation between audit effort and financial report misstatements: evidence from quarterly and annual restatements. Account. Rev. 88 (4), 1385–1412.
Lucas, R.E., 1988. On the mechanics of economic development. J. Monetary Econ. 22 (1), 3–42.
Mankiw, N.G., Romer, D., Weil, D.N., 1992. A contribution to the empirics of economic growth. Quart. J. Econ. 107 (2), 407–437.
Mincer, J., 1962. On-the-job training: costs, returns, and some implications. J. Political Econ. 70 (5), 50–79.
Moroney, R., Carey, P., 2011. Industry-versus task-based experience and auditor performance. Auditing: J. Practice Theory 30 (2), 1–18.
Nelson, M.W., 2009. A model and literature review of professional skepticism in auditing. Auditing: J. Practice Theory 28 (2), 1–34.
Omer, T.C., Sharp, N.Y., Wang, D., 2010. Do local religious norms affect auditors going concern decisions. https://doi.org/10.2139/ssrn.1664727.
Pennings, J.M., Lee, K., Van Witteloostuijn, A., 1998. Human capital, social capital, and firm dissolution. Acad. Manage. J. 41 (4), 425–440.
Petersen, M.A., 2009. Estimating standard errors in finance panel data sets: comparing approaches. Rev. Financial Stud. 22 (1), 435–480.
Ponemon, L.A., Gabhart, D.R.L., 1993. Ethical Reasoning in Accounting and Auditing. Canadian General Accountants' Research Foundation, Vancouver, Canada.
Ponemon, L.A., 1993. The influence of ethical reasoning on auditors' perception of management's integrity and competence. Adv. Account. 11, 1–23.
Rest, J.R., Thoma, S.J., 1985. Relation of moral judgment development to formal education. Develop. Psychol. 21 (4), 709–714.
Rice, S., Weber, D., 2012. How effective is internal control reporting under SOX 404? Determinants of the (non-) disclosure of existing material weaknesses? J. Account. Res. 50 (3), 811–843.
Romer, P.M., 1990. Endogenous technological change. J. Political Econ. 98 (5), 71–102.
Samagaio, A., Rodrigues, R., 2016. Human capital and performance in young audit firms. J. Bus. Res. 69 (11), 5354–5359.
Sargan, J.D., 1958. The estimation of economic relationships using instrumental variables. Economet.: J. Econ. Soc. 26 (3), 393–415.
Schultz, T.W., 1960. Capital formation by education. J. Political Econ. 68 (6), 571–583.
Schultz, T.W., 1961. Investment in human capital. Am. Econ. Rev. 51 (1), 1–17.

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Shelton, S.W., 1999. The effect of experience on the use of irrelevant evidence in auditor judgment. Account. Rev. 74 (2), 217–224.
Shleifer, A., 2004. Does competition destroy ethical behavior? Am. Econ. Rev. 94 (2), 414–418.
Sonu, C.H., Choi, A., Lee, J., Ha, W., 2016. Audit partner's length of audit experience and audit quality: evidence from Korea. Asia-Pacific J. Account. Econ. https://doi.org/10.1080/16081625.2016.1242428.
Sundgren, S., Svanström, T., 2014. Auditor-in-charge characteristics and going-concern reporting. Contemp. Account. Res. 31 (2), 531–550.
Sweeney, J.T., Roberts, R.W., 1997. Cognitive moral development and auditor independence. Account., Org. Soc. 22 (3–4), 337–352.
Tihanyi, L., Ellstrand, A.E., Daily, C.M., Dalton, D.R., 2000. Composition of the top management team and firm international diversification. J. Manage. 26 (6), 1157–1177.
Tubbs, R.M., 1992. The effect of experience on the auditor's organization and amount of knowledge. Account. Rev. 67 (4), 783–801.
Tyler, B.B., Steensma, H.K., 1998. The effects of executives' experiences and perceptions on their assessment of potential technological alliances. Strategic Manage. J. 19 (10), 939–965.
Wally, S., Baum, J.R., 1994. Personal and structural determinants of the pace of strategic decision making. Acad. Manage. J. 37 (4), 932–956.
Wang, X., Wang, Y., Yu, L., Zhao, Y., Zhang, Z., 2015. Engagement audit partner experience and audit quality. China J. Account. Stud. 3 (3), 230–253.
Wang, Q., Wong, T.J., Xia, L., 2008. State ownership, the institutional environment, and auditor choice: evidence from China. J. Account. Econ. 46 (1), 112–134.
Wang, X., Wu, M., 2011. The quality of financial reporting in China: an examination from an accounting restatement perspective. China J. Account. Res. 4 (4), 167–196.
Wiersema, M.F., Bantel, K.A., 1992. Top management team demography and corporate strategic change. Acad. Manage. J. 35 (1), 91–121.
Wooldridge, J.M., 1995. Score diagnostics for linear models estimated by two stage least squares. In: Maddala, G.S., Phillips, P.C.B., Srinivasan, T.N. (Eds.), Advances in Econometrics and Quantitative Economics: Essays in Honor of Professor Rao C. R. Blackwell, Oxford, pp. 66–87.
Wright, W.F., 2001. Task experience as a predictor of superior loan loss judgments. Auditing: J. Practice Theory 20 (1), 147–155.
Wu, X., 2009. Do audit firms assign the more experienced engagement partners to new clients switching from other firms? China Account. Finance Rev. 11 (3), 29–59.
Xin, K.K., Pearce, J.L., 1996. Guanxi: connections as substitutes for formal institutional support. Acad. Manage. J. 39 (6), 1641–1658.
Yang, Z., 2013. Do political connections add value to audit firms? Evidence from IPO audits in China. Contemp. Account. Res. 30 (3), 891–921.
Yu, F.F., 2008. Analyst coverage and earnings management. J. Financial Econ. 88 (2), 245–271.
Yuan, H.Q., Han, W.F., 2012. Individual auditor's characteristics and audit quality. China Account. Rev. 10 (3), 275–301.
Zerni, M., 2012. Audit partner specialization and audit fees: some evidence from Sweden. Contemp. Account. Res. 29 (1), 312–340.
Zhang, H., Patton, D., Kenney, M., 2013. Building global-class universities: assessing the impact of the 985 Project. Res. Policy 42 (3), 765–775.

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