

Partner-Level Cumulative Industry Expertise and Audit Quality

Like Jiang

Vic Naiker

The University of Melbourne

Yu Wang

Dongbei University of Finance and Economics

Shafu Zhang

Hunan University

SUMMARY: We employ a novel framework to evaluate the audit quality implications of cumulative industry expertise that audit partners acquire from auditing public clients across their careers. Leveraging the historical data of audit partner engagements with public clients in China, we find that the development of cumulative industry expertise is explained by various experiences of the partners in their initial year of handling public clients, as well as the growth, homogeneity, and demand for specialized knowledge in an industry. Our main results reveal a positive and significant association between partner cumulative industry expertise and different proxies of audit quality. We also find that many partners deemed specialists based on the largest market shares in a given year do not possess a high level of cumulative industry expertise and are insignificantly associated with audit quality. Our findings highlight the importance of adopting a cumulative perspective to study partners' industry expertise.

Keywords: audit partner; auditor industry expertise; auditor career; audit quality.

I. INTRODUCTION

Theories on expertise development suggest that expertise is developed through considerable domain-specific experience over time (Ericsson 1988; Ormrod 2006). The value of expertise has been widely recognized by accounting regulators and audit firms with a long-standing commitment to the importance of industry expertise for developing auditor competence (Public Company Accounting Oversight Board (PCAOB) 2019). Surprisingly, although the auditing literature inherently assumes that the development of auditor industry expertise is a function of many years of practice in an industry (Bonner 1990; Bonner and Lewis 1990; Bédard and Chi 1993; Taylor 2000; Moroney and Carey 2011), the audit quality implications of auditors' cumulative industry expertise are yet to be considered in the literature.

We thank Steven Cahan, Chen Chen, Simon Fung, Ronen Gal-Or, Ferdinand Gul, Miguel Minutti-Meza, Debra Jeter, Christo Karuna, Joey Huang, Rencheng Wang, Jun Yao, as well as workshop participants at The Australian National University, Monash University, and Deakin University for helpful comments and suggestions. Authors are alphabetically listed and contributed equally to the paper. Like Jiang and Vic Naiker gratefully acknowledge financial support from The University of Melbourne. Yu Wang acknowledges financial support from the National Natural Science Foundation of China [Project-ID: 72302033].

Like Jiang and Vic Naiker, The University of Melbourne, Faculty of Business and Economics, Department of Accounting, Melbourne, Victoria, Australia; Yu Wang, Dongbei University of Finance and Economics, School of Accounting, Department of Auditing, Dalian, China; Shafu Zhang, Hunan University, Business School, Accounting Department, Changsha, China.

Editor's note: Accepted by Ann Vanstraelen, under the Senior Editorship of Jayanthi Krishnan.

Submitted: April 2022
Accepted: May 2024
Early Access: July 2024

A 2015 PCAOB concept release on audit quality indicators¹ stresses the importance of filling this gap by highlighting the *cumulative* industry experience of audit partners and other senior staff as a measure that could provide new insights into how high-quality audits are achieved (PCAOB 2015). As an extension of the concept release, a current PCAOB project seeks to foster discussion among the members of the current Standards and Emerging Issues Advisory Group on various issues previously covered in the 2015 release, including the importance of industry experience of audit partners as an engagement performance metric or audit quality indicator (PCAOB 2023). Against the backdrop of regulatory interest in the cumulative industry expertise of senior audit personnel, we develop a novel framework for capturing the industry expertise that partners acquire from managing the audit engagements of public clients across their career as a signing partner, referred to as partner-level cumulative industry expertise in this study (or cumulative industry expertise for short).² We then examine its implications for audit quality.

We conduct our study in the context of the Chinese audit market because it provides historical data on all engagement partners³ who sign audit reports of public clients since the establishment of the Shanghai and Shenzhen Stock Exchanges in the early 1990s. This allows us to capture the cumulative experience of partners on all audit engagements of public clients in a particular industry and across all years leading up to the current audit engagement year. Our framework for measuring partner-level cumulative industry expertise takes into account the size of the partner's clients relative to other firms in the same industry-year and a time factor that places greater weighting on more recent experience with clients in the industry.

As a prelude to our audit quality analysis, we examine the determinants of cumulative industry expertise. We find that the development of cumulative industry expertise is associated with various early experiences of partners, including the industry concentration of partners, the industry expertise of the other partners they are paired with, and the risk exposure of an industry in the initial partner year. These findings are consistent with career construction theory, highlighting the role of early-career experiences in influencing future professional and career choices (Savickas 1997). Our analysis also reveals that factors representing cost efficiency potential, need for specialized knowledge, and future revenue generation potential can incentivize or provide greater scope for partners to develop industry expertise.

Our audit quality analyses show that partner-level cumulative industry expertise is positively related to different proxies for audit quality (i.e., discretionary accruals, audit reporting errors, regulatory sanctions, and accounting restatements). The results are robust to several additional checks, including client and partner fixed effects. We also rule out the possibility of our results being driven by partners' general audit experience, their cumulative expertise in all other (i.e., nonfocal) industries, or their client-specific knowledge. Collectively, these results strongly support partner-level cumulative industry expertise being highly relevant for promoting audit quality.

Another natural and important question that arises is the extent to which our measure of partner-level cumulative industry expertise aligns with those based on static snapshots of a partner's market share of clients in a single (e.g., prior or current) year, employed to capture industry expertise in some previous studies (Chi and Chin 2011; Chin and Chi 2009). Interestingly, we find that between 37 and 43 percent of client observations are handled by partners who lead their industries in market shares in the current year but do not possess high levels of cumulative industry expertise, depending on the percentile cutoffs used to identify partners with high levels of cumulative industry expertise.

To isolate the extent to which we can attribute this divergence to the novelty of our framework, which is to weight and sum industry experience across an auditor's career as a partner, we estimate and rank cumulative industry expertise under our framework using data from a single year (i.e., prior year) only. We show that about a quarter of partners with the resulting industry expertise values above the 90th through 75th percentile thresholds are no longer ranked above these thresholds when we consider the entire clientele data of these partners from the past decade to measure their cumulative industry expertise.

¹ The concept release encouraged commenters to consider how senior staff's industry expertise could be measured against their public firm client base. Within the pool of commenters that provided feedback on the specific audit quality indicators, about 75 percent of commenters expressed support for the important role that the industry expertise of senior audit personnel plays in advancing audit quality.

² A partner's career considered in this study specifically refers to her experience with managing audit engagements of publicly listed companies and signing audit reports of public clients. We acknowledge that a partner can also obtain industry expertise from performing fieldwork when she is a junior auditor. However, partners and junior auditors differ significantly with regard to the nature and complexity of the tasks and responsibilities they handle in audit engagements. We also acknowledge that auditors can acquire industry expertise from serving private firms. However, private firms typically differ from public firms across many dimensions including scale and complexity of operations, ownership and governance structures, access and exposure to capital markets, and compliance with rules and regulations imposed by stock exchanges and regulatory agencies (Wang, Xie, and Zhu 2015). These differences are likely to result in differential financial reporting processes. We are unable to separately consider the audit quality implications of partner-level cumulative industry expertise from junior auditor experience or from handling private clients due to data availability limitations. We acknowledge that this is a limitation of our study and most prior studies on partner industry expertise.

³ We use the term "partner" in our study to refer to the individual auditor who signs the audit reports of public clients. In China, auditors who sign the audit reports could be equity partners, salaried partners, and senior audit managers (Lennox, Wang, and Wu 2020).

The above findings are not surprising because factors such as mandatory audit partner rotations, retirements, and promotions can result in some partners with little (considerable) prior experience in an industry being classified (not being classified) as industry experts if they are assigned to a large client (not assigned any clients) in that industry in a given year. Indeed, our tests reveal an insignificant association between audit quality and partner single-year industry expertise, whereas our measure of cumulative industry expertise remains significantly associated with audit quality.⁴ Taken together, the findings suggest that the effect of cumulative industry expertise is distinct and that single-year-based measures can impede our ability to characterize and fully understand the effect of partner-level industry expertise on audit quality.

In cross-sectional analyses, we show that the effect of cumulative industry expertise is more pronounced for partners who accumulate their expertise more persistently through serving an industry over more consecutive years, supporting the importance of prolonged presence in industries in developing industry expertise. We also document that the influence of cumulative industry expertise on audit quality becomes weak when clients (1) operate in multiple industries, which requires partners to have a broader scope of knowledge beyond one industry, and (2) have less comparable accounting information than industry peers, a situation that renders information gathered from industry peers less relevant for the focal audit client. These findings align with some prior experimental studies arguing that the benefits of expertise might not always exist (Frensch and Sternberg 1989; Koonce and Mercer 2005).

The Chinese audit market has unique characteristics such as relatively weak institutions and enforcement, small Big 4 audit firm market share, and intensive audit market competitions (Lennox and Wu 2022; DeFond, F. Zhang, and J. Zhang 2021), which could potentially affect partners' incentives and opportunities to develop industry expertise.⁵ Like all other studies using Chinese data, our findings could be subject to a generalizability issue. We conduct several tests to alleviate this concern. First, we demonstrate that our results hold within a restricted sample of clients of the top ten audit firms that are comparable to large audit firms that are more prominent in other countries⁶ and within a sample of clients that are likely to adhere to international accounting practices. Second, our results hold in two subsamples representing partners in larger or smaller cities. Results based on larger cities suggest that our findings apply to partners in offices with more sophisticated audit technologies and superior resources, whereas the results based on smaller cities alleviate the concern that a "big-city" effect drives our results. Third, we document that our results hold for equity and nonequity partners. Collectively, although we acknowledge the potential generalizability issue inherent in using Chinese data, we believe the theoretical premises and findings in this study are broad and could potentially be generalizable to developed countries. To further assist researchers in countries with partner-level data available for only a limited number of years (e.g., the U.S.) or where the hand collection of partner data is tedious and time-consuming (e.g., Australia), we show that we require data from four prior years to construct our measure of partner-level cumulative industry expertise before we witness a positive and significant relation between such expertise and all proxies of audit quality.

Our study extends the literature on auditor industry expertise by advancing the understanding of conditions under which the industry expertise of partners benefits audit quality. The extant literature has generally focused on static snapshots of an auditor's industry experience in a single year and documented mixed evidence on the audit quality implications of partner industry expertise (Aobdia et al. 2021; Bell, Causholli, and Knechel 2015; Chi and Chin 2011; Chi, Myers, Omer, and Xie 2017; Ittonen, Johnstone, and Myllymäki 2015). Single-year-based measures inadvertently embrace the assumption of the past experience of auditors with clients being irrelevant for determining the industry expertise. Our study relaxes this assumption by offering initial insights on factors that incentivize and/or allow partners to accumulate significant industry expertise over time and on the audit quality implications of such expertise. Our cross-sectional tests shed further insights into conditions that may benefit more (or less) from partner-level cumulative industry expertise.

Our study complements and extends Gaver and Utke (2019), who document a positive relation between audit quality and audit firms that are seasoned industry specialists (i.e., longer-tenured industry specialists). They state that audit firms that are not seasoned specialists can still possess individual audit personnel with ample (industry) experience,⁷

⁴ Recent studies often fail to find a positive relation between audit quality and industry specialist partners based on single-year measures, except for a minority of audit clients (e.g., Aobdia, Siddiqui, and Vinelli 2021).

⁵ Although the unique characteristics of the Chinese audit market might influence the development of partner-level cumulative industry expertise, the direction of the influence is not clear *ex ante*. On one hand, the relatively weak institutional environment in China could lower auditors' incentives to deliver high-quality audit services and, consequently, specialize as experts in an industry. On the other hand, the intensive audit market competition could provide stronger incentives for auditors to develop industry expertise to differentiate themselves from others in the audit market.

⁶ In 2011, the Chinese Institute of Certified Public Accountants (CICPA) released the "Development Plan of the Chinese Accountancy Profession (2011–2015)" proposing the creation of 10 accounting firms with international standards that would compete with the largest audit firms in developed countries.

⁷ Consistent with this view, we find that the ratio of the number of partners with cumulative industry expertise values above the 90th percentile in our sample to the total number of partners in an audit firm is only marginally smaller and is insignificantly different across audit firms that are *not* seasoned industry specialists (9.8 percent) relative to audit firms that are seasoned industry specialists (10.6 percent), as per the definition of audit firm industry specialists in Gaver and Utke (2019).

allowing them to provide high-quality audits. Our study directly investigates the audit quality effect of partner industry expertise after factoring in that the development of such expertise is a function of career-long experience with public clients in an industry.⁸ It is critical to consider partners' cumulative industry expertise since their market shares in a given year can be heavily influenced by events such as partner rotations, promotions, and retirements.

Given the significant growth in research at the audit partner level over the past decade (Lennox and Wu 2018), our findings highlight the importance of future studies adopting a more encompassing approach to accounting for partner industry expertise. With more years of partner identity data becoming available in some countries (e.g., the U.S.), our study is timely in guiding future research on partner industry expertise or other partner attributes (e.g., client tenure) that can be correlated with such expertise. Moreover, our insights and framework can be applied to other streams of research that focus on individual experts' industry expertise within and outside of firms (e.g., industry expertise of directors). Finally, our findings should be of particular interest to regulatory bodies such as the PCAOB, which has solicited feedback on the impact of senior personnel's cumulative industry experience on audit engagements.

II. RESEARCH BACKGROUND

Background

The decades since the seminal work of DeAngelo (1981) have witnessed waves of research supporting a link between audit firm/office industry specialization and higher audit quality (DeFond and Zhang 2014). Chin and Chi (2009); Chi and Chin (2011); and Chi et al. (2017) extend this line of research by documenting a positive relation between partners with the largest *annual* market share in an industry and audit quality. Although these findings are consistent with partner industry expertise promoting audit quality, the findings from studies based on more contemporaneous sample periods have been mixed.⁹ Specifically, Ittonen et al. (2015) do not find a relation between audit quality and partners with more than two clients in an industry, except for a subsample of partners with at least 20 years of experience. Similarly, motivated by prior studies (e.g., Zerni 2012; Goodwin and Wu 2014) that have linked partner industry expertise to audit fees without any effects on audit quality, Aobdia et al. (2021) show that a partner's market share of audit fees in the industry generally depicts a positive association with audit fees, but is positively associated with audit quality for only a small pool of high-risk clients.¹⁰ Their findings lead them to conclude that partner industry expertise is priced for all audits without enhancing the audit quality of most clients. Similarly, Bell et al. (2015) report that the match between a partner's industry specialization and client primary industry matters for audit quality only in the financial industry, which is subject to complex transactions and regulation. The mixed evidence from prior studies suggests that the influence of partner industry expertise warrants further investigation.

Partner-Level Cumulative Industry Expertise and Audit Quality

We extend the line of research on the industry expertise of partners by embracing a cumulative perspective of partner industry expertise. Our approach aligns with the theoretical premises of the expertise development literature, which contends that expertise is gradually acquired and developed through considerable domain-specific experience over time (Ericsson 1988; Ericsson and Lehmann 1996; Ormrod 2006). Specifically, expert development researchers and psychologists posit that, regardless of their innate ability, individuals cannot attain superior expertise in their field unless they endure a long and intensive process of education and training (Bloom 1985; D. Allison and P. Allison 1993; Chua and Gauthier 2020). The positive impact of prolonged domain-specific experience on exceptional performance has been demonstrated across various domains, ranging from sports to science (Larkin, McDermott, D. Simon, and H. Simon 1980; Schoenfeld and Herrmann 1982; Ericsson and Crutcher 1990).

Although theoretical foundations of expertise development emphasize the role of experience and knowledge accumulation over time, this approach has rarely been adopted in prior auditing studies. The complex and multifaceted nature of auditing requires significant expertise and professional judgment, which are likely to be acquired through prolonged experience in a client's industry. However, the common practice in prior studies is to consider partner industry expertise based on the partners' current year (i.e., single-year) market share of fees, assets, sales, or

⁸ We apply the Gaver and Utke (2019) framework in our setting by controlling for partners who are market leaders in their industry for more than a year (i.e., seasoned industry specialist partners) in our robustness tests. We find that this variable is insignificantly related to audit quality in our setting whereas our findings for partner cumulative industry expertise remain robust to the inclusion of this variable.

⁹ The sample periods employed in Chin and Chi (2009); Chi and Chin (2011); and Chi et al. (2017) end in 2004 or 2001.

¹⁰ Aobdia et al. (2021) find that only 8 percent of their sample firms are classified as high-risk clients and only 3 percent of firms experience a material restatement.

clients in an industry. The use of annual market shares may not appropriately reflect a partner's currency of industry expertise. Most partners typically handle one listed client in an industry in a year.¹¹ As such, relying on the single-year largest market share to identify industry specialist partners is likely to assign the partner with the largest client (based on audit fees, client assets, or client sales) in the industry as the industry specialist. Some studies have attempted to circumvent this problem by considering market shares based on the number of clients in an industry (e.g., Chi et al. 2017; Chin and Chi 2009). However, such an approach is problematic as it can classify partners as industry specialists by virtue of handling several small clients, which may not necessarily represent the ideal clientele for accruing industry expertise. Regardless of the market share basis used to designate industry specialist partners, the challenges of using single-year market share to assess partner industry expertise are further exacerbated by factors such as mandatory partner rotation, promotions, and retirements that can cause sporadic changes in a partner's portfolio of clients. This could result in a partner without any prior industry experience being designated as an industry expert if she is assigned to lead the audit of the largest firm in an industry in a year (i.e., Type I error) or in a partner with extensive industry expertise not being assigned as an expert if she is not assigned any industry clients in a year (i.e., Type II error). Such concerns are less acute when considering the industry expertise of a partner across her career as a signing auditor of public clients.

Our line of inquiry is supported by a 2015 concept release by the PCAOB that sought feedback on the role that the *cumulative* industry expertise of partners can play in promoting audit quality (PCAOB 2015), which continues to be emphasized in the current PCAOB project on firm and engagement quality metrics (PCAOB 2023).¹² To the extent that the accumulation of significant industry expertise across a partner's career generates positive externalities for designing and implementing more effective audit strategies, we expect partner-level cumulative industry expertise to influence audit quality positively. We also acknowledge that the degree of such influence likely varies across situations (Frensch and Sternberg 1989; Koonce and Mercer 2005), which we explore in our cross-sectional analyses.

III. SAMPLE AND DATA

We rely on the Chinese setting to operationalize our analyses, as it allows us to collect individual auditors' partner-level clientele experience with public companies using the China Stock Market and Accounting Research (CSMAR) database. Our empirical analysis of audit quality is based on the sample of Chinese A-share listed companies that trade on the Shanghai Stock Exchange and the Shenzhen Stock Exchange between 2007 and 2017. We begin our sample period in 2007 because we require sufficient historical data since the birth of the Chinese stock market in 1990 to construct our measure of cumulative industry expertise. Our sample period's starting point also allows us to mitigate any confounding effects from China's conversion of its accounting standards (Chinese GAAP) to International Financial Reporting Standards (IFRS) in 2007. We end our sample period in 2017 to allow for sufficient time lag between misstatements/fraud and the announcements of restatements and sanctions at the time of data collection. Our initial sample consists of 26,041 client company-year observations. We delete 487 observations in the financial industry, 435 observations for which auditor information is missing, and 3,922 observations missing necessary data on variables used in the empirical tests. Our final sample consists of 21,197 client-year observations.

We employ several proxies for audit quality, including the absolute value of discretionary accruals, signed discretionary accruals, audit reporting errors, regulatory sanctions, and accounting restatements. Earnings-restatement data are manually collected from these annual reports and supplementary or correction announcements published on CNINFO, the official website designated by the CSRC for Chinese-listed companies to publicly disclose information. Following prior studies (e.g., Guan, Su, Wu, and Yang 2016; Wu and Ye 2020), data to construct our remaining audit quality proxies, as well as the majority of our control, are collected from the CSMAR database, except for data on institutional investor shareholdings and state-owned enterprises, which were obtained from the WIND Financial

¹¹ Our assessments reveal that most partners in the Chinese setting employed in this study handle very few public clients in a given industry-year (e.g., around 87 percent of partners in China during our sample period 2007–2017 audit only one client in a given industry-year), suggesting that partners have limited capacity to handle multiple clients in an industry-year. This, together with the partner rotation requirements, can introduce considerable volatility in the designation of partners with industry expertise based on current year market share. This phenomenon is likely to prevail in other countries too. For example, our observations based on the newly introduced Form AP disclosures in the U.S. reveal that the majority (around 70 percent) of audit partners only handle a single public firm client in an industry (two-digit SIC code)-year between 2016 and 2018.

¹² The importance of industry expertise to auditing is also highlighted by other regulatory bodies such as The Canadian Public Accountability Board (CPAB) (<https://cpab-ccrc.ca/insights/aqi>), and the Accounting and Corporate Regulatory Authority (ACRA) in Singapore (<https://www.acra.gov.sg/docs/default-source/default-document-library/public-accountants/audit-quality-indicators-disclosure-framework/guidance-to-audit-firms-on-acra's-revised-aqi-disclosure-framework.pdf>), which have considered the potential role of the industry expertise of the engagement team and partners as an audit quality indicator.

database. We collect individual partners' characteristics from the Chinese Research Data Services Platform (CNRDS) database.¹³

IV. PARTNER CUMULATIVE INDUSTRY EXPERTISE: MEASURE AND DETERMINANTS

Constructing the Measure of Partner-Level Cumulative Industry Expertise

We capture cumulative industry expertise by tracing a partner's history of signing audit reports of public clients in an industry since the partner's first work with a client in the industry. Our measure takes into account the size of the partner's clients relative to other firms in the same industry-year and a time factor that places greater weight on more recent experience with clients in the industry. Our choice of these factors in constructing cumulative industry expertise is supported by insights from a small-scale online survey of partners we conducted on factors contributing to developing cumulative industry expertise.¹⁴ Their responses revealed that the number of years of auditing public clients in an industry, the size of the clients, and the continuous performance of audit services in an industry were the most important factors in developing industry expertise. We use the following equation to construct our measure of cumulative industry expertise:

$$RawAPCumIndExp_{i,j,T} = \sum_{t=first\ year}^{t=T-1} MS_{i,j,t} \times TW_{i,j,t} \quad (1)$$

where t is the sequence of years from the year of partner i 's first audit engagement in industry j to the current year T minus 1.¹⁵ For example, when we estimate the cumulative industry expertise of partner i in industry j in 2010, and that partner's first engagement in this industry was in 2005, we consider the collective experience of the partner with clients in this industry from 2005 through 2009.¹⁶ We measure the partner's industry experience for each year in this period as the product of two factors. Since larger clients provide auditors with more significant opportunities to acquire industry knowledge, the first factor, $MS_{i,j,t}$, captures the industry market share of the assets audited by the partner (i.e., the total assets of industry j clients audited by the partner i divided by the total assets of all companies in industry j , multiplied by 100). The second factor, $TW_{i,j,t}$, is a weighting term that discounts more distant experience of the partner with clients in industry j . Specifically, this factor fully weights (i.e., is assigned a value of 1) the first factor described above in the year before the focal year ($T-1$) and then reduces the weighting of this product by 0.1 for each preceding year. We assign a minimum value of 0.1 to years over a decade old relative to the year before the focal year. We sum the product of the above-discussed two factors across all years to compute the raw measure of the partner's cumulative expertise in industry j in year T ($RawAPCumIndExp_{i,j,T}$). We employ the natural logarithm of 1 plus $RawAPCumIndExp_{i,j,T}$ as the main variable of interest ($APCumIndExp_{i,j,T}$).¹⁷

¹³ We rely on multiple sources to obtain data for our empirical analyses given the diversified data requirements in relation to client companies, individual partners, and institutional environment. Although all databases in this study have been used in prior studies (e.g., Guan et al. 2016; He, Yin, Zeng, Zhang, and Zhao 2019; Chen, Huang, Li, and Pittman 2022; Fung, Jiang, Pittman, Wang, and Zhang 2023), we acknowledge the difficulty of eliminating the risk of data integrity and reliability issues. However, we believe that unless the measures of audit quality employed in this study are systematically biased in one direction across multiple databases, any issues in the reliability of data would likely bias against us finding consistent results across all measures.

¹⁴ The online survey was conducted from April to June 2023, with the approval from the Human Ethics Committee at The University of Melbourne. The survey was sent to nine partners from top ten audit firms in China. We utilized the alumni network of a Chinese university, which reached out to potential partners to invite them to participate in the online survey anonymously and collected responses. Among the nine responses, two are not usable due to incomplete answers. In the survey, partners were asked several questions relating to elements that are critical to the development of partner industry expertise and factors that influence their incentives and opportunities to stay in an industry to accrue industry expertise.

¹⁵ Our industry classification is based on the CSRC Industry Classification Scheme (http://www.csrc.gov.cn/csrc_en/c102034/c1371375/content.shtml). Because the manufacturing industry in China is significantly larger than the other industries, we follow prior studies (e.g., Guan et al. 2016; Gul, Wu, and Yang 2013; Chen, Peng, Xue, Yang, and Ye 2016) and use the two-digit code for the manufacturing sector and the one-digit code for the other sectors.

¹⁶ We do not consider the industry experience of the partner in the current year because partners would need to conduct the audit first to acquire the industry experience. Our results are unaffected when we also include the current year industry experience of partners to measure their cumulative industry expertise.

¹⁷ Our measurement of $APCumIndExp$, which relies on a market-share-based approach, aligns with the most widely used approach in determining industry expertise in prior studies. In addition to market-share-based measures, some prior studies also consider a portfolio-share-based approach to identify industry expertise (e.g., the most highly represented industry across an auditor's portfolio of audit clients). However, the portfolio-share-based approach is mainly used to measure industry expertise at audit office or audit firm levels (Audousset-Coulier, Jeny, and Jiang 2016; Stein 2019). Applying the portfolio approach to capture the industry expertise of partners with public firms could be challenging because many partners only have one public client in an industry-year. It is worth noting that recent studies also use proprietary data to capture audit office industry expertise directly by factors that influence the production of audits (Dekeyser, Gaeremynck, and Willekens 2019) and tackles industry expertise at the audit team level (Contessotto, Knechel, and Moroney 2021). Our results should be interpreted with caution because it focuses on only one approach to capturing the cumulative industry expertise of partners, and such expertise could be potentially measured in other ways and influenced by other factors that are difficult to measure empirically (e.g., knowledge spillovers from other members of the audit team).

Appendix A illustrates the computation of *APCumIndExp* for three partners (Partner A, Partner B, Partner C) in the industry related to manufacturing agriculture products, textiles, clothes, and fur (i.e., C1 industry based on the CSRC Industry Classification Scheme) for the 2017 year. Although Partner A and Partner C have similar years of experience with public clients, the higher *APCumIndExp* value in Industry C1 for Partner A (2.75) compared to Partner C (1.80) is largely attributable to more total assets audited across time in the C1 industry. Further, although Partner C has longer auditing experience in Industry C1 and other industries than Partner B, he has a lower *APCumIndExp* value in Industry C1 (1.80) than Partner B (2.16) because Partner B audited more total assets in Industry C1 since becoming a signing partner. These examples highlight that cumulative industry expertise can differ significantly from previously examined proxies of partner industry expertise that rely on a snapshot of partners' industry experience from the most recent year. The examples also demonstrate that our measure of cumulative industry expertise is distinct from general auditing experience.

Determinants of Partner-Level Cumulative Industry Expertise

Prior to evaluating the impact of cumulative industry expertise on audit quality, we first attempt to shed light on the factors that may incentivize or provide greater scope for partners to accrue industry expertise.

Early Experiences As a Partner

According to career construction theory, early experiences can influence future professional and career choices (Savickas 1997).¹⁸ Some partners in our small-scale survey also suggested that the characteristics of clients that partners first handled as signing partners could affect the partners' incentives and opportunities to develop industry expertise in an industry. To begin, it is possible that handling more clients in the focal industry by a partner in her first year as a signing partner of public clients could increase the partner's incentive to develop expertise in the industry. We capture this using an indicator (*FirstYearIndustry*) for whether the current client's industry is the industry in which the partner had most clients in her first year of handling audit engagements of listed firms.¹⁹ Similarly, given that audit reports are signed by two partners in China, it is possible that the focal partner could develop expertise in an industry if the partner is paired with another partner (i.e., paired partner) who had more industry expertise when the focal partner first audits a client in the focal industry. We measure the cumulative industry expertise of the paired partner using the *APCumIndExp* of the paired partner from the first client handled by the focal partner in an industry (*PairAPCumIndExp*). Moreover, the occurrence of frequent lawsuits in an industry in which partners handle their first public client(s) is likely to increase partners' perception of the risk in that industry and lower their incentive to stay in the industry, even when the lawsuits are unrelated to financial reporting. We capture the risk exposure of an industry using an indicator (*FirstYearLowRisk*) for whether the current client's industry is the industry in which the partner had at least one client in the first year of handling listed firms and that industry did not have any lawsuits in that year.²⁰

Industry Characteristics and Environmental Factors

Prior studies find that audit firms are more likely to specialize in industries with greater industry operation homogeneity because such industry conditions can allow audit firms to achieve economies of scale and cost efficiency (Bills, Jeter, and Stein 2015). These incentives could also apply to individual auditors. Accordingly, we follow Bills et al. (2015) and assess whether industry operation homogeneity (*Homogeneity*) positively affects the development of partner cumulative industry expertise. The importance of and demand for industry expertise can also increase with the difficulty of audit engagements. Based on Nguyen, Calantone, and Krishnan (2020), we measure the degree of audit difficulty for an industry based on the intensity of intangible assets in the industry in the past three years (*IndIntangible*). Another factor that can incentivize industry specialization is industry growth (*IndGrowth*), which can present partners with greater revenue generation prospects. Finally, partners in big cities may have greater scope for developing industry expertise because of more opportunities to audit large clients and access industry resources and information. We assess this using an indicator for partners located in the top five cities and provinces in terms of economic development (*Top5Province*).

¹⁸ Applying this logic to the auditing field, He, Kothari, Xiao, and Zuo (2018) find that engagement partners issue more frequent audit adjustments when they start their career during economic downturns, which arguably makes them more sceptical.

¹⁹ In instances in which partners had an equal number of clients cross different industries in their first year of handling listed companies, we consider all of these industries as those in which the partners gained industry concentration in their first year of handling audit engagements.

²⁰ We obtain data on lawsuits from WIND Financial Terminal. We use data from 2000 to construct the variable *FirstYearLowRisk* because data on lawsuits is limited before 2000.

Other Partner Characteristics

We also include many other traits of partners, although it is difficult to form clear predictions on how these traits may influence the development of cumulative industry expertise. Specifically, we control for partners' general auditing expertise, measured as the natural logarithm of 1 plus the number of years since the partner first audited public clients (*APGenYearExp*), and other individual characteristics, including gender (*APGender*), whether the partner graduated from prestigious schools (*APSchool*), the education level of the partner (*APEducation*), the partner's major in education (*APMajor*), the partner's position in the audit firm (*APPosition*), whether the partner is an equity partner (*APEPartner*), whether the partner has other qualifications (e.g., asset appraisal certificate) in addition to a license of Certified Public Accountants (*APOtherQualification*), and whether the partner has working experience in Big 4 audit firms (*APBig4Experience*).

Regression Results

Table 1, column (1) presents results from the regression on the determinants of *APCumIndExp* based on a sample of 20,585 partner-industry-years from 2007 to 2017. Consistent with our predictions, we find that *APCumIndExp* is positively and significantly ($p < 0.01$) associated with greater handling of clients in the focal industry in their first year (*FirstYearIndustry*), pairing with other partners with significant industry expertise in their first year (*PairAPCumIndExp*), and lower lawsuit exposure of the focal industry in their first year (*FirstYearLowRisk*). We also find that cost efficiency potentialities (*Homogeneity*), need for specialized knowledge (*IndIntangible*), future potential of revenue generation (*IndGrowth*), and being in large cities (*Top5Province*) are all positively associated with *APCumIndExp* ($p < 0.05$). Regarding the partners' individual characteristics, we find that general auditing experience (*APGenYearExp*), education level (*PEducation*), and Big 4 audit firm experience (*APBig4Experience*) are positively associated with *APCumIndExp*.

We also assess whether the aforementioned factors can explain the extent to which *APCumIndExp* differs from the industry experience of partners in the most recent year only (i.e., the single-year based approach used in prior studies). The results reported in Table 1, column (2) are consistent with this expectation. Specifically, we find that the factors representing the early experiences of auditors as partners, growth, homogeneity, and need for specialized knowledge of the industry play a significant role in explaining the magnitude of difference between *APCumIndExp* and a comparable measure of the industry experience of partners in the most recent year only (*APPreIndExp*). The results reported in the last column of Table 1 show that our findings are unaffected when we repeat our analysis based on a reduced sample of partners with at least three years of experience in an industry.

V. PARTNER-LEVEL CUMULATIVE INDUSTRY EXPERTISE AND AUDIT QUALITY

Research Design

We employ the following regression model to test the relationship between cumulative industry expertise and audit quality:

$$\text{AuditQuality} = \alpha_0 + \alpha_1 \times \text{APCumIndExp} + \alpha_2 \times \text{Controls} + \text{FixedEffects} + \varepsilon \quad (2)$$

Following DeFond and Zhang (2014), we use several variables to proxy for audit quality (*AuditQuality*), including absolute discretionary accruals ($|DAC|$), signed discretionary accruals (*DAC*), audit reporting errors capturing instances where partners issue a clean opinion on financial statements that are restated in the subsequent years (*ReportError*), regulatory sanctions (*Sanction*), and restatements due to accounting issues (*Restatement*).²¹ We estimate Equation (2) using an OLS framework when the dependent variable is $|DAC|$ and *DAC*, and a logit regression when the dependent variables are *ReportError*, *Sanction*, and *Restatement*. Our test variable, *APCumIndExp*, is defined earlier in Section III. Because Chinese auditing standards mandate that audit reports are signed by two partners, we use the largest value of

²¹ In an untabulated analysis, we find that *APCumIndExp* is associated with an increased likelihood of issuing going concern opinions in a restricted sample of financially distressed firms. Financially distressed firms are defined as those having *Zscore* less than 2.99 (Altman 1968) and suffering from operating losses. This result is consistent with cumulative industry expertise being associated with higher audit quality. In addition, we also document a negative relationship between *APCumIndExp* and Type II errors in issuing going concern opinions, where Type II errors occur when a going concern opinion is not issued in year t , but the client suffers financial distress in year $t+1$. This result also aligns with cumulative industry expertise being relevant to audit quality. We do not consider Type I errors in issuing going concern opinions as an audit quality indicator, because the higher likelihood of issuing going concern opinions could be interpreted as auditors offering higher audit quality, even when clients do not suffer significant financial distress in the future.

TABLE 1
Determinants of Partner-Level Career Industry Expertise

Variables	$y = APCumIndExp$ Full Sample	$y = APCumIndExp - APPreIndExp$ Full Sample	$y = APCumIndExp - APPreIndExp$ ≥ Three Years Industry Experience
<i>FirstYearLowRisk</i>	0.303*** (6.428)	0.282*** (6.116)	0.295*** (3.700)
<i>FirstYearIndustry</i>	0.266*** (19.108)	0.249*** (18.938)	0.222*** (10.930)
<i>PairAPCumIndExp</i>	0.203*** (14.931)	0.191*** (14.400)	0.087*** (8.556)
<i>IndIntangible</i>	1.588*** (6.681)	1.519*** (6.642)	2.769*** (5.866)
<i>IndGrowth</i>	0.101*** (5.008)	0.087*** (4.470)	0.154*** (3.166)
<i>Top5Province</i>	0.022** (2.144)	0.020** (2.083)	0.027 (1.496)
<i>Homogeneity</i>	0.183*** (18.025)	0.160*** (16.936)	0.249*** (16.025)
<i>APGenYearExp</i>	0.230*** (31.557)	0.220*** (31.281)	0.230*** (18.496)
<i>APGender</i>	0.000 (0.037)	-0.000 (-0.011)	0.004 (0.234)
<i>APSchool</i>	-0.006 (-0.985)	-0.006 (-0.965)	-0.013 (-1.259)
<i>APEducation</i>	0.013* (1.904)	0.011* (1.691)	0.011 (0.999)
<i>APMajor</i>	-0.003 (-0.580)	-0.003 (-0.595)	0.005 (0.478)
<i>APPosition</i>	-0.007 (-1.283)	-0.006 (-1.241)	-0.013* (-1.718)
<i>APEPartner</i>	0.013 (1.194)	0.009 (0.898)	-0.009 (-0.483)
<i>APOtherQualification</i>	-0.023 (-1.159)	-0.017 (-0.904)	0.001 (0.026)
<i>APBig4Experience</i>	0.305*** (10.108)	0.242*** (8.712)	0.377*** (6.356)
Constant	-0.441*** (-13.439)	-0.424*** (-13.732)	-0.479*** (-8.979)
Year FEs	Yes	Yes	Yes
Cluster by partner	Yes	Yes	Yes
n	20,585	20,585	9,317
Adjusted R ²	0.319	0.311	0.260

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.

This table presents the results for the analysis of the determinants of partner cumulative industry expertise. The regressions are estimated using a partner-industry-year level sample for the period 2007–2017. Column (1) of this table presents the regression results on factors that can explain the variation in partners' development of cumulative industry expertise (*APCumIndExp*). Column (2) of this table presents regression results on the same factors that can explain the difference between *APCumIndExp* and the industry expertise of partners in the previous year only (*APPreIndExp*). For sake of comparability, we measure *APPreIndExp* using the same approach developed to measure *APCumIndExp*, except that we measure *APPreIndExp* using the partners' clientele from the previous year ($t-1$) only instead of their entire partner-level career. Column (3) extends our analysis in column (2) after restricting the sample to partners with at least three years of experience in an industry. Numbers reported are regression coefficients with t-statistics in parentheses. Standard errors are clustered at the partner level. All continuous variables are Winsorized at the 1st and 99th percentiles.

Variable definitions are presented in [Appendix B](#).

APCumIndExp across the two partners in our main analysis, which arguably captures the highest level of cumulative industry expertise applied to the audit engagement. Because larger values of the audit quality proxies indicate lower audit quality, *APCumIndExp* is expected to be negatively associated with the audit quality proxies if cumulative industry expertise leads to higher audit quality.

Turning to our control variables (*Controls*), following prior studies based on the Chinese auditing setting (e.g., DeFond, Wong, and Li 1999; Wang, Wong, and Xia 2008; Guan et al. 2016; He, Pittman, Rui, and Wu 2017; Gong, Li, Lin, and Wu 2016; Gul et al. 2013; Wu and Ye 2020; Chen, Sun, and Wu 2010), we include controls capturing auditor attributes, client firm characteristics, and institutional factors. With respect to auditor attributes, we control for partners' cumulative expertise across all industries other than the focal client's industry (*APCumOthExp*). This allows us to account for a partner's general level of cumulative experience in other industries and is measured similarly to our test variable by taking into account the relative industry market shares in all other industries and timing factors across the partner's career. We also control for the partner's general length of experience (in years) in handling public firm audit engagements (*APGenYearExp*). To ensure that *APCumIndExp* provides incremental information to current-year-based industry knowledge used in prior studies (Chi and Chin 2011), we also control for the single-year-based proxy for partner industry expertise, namely partners with the largest and the second largest market shares in terms of client size in an industry (*APCurLeader*). In addition, we control for audit client importance at the partner level (*APCI*) and the tenure of the partner of a client (*APTtenure*). We also control for various partner characteristics considered in our analysis of the determinants of *APCumIndExp*. For the audit-firm-level control variables, we control for whether the audit firm is one of the top ten audit firms in China (*Big10*), whether the audit firm is an industry leader based on its market share of client size in an industry (*AFCurLeader*), and audit firm tenure of a client (*AFTenure*).

Regarding client attributes, we control for client size (*Size*), leverage (*Lev*), return on equity (*ROE*), sales growth (*Growth*), Tobin's q (*TobinQ*), operating cash flows relative to assets (*OCF*), inventory intensity (*Inv*), intangible assets intensity (*Intangible*), accounts receivable intensity (*AR*), quick ratio (*Quick*), listing age (*Age*), financial loss (*Loss*), financial distress (*Zscore*), performance volatility (*SdROA*), number of subsidiaries (*Subs*), and whether the client is a multinational company (*Multinational*). The intuitional factors we control for include the level of institutional ownership (*InsOwn*) and an indicator for whether the client has issued H-shares in the Hong Kong stock markets or B-shares offered initially to foreign investors (*BHShare*). We also control for the marketization index of the provinces where the client firm is located (*MktIndex*) and an indicator for whether the client is a state-owned enterprise (*SOE*). Detailed definitions of the variables are provided in Appendix B. We include industry fixed effects, year fixed effects, and audit firm fixed effects in the regressions.

Descriptive Statistics

Table 2, Panel A presents the summary statistics of the variables based on the main sample for our audit quality analysis. The 5th and 95th percentile values of *APCumIndExp* (0 and 1.943) suggest considerable variation in cumulative industry expertise in China. Interestingly, the mean and median values for *APCumOthExp* are larger than the comparable values of *APCumIndExp*, suggesting that partners often possess considerable experience from serving clients in other industries. The summary statistics for the audit quality proxies are similar to those documented in prior studies (e.g., Chi et al. 2017; Fang, Pittman, Zhang, and Zhao 2017; He et al. 2017), and so are the statistics for the other control variables (e.g., Guan et al. 2016; Fang et al. 2017; Gong et al. 2016; Wu and Ye 2020).

Table 2, Panel B shows that the values of the audit quality proxies generally decrease moving from the first to the fourth quartile of *APCumIndExp*. We also find significant ($p < 0.01$) differences between the mean values of the audit quality measures across the first and fourth quartiles of *APCumIndExp* based on all audit quality proxies, consistent with audit quality generally increasing with cumulative industry expertise.

Regression Results

Table 3, Panel A reports the main results from the estimation of Equation (2). The findings in the first two columns indicate that partners with greater cumulative industry expertise are associated with lower levels of unsigned and signed discretionary accruals ($|DAC|$ and *DAC*). The remaining results indicate that such partners are associated with a lower incidence of audit reporting errors (*ReportError*), regulatory sanctions (*Sanction*), and accounting restatements (*Restatement*). These results are significant at the 5 percent level or better. The magnitude of the coefficient of *APCumIndExp* in the $|DAC|$ regression (-0.003) suggests that moving from the 25th (0.104) to the 75th (0.797) percentile of *APCumIndExp* reduces $|DAC|$ by 0.003, which equates to 5.20 percent of its median value in our full sample (0.040). The comparable marginal effects of an interquartile increase in *APCumIndExp* are similar for our analyses based on the other proxies of audit quality.

TABLE 2
Summary Statistics

Panel A: Descriptive Statistics—Client Company-Year Level

Variables	n	Mean	Std. Dev.	P5	P25	Median	P75	P95
DAC	20,825	0.057	0.057	0.003	0.018	0.040	0.075	0.172
DAC	20,825	0.001	0.079	-0.122	-0.042	-0.002	0.038	0.134
ReportError	21,197	0.051	0.220	0.000	0.000	0.000	0.000	1.000
Sanction	21,197	0.081	0.272	0.000	0.000	0.000	0.000	1.000
Restatement	21,197	0.056	0.229	0.000	0.000	0.000	0.000	1.000
APCumIndExp	21,197	0.562	0.632	0.000	0.104	0.335	0.797	1.943
APCumOthExp	21,197	1.499	1.054	0.000	0.577	1.434	2.312	3.327
APCurLeader	21,197	0.109	0.311	0.000	0.000	0.000	0.000	1.000
APCurLeader	21,197	0.011	0.106	0.000	0.000	0.000	0.000	0.000
AFTenure	21,197	5.434	3.945	1.000	2.000	4.000	8.000	14.000
APTenre	21,197	2.332	1.230	1.000	1.000	2.000	3.000	5.000
APGenYearExp	21,197	2.288	0.596	1.099	1.946	2.398	2.708	2.996
Multinational	21,197	0.667	0.471	0.000	0.000	1.000	1.000	1.000
SdROA	21,197	0.031	0.050	0.002	0.008	0.016	0.035	0.108
TobinQ	21,197	0.405	1.972	-1.564	-0.641	-0.056	0.840	3.963
Growth	21,197	0.225	0.629	-0.294	-0.022	0.120	0.297	0.932
Zscore	21,197	6.846	9.547	0.760	2.005	3.742	7.377	24.331
OCF	21,197	0.042	0.076	-0.084	0.001	0.041	0.086	0.168
Intangible	21,197	0.048	0.055	0.000	0.015	0.033	0.060	0.151
Size	21,197	21.275	1.495	19.064	20.314	21.169	22.150	23.992
Lev	21,197	0.456	0.227	0.110	0.283	0.451	0.616	0.812
ROE	21,197	0.062	0.145	-0.112	0.028	0.068	0.115	0.220
Inv	21,197	0.160	0.152	0.005	0.061	0.120	0.203	0.506
AR	21,197	0.105	0.099	0.002	0.025	0.079	0.158	0.307
Quick	21,197	1.753	2.338	0.274	0.619	1.037	1.846	5.839
Age	21,197	2.293	0.640	1.099	1.792	2.398	2.833	3.091
Loss	21,197	0.098	0.297	0.000	0.000	0.000	0.000	1.000
Subs	21,197	2.329	0.972	0.693	1.609	2.303	2.944	3.970
InsOwn	21,197	0.375	0.235	0.018	0.172	0.373	0.558	0.767
BHShare	21,197	0.065	0.247	0.000	0.000	0.000	0.000	1.000
MktIndex	21,197	7.657	1.804	4.390	6.510	7.800	9.350	9.910
SOE	21,197	0.434	0.496	0.000	0.000	0.000	1.000	1.000
APCI	21,197	0.221	0.123	0.081	0.128	0.192	0.261	0.500
Big10	21,197	0.570	0.495	0.000	0.000	1.000	1.000	1.000
APGender	21,197	0.503	0.500	0.000	0.000	1.000	1.000	1.000
APSchool	21,197	1.900	0.807	1.000	1.000	2.000	3.000	3.000
APEducation	21,197	3.131	0.614	2.000	3.000	3.000	3.000	4.000
APMajor	21,197	2.502	0.802	1.000	2.000	3.000	3.000	3.000
APPosition	21,197	2.530	1.319	1.000	1.000	3.000	4.000	4.000
APEPartner	21,197	0.417	0.493	0.000	0.000	0.000	1.000	1.000
APOtherQualification	21,197	0.218	0.413	0.000	0.000	0.000	0.000	1.000
APBig4Experience	21,197	0.095	0.293	0.000	0.000	0.000	0.000	1.000

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Turning to our control variables, we find that the general experience in auditing public clients (*APGenYearExp*) and partners with leading industry market shares considered in prior studies (*APCurLeader*) do not affect the audit quality. The partner's knowledge in other nonfocal industries (*APCumOthExp*) might work against achieving high audit quality

TABLE 2 (continued)

Panel B: Descriptive Statistics for Dependent Variables by Quartiles of *APCumIndExp*

Variables	(1) Bottom Quartile	(2) Second Quartile	(3) Third Quartile	(4) Fourth Quartile	Differences Tests between Columns (4) and (1)	
					(5) Diffs	(6) p-value
DAC	0.063	0.057	0.054	0.054	-0.009***	0.000
DAC	0.005	-0.001	0.002	-0.004	-0.009***	0.000
ReportError	0.062	0.055	0.050	0.036	-0.026***	0.000
Sanction	0.096	0.083	0.078	0.066	-0.030***	0.000
Restatement	0.070	0.059	0.055	0.039	-0.031***	0.000

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.

Panel A of this table presents the descriptive statistics of the variables used in main analysis. Panel B of this table presents the values of audit quality proxies across the quartiles of *APCumIndExp* and compares the values of audit quality proxies between partners in the bottom quartile and top quartile of *APCumIndExp*.

TABLE 3

Regression Results Based on Partner-Level Cumulative Industry Expertise

Panel A: Influence of Partner-Level Cumulative Industry Expertise on Audit Quality Proxies

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
<i>APCumIndExp</i>	-0.003*** (-3.419)	-0.002** (-2.533)	-0.253*** (-3.108)	-0.183** (-2.439)	-0.237*** (-3.105)
<i>APCumOthExp</i>	-0.000 (-0.018)	-0.000 (-0.748)	0.065 (1.558)	0.138*** (3.862)	0.084** (2.044)
<i>AFCurLeader</i>	-0.001 (-0.634)	-0.001 (-0.591)	0.435*** (3.497)	-0.141 (-1.129)	0.380*** (3.199)
<i>APCurLeader</i>	0.002 (0.449)	-0.006 (-1.195)	-0.377 (-0.851)	-0.312 (-0.589)	-0.367 (-0.845)
<i>AFTenure</i>	-0.000 (-0.484)	0.000 (0.433)	-0.031** (-2.466)	-0.009 (-0.773)	-0.034*** (-2.923)
<i>APTenure</i>	-0.001*** (-2.799)	-0.000 (-0.156)	-0.015 (-0.485)	-0.046* (-1.727)	-0.032 (-1.087)
<i>APGenYearExp</i>	-0.001 (-0.714)	0.001 (0.835)	-0.040 (-0.542)	-0.096 (-1.512)	-0.051 (-0.713)
<i>Multinational</i>	-0.003** (-2.530)	-0.002 (-1.546)	0.049 (0.557)	-0.056 (-0.644)	0.067 (0.779)
<i>SdROA</i>	0.114*** (7.497)	-0.077*** (-4.883)	-0.491 (-0.596)	0.398 (0.616)	0.319 (0.483)
<i>TobinQ</i>	0.003*** (6.707)	0.002*** (3.657)	-0.055* (-1.907)	-0.007 (-0.293)	-0.027 (-1.062)
<i>Growth</i>	0.017*** (13.945)	0.006*** (4.558)	0.098** (2.176)	0.047 (1.219)	0.080* (1.792)
<i>Zscore</i>	-0.000*** (-4.205)	0.000*** (2.900)	0.006 (0.806)	0.009 (1.205)	0.003 (0.407)

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TABLE 3 (continued)

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
OCF	-0.061*** (-5.108)	-0.921*** (-113.899)	-1.653*** (-3.234)	-1.117*** (-2.757)	-1.794*** (-3.757)
Intangible	-0.028*** (-3.091)	-0.039*** (-4.067)	-1.668** (-2.133)	-1.426* (-1.918)	-0.905 (-1.238)
Size	0.001*** (2.632)	0.009*** (16.365)	-0.051 (-1.094)	-0.140*** (-3.454)	-0.090** (-1.992)
Lev	0.016*** (5.028)	-0.055*** (-16.155)	0.289 (1.179)	0.947*** (4.067)	0.604*** (2.596)
ROE	0.022*** (5.241)	0.052*** (8.494)	0.220 (0.896)	-0.282* (-1.763)	0.207 (0.862)
Inv	0.033*** (6.380)	-0.006 (-1.300)	-0.615* (-1.784)	-0.635** (-2.010)	-0.560* (-1.719)
AR	-0.006 (-1.008)	0.000 (0.017)	-0.406 (-0.884)	-0.354 (-0.787)	-0.753* (-1.648)
Quick	0.000 (0.663)	-0.002*** (-6.634)	-0.013 (-0.532)	-0.121*** (-3.781)	-0.005 (-0.214)
Age	0.000 (0.385)	-0.007*** (-7.192)	0.073 (0.922)	0.164* (1.875)	0.124 (1.574)
Loss	0.001 (0.502)	-0.014*** (-7.539)	0.006 (0.047)	0.483*** (5.178)	0.241** (2.023)
Subs	-0.003*** (-5.076)	-0.006*** (-9.783)	0.107* (1.946)	0.171*** (3.310)	0.107** (1.975)
InsOwn	-0.000 (-0.092)	0.012*** (5.691)	-0.318* (-1.660)	-0.543*** (-3.079)	-0.291 (-1.566)
BHShare	-0.008*** (-3.712)	-0.004 (-1.515)	-0.250 (-1.263)	-0.437** (-2.043)	-0.270 (-1.456)
MktIndex	0.000 (0.144)	-0.001** (-2.306)	-0.052** (-2.175)	-0.019 (-0.785)	-0.047** (-2.004)
SOE	-0.004*** (-3.173)	-0.002 (-1.509)	-0.109 (-1.071)	-0.300*** (-3.022)	-0.167* (-1.692)
APCI	-0.009** (-2.248)	-0.004 (-1.202)	-0.103 (-0.274)	0.320 (1.030)	0.154 (0.425)
Big10	-0.004 (-0.984)	0.001 (0.150)	-0.729** (-2.086)	0.484** (2.039)	-0.628* (-1.807)
APGender	-0.000 (-0.418)	-0.001 (-1.549)	0.007 (0.092)	-0.234*** (-3.719)	-0.013 (-0.181)
APSchool	0.000 (0.844)	0.000 (0.313)	0.047 (1.032)	-0.048 (-1.134)	0.041 (0.929)
APEducation	-0.000 (-0.357)	0.000 (0.534)	0.060 (0.983)	0.032 (0.632)	0.059 (1.010)
APMajor	-0.001 (-1.476)	0.000 (0.119)	-0.015 (-0.318)	0.001 (0.031)	-0.011 (-0.247)
APPosition	0.000 (0.115)	0.000 (1.023)	0.017 (0.553)	-0.016 (-0.557)	0.017 (0.577)
APEPartner	-0.000 (-0.170)	0.004*** (2.841)	0.211* (1.756)	0.079 (0.799)	0.165 (1.456)
APOtherQualification	0.000 (0.064)	0.000 (0.180)	-0.099 (-0.891)	-0.051 (-0.526)	-0.106 (-0.970)

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TABLE 3 (continued)

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
<i>APBig4Experience</i>	-0.001 (-0.524)	-0.003* (-1.697)	-0.032 (-0.178)	-0.302 (-1.530)	-0.068 (-0.387)
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes
n	20,825	20,825	21,197	21,197	21,197
Adjusted/Pseudo R ²	0.137	0.677	0.041	0.083	0.046

Panel B: Results Using Indicator Variables Based on Different Cutoffs

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
Partners ranked in the top 10% of <i>APCumIndExp</i>					
<i>APCumIndExpTop10</i>	-0.003 (-1.590)	-0.003** (-2.099)	-0.371** (-2.478)	-0.101 (-0.775)	-0.301** (-2.065)
Partners ranked in the top 15% of <i>APCumIndExp</i>					
<i>APCumIndExpTop15</i>	-0.003** (-2.465)	-0.003** (-2.116)	-0.448*** (-3.547)	-0.236** (-2.047)	-0.344*** (-2.875)
Partners ranked in the top 20% of <i>APCumIndExp</i>					
<i>APCumIndExpTop20</i>	-0.004*** (-2.958)	-0.003** (-2.475)	-0.358*** (-3.247)	-0.236** (-2.312)	-0.305*** (-2.875)
Partners ranked in the top 25% of <i>APCumIndExp</i>					
<i>APCumIndExpTop25</i>	-0.003** (-2.399)	-0.002** (-2.230)	-0.362*** (-3.596)	-0.223** (-2.476)	-0.314*** (-3.211)
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes
n	20,825	20,825	21,197	21,197	21,197

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.

This table presents the regression results on the relationship between partner-level cumulative industry expertise and audit quality. Panel A reports the regression results based on a continuous measure of partner cumulative industry expertise (*APCumIndExp*). Panel B reports the regression results based on different cutoffs to designate industry specialized auditors based on *APCumIndExp*. The test variables in Panel B capture partners with the *APCumIndExp* values above the 90th, 85th, 80th, and 75th percentiles (*APCumIndExpTop10*, *APCumIndExpTop15*, *APCumIndExpTop20*, *APCumIndExpTop25*, respectively). Our tests of discretionary accruals are based on a smaller sample ($n = 20,825$) because we require an industry-year to have at least 20 observations when estimating the industry-year level regressions to calculate the discretionary accruals. Numbers reported are regression coefficients with *t/z*-statistics in parentheses. Standard errors are clustered at client level. All continuous variables are Winsorized at the 1st and 99th percentiles.

Variable definitions are presented in [Appendix B](#).

in the focal industry, as it is positively associated with *Sanction* and *Restatement*. The partner's tenure (*APTenure*), which could capture the partner's client-specific knowledge, is negatively associated with *|DAC|* and *Sanction*. We do not discuss the results for the remaining control variables to conserve space but note that most of the results are similar to those documented in prior studies in the Chinese setting (e.g., [Fang et al. 2017](#); [Gong et al. 2016](#)).

The test variable in our main analysis (*APCumIndExp*) allows for a continuous measure of partner-level cumulative industry expertise without relying on subjective cutoffs to designate industry specialist partners. However, the results reported in [Table 3](#), Panel B show that our inferences generally remain robust when we use indicators to capture

partners with *APCumIndExp* values above the 90th, 85th, 80th, and 75th percentiles. These results support the positive impact of partner-level cumulative industry expertise on audit quality.²²

VI. ROBUSTNESS TESTS

Mitigating Endogeneity Concern

We perform several robustness checks to alleviate the concern regarding unobservable factors simultaneously determining the assignment of industry specialist partners and clients' financial reporting quality. As shown in Table 4, Panel A, we find that all of our results remain robust to the inclusion of client fixed effects ($p < 0.10$ or better), which mitigate the influence of time-invariant client characteristics. The results reported in Table 4, Panel B show that the coefficient on *APCumIndExp* remains negative and significant in all regressions after including partner fixed effects to address the impact of other partner characteristics ($p < 0.10$ or better).²³

Next, we employ entropy balancing, a multivariate reweighting method for mitigating concerns of functional form misspecification. To execute this analysis, we define the treatment and control firms based on whether a partner has an *APCumIndExp* value that places the partner in the top quartile (*APCumIndExpTop25* = 1). This approach is consistent with the cutoff used in prior studies to designate industry-specialized audit partners (Zerni 2012). Following McMullin and Schonberger (2022), we balance the mean and variance of the control variables across the treatment and control firms. Table 4, Panel C shows that our findings remain largely the same after estimating our main analyses based on the reweighted variables.²⁴

Further, following the approach in Custódio and Metzger (2013) to compare outcomes for the same individual, we perform the analysis based on a reduced sample in which we require a partner to operate in at least two industries in a year but be identified as a specialist in only one industry based on *APCumIndExpTop25*. Relying on this restricted sample and including partner fixed effects, we compare the audit quality across the different engagements of the same partners to further alleviate the concern that omitted partner attributes drive our results. The results from this analysis, reported in Table 4, Panel D, indicate a positive and significant relation between *APCumIndExpTop25* and three audit quality proxies.

Finally, we use a two-stage instrumental variable (IV) approach based on our analysis in Table 1 to further alleviate the endogeneity issue arising from omitted variables. Notwithstanding the challenges of identifying and relying on weak instruments (Larcker and Rusticus 2010), we employ the variable, *FirstYearLowRisk*, from our cumulative industry expertise determinants analysis in Table 1 as our IV. As discussed earlier, *FirstYearLowRisk* captures the low risk of lawsuits in an industry in the year that partners first handle audit engagements of public firms, incentivizing partners to stay in the industry and accrue industry expertise. However, a low rank in the number of lawsuits in an industry from a distant year (*FirstYearLowRisk*) is unlikely to directly affect the audit quality of current clients. The results from the first-stage regression, reported in Table 5, Panel A, indicate that *FirstYearLowRisk* has significant predictive power for *APCumIndExp*. Results from the second-stage regression, reported in Table 5, Panel B, indicate a negative and

²² We perform several additional tests to ensure the robustness of our findings to alternative measures of *APCumIndExp*. First, we re-estimate our analyses after using client sales or audit fees to calculate the client market share weighting factor ($MS_{i,j,t}$). Second, we repeat our analyses after varying the time weighting factor $TW_{i,j,t}$ used to construct *APCumIndExp* so that it is assigned a value of 0.1 for all years prior to the four (instead of nine) years preceding the current year. This approach further discounts the weighting of industry experience gained between four and nine years ago, which could be considered more outdated. Conversely, given the possibility that each year of industry experience can be equally valuable, we set the varying time weighting factor $TW_{i,j,t}$ to 1 for all prior years. Third, to alleviate the concern that our results are driven by the continuous industry experience that partners gain from a particular client, we repeat our analysis after measuring cumulative industry expertise based on the most recent experience of partners with each client across the partners' career. The untabulated results from all of these additional tests generate results that are almost identical to our main results; the coefficient on *APCumIndExp* remains negative and significant ($p < 0.10$ or better) in 19 of the 25 regressions across these tests.

²³ Following Fung, Raman, and Zhu (2017) and Wu and Ye (2020), we use a linear probability model when we include client fixed effects and partner fixed effects. An issue of using a linear probability model is that the predicted probabilities may fall outside the internal [0,1]. However, this is very uncommon in our sample.

²⁴ Untabulated tests confirm no significant post-weighting differences in means and variances across the treatment and control firms. When performing entropy balancing in the full sample, the match ratio is 0.059 and the maximum weight is 42.19. To address the issue of the relatively low match ratio, we follow McMullin and Schonberger (2022) and adopt an approach that combines propensity score matching (PSM) and entropy balancing. Specifically, we first run a logistic regression of *APCumIndExpTop25* and calculate the propensity scores. We remove observations unlikely to act as a valid counterfactual for the control sample by deleting the observations in the treatment and control groups with propensity scores smaller than 0.02 or larger than 0.98. This approach reduces the sample size to 7,510. We then perform entropy balancing (mean and variance) in the trimmed sample. The match ratio improves to 0.42 and the maximum weight is 6.11, both of which fall into the acceptable ranges according to McMullin and Schonberger (2022). Our results stay largely the same when we perform the regression analysis using this trimmed sample with entropy balancing. In addition, we also perform PSM directly on the full sample and conduct coarsened exact matching (CEM) based on *Size*, *Lev*, and *Loss*. Our findings from the PSM- and CEM-based tests are consistent with those reported in our main analysis.

TABLE 4
Mitigating Endogeneity Concerns

Panel A: Results After Controlling for Client Firm Fixed Effects

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
<i>APCumIndExp</i>	-0.004*** (-2.878)	-0.002* (-1.703)	-0.009* (-1.933)	-0.010* (-1.651)	-0.011** (-2.256)
n	20,825	20,825	21,197	21,197	21,197
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

Panel B: Results After Controlling for Partner Fixed Effects

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
<i>APCumIndExp</i>	-0.003*** (-3.058)	-0.003*** (-2.782)	-0.009** (-2.341)	-0.010* (-1.943)	-0.009** (-2.233)
n	20,825	20,825	21,197	21,197	21,197
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

Panel C: Results After Entropy Balancing

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
<i>APCumIndExpTop25</i>	-0.003** (-2.461)	-0.002** (-2.245)	-0.225* (-1.908)	-0.112 (-1.167)	-0.233** (-2.042)
n	20,825	20,825	21,197	21,197	21,197
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

Panel D: Results Based on Partners with Clients across (at Least) Two Industries and Controlling for Partner Fixed Effects

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
<i>APCumIndExpTop25</i>	-0.004** (-2.378)	-0.003** (-2.056)	-0.005 (-0.693)	-0.022** (-2.490)	-0.004 (-0.531)
n	6,290	6,290	6,416	6,416	6,416
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.

This table presents the regression results for the analyses to mitigate endogeneity concern. Panel A reports the results when client fixed effects are added to the regressions. Panel B reports the results when partner fixed effects are added to the regressions. Panel C reports the results after entropy balancing. Panel D reports the results based on partners who have clients across at least two industries and are identified as industry specialists in at least one industry and are not identified as industry specialists in at least one industry. Numbers reported are regression coefficients with *t/z*-statistics in parentheses. Standard errors are clustered at client level. All continuous variables are Winsorized at the 1st and 99th percentiles. Variable Definitions are presented in [Appendix B](#).

TABLE 5
Two-Stage Regressions with an IV

Panel A: First Stage of IV-2SLS Analysis

Variables	$y = APCumIndExp$	
	Coeff.	t-statistics
<i>FirstYearLowRisk</i>	0.094***	2.885
Controls in second-stage regression		Yes
Year FEs		Yes
Industry FEs		Yes
Audit firm FEs		Yes
n		15,963
Adjusted R ²		0.411

Panel B: Second Stage of IV-2SLS Analysis

Variables	(1) <i> DAC </i>	(2) <i>DAC</i>	(3) <i>ReportError</i>	(4) <i>Sanction</i>	(5) <i>Restatement</i>
<i>Pred_APCumIndExp</i>	-0.049* (-1.735)	0.033 (1.254)	-0.178* (-1.781)	-0.098 (-0.835)	-0.177* (-1.708)
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes
n	15,713	15,713	15,963	15,963	15,963
Second-stage F-value	7.270	119.120	1.670	5.140	1.910
(Second-stage p-value)	(p < 0.000)	(p < 0.000)	(p < 0.000)	(p < 0.000)	(p < 0.000)
First-stage Cragg-Donald Wald F-value	26.136	26.136	29.654	29.654	29.654
(First-stage p-value)	(p < 0.100)	(p < 0.100)	(p < 0.100)	(p < 0.100)	(p < 0.100)

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.

This table presents the regression results for the two-stage regressions with IVs. Numbers reported are regression coefficients with t-statistics in parentheses. Standard errors are clustered at client level. All continuous variables are Winsorized at the 1st and 99th percentiles.

Variable definitions are presented in [Appendix B](#).

significant ($p < 0.10$) coefficient on the predicted value of *APCumIndExp* (*Pred_APCumIndExp*) across our results based on the three proxies of audit quality.²⁵

Overall, although we find consistent results across the above robustness checks seeking to address endogeneity concerns, we acknowledge that it is impossible to fully address or assess the extent to which the robustness tests alleviate endogeneity concerns in our research setting.

Alternative Measures of Client-Year *APCumIndExp* with Two Signing Partners

Although we use the maximum *APCumIndExp* of the two partners in our main tests, in untabulated tests, we find that our results remain qualitatively similar using the *APCumIndExp* of the first signing partner, the *APCumIndExp* of the second signing partner, and the average *APCumIndExp* of the two partners. Further, given that partners with more senior positions could exert greater influence in the audit engagements, we also document consistent results when we employ the *APCumIndExp* of the partner with a higher position in the audit firm.²⁶

²⁵ We also perform an analysis in which we use a restricted sample of first-time audit clients to evaluate whether partners with higher partner-level cumulative industry expertise are assigned to clients with lower audit risk, proxied using presence of restatements (*PastRestatement*) or sanctions (*PastSanction*) in the prior three years. We investigate this by regressing *PastSanction* or *PastRestatement* on *APCumIndExp* and other attributes of partners (e.g., gender, seniority, educational level, prestige of alma mater). We do not find significant results for *APCumIndExp*, suggesting that partners with greater cumulative industry expertise do not have a preference for and/or are assigned to clients with lower audit risk.

²⁶ If one of the signing auditors is the equity partner of the audit firm, we consider the partner as more senior. If both signing auditors are not partners, we consider the signing auditor holding a higher position in the audit firm as more senior. If both signing auditors are not partners and hold the same level of position, we select the partner with the larger value for *APCumIndExp*.

TABLE 6
Address Alternative Explanation of Client-Specific Expertise

Panel A: Results Based on First Year Clients

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
<i>APCumIndExp</i>	−0.002* (−1.698)	−0.001 (−1.039)	−0.285** (−2.174)	−0.326*** (−3.139)	−0.294** (−2.395)
n	6,628	6,628	6,762	6,762	6,762
Adjusted/Pseudo R ²	0.180	0.620	0.069	0.104	0.074
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

Panel B: Deleting Observations Audited by at Least One Auditor Who Has Experienced Mandatory Rotation for Their Current Clients

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
<i>APCumIndExp</i>	−0.003*** (−3.112)	−0.002** (−2.359)	−0.220*** (−2.593)	−0.159** (−2.012)	−0.207*** (−2.606)
n	18,246	18,246	18,578	18,578	18,578
Adjusted/Pseudo R ²	0.138	0.677	0.041	0.083	0.046
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.

This table presents the regression results to exclude the alternative explanation that our results are driven by client-specific knowledge. Panel A reports the results based on first-year clients only. Panel B reports the results after excluding cases with “repeated” clients when one of the partners is rotated off a client and then rotated back to the client. Numbers reported are regression coefficients with t/z-statistics in parentheses. Standard errors are clustered at client level. All continuous variables are Winsorized at the 1st and 99th percentiles.

Variable definitions are presented in [Appendix B](#).

Alternative Audit Quality Proxies

In untabulated tests, we also find that *APCumIndExp* positively affects other indicators of audit quality used in prior studies. Specifically, we find that *APCumIndExp* is associated with higher audit fees ($p < 0.01$), lower levels of income-increasing accruals ($p < 0.01$), and less total accruals ($p < 0.01$).²⁷ Taken together with our main findings, the result based on audit fees suggests that partner-level cumulative industry expertise is priced for audits while also enhancing audit quality in our setting.

Mitigate the Confounding Effect of Partner Client-Specific Expertise

Although we control for partner-level client tenure (*APTenure*) in our main analysis, we further alleviate the confounding impact of the partner’s client-specific knowledge by re-estimating our main analyses after restricting our sample to firm-year observations in which both partners are in their first year of tenure with a client (i.e., no prior partner-level experience with the client). The results from this analysis are reported in [Table 6](#), Panel A. We find that *APCumIndExp* is negative and significant for four audit quality proxies ($p < 0.10$ or better). Additionally, we delete

²⁷ We use a two-step procedure to estimate discretionary accruals and test the effect of *APCumIndExp* on |DAC| and DAC in our main analyses. This approach might be subject to biased coefficients ([Chen, Hribar, and Melessa 2018](#)). To alleviate this concern, we follow [Chen et al. \(2018\)](#) and use total accruals as the dependent variable and regress them on both the variables in the first-stage estimation of discretionary accruals and all control variables included in [Equation \(2\)](#).

“repeated” clients, i.e., when one of the partners is rotated off a client and then rotated back to the client. The results from these analyses, reported in Table 6, Panel B, yield results similar to our main findings ($p < 0.05$ or better). In an untabulated analysis, we find insignificant results for the interaction effect between *APCumIndExp* and *APTenure*. Overall, these additional analyses suggest that our findings are unlikely to be explained by client-specific knowledge afforded by longer client tenure.

Comparability with Single-Year-Based Measures of Partner Industry Expertise

Next, we consider how our measure of partner-level cumulative industry expertise differs from single-year-based partner industry expertise measures used in prior studies. The cross-tabulated frequency counts presented in Table 7, Panel A reveal that between 37 and 43 percent of client observations in which partners are ranked above the 90th, 85th, 80th, and 75th percentile values of a single-year proxy for partner industry expertise based on the current year market share of a partner in an industry (*APCurMS*) do not have above the corresponding (i.e., 90th, 85th, 80th and 75th) percentile values of our test variable *APCumIndExp* in the industry.

Figure 1 further demonstrates how the divergence between *APCumIndExp* and single-year-based measures of partner industry expertise can be attributed, at least partly, to the novelty of our approach of considering the cumulative industry expertise of partners. To illustrate this, we first compute *APCumIndExp* for all partners in 2017 using client data from 2016 only (i.e., single-year data only) and classify partners as industry experts if their *APCumIndExp* value places them in the top decile (referred to as baseline industry expert partners). The solid line in Figure 1 illustrates a monotonic decrease in the percentage of baseline industry expert partners that remain in the top decile of *APCumIndExp* as we gradually include more years over the past decade (i.e., since 2007) to measure *APCumIndExp*. The slope’s final resting point indicates that about 27 percent of baseline industry expert partners are no longer in the top decile of *APCumIndExp* when we consider data from 2016 through 2007 to deduce *APCumIndExp*. The other three dotted lines in Figure 1 depict similar findings when we repeat this exercise after identifying baseline industry expert partners as those with 2016-based *APCumIndExp* values that are above the 85th, 80th, and 75th percentiles. The findings in Table 7, Panel A and Figure 1 suggest that using single-year-based proxies to capture partner industry expertise can result in significant Type I errors (i.e., classify partners without significant cumulative industry expertise as industry experts).

TABLE 7

Single-Year-Based Measure of Partner Industry Expertise: Comparison and Empirical Results

Panel A: Comparison between *APCumIndExp* and Single-Year Market Share Based on Industry Expertise

The Comparison between *APCurMSTop10* and *APCumIndExpTop10*

	<i>APCurMSTop10</i> = 0	<i>APCurMSTop10</i> = 1	Percentage of obs. where <i>APCurMSTop10</i> = 1
<i>APCumIndExpTop10</i> = 0	18,178	904	<i>APCumIndExpTop10</i> = 0
<i>APCumIndExpTop10</i> = 1	904	1,211	42.74%

The Comparison between *APCurMSTop15* and *APCumIndExpTop15*

	<i>APCurMSTop15</i> = 0	<i>APCurMSTop15</i> = 1	Percentage of obs. where <i>APCurMSTop15</i> = 1
<i>APCumIndExpTop15</i> = 0	16,691	1,330	<i>APCumIndExpTop15</i> = 0
<i>APCumIndExpTop15</i> = 1	1,330	1,846	41.87%

The Comparison between *APCurMSTop20* and *APCumIndExpTop20*

	<i>APCurMSTop20</i> = 0	<i>APCurMSTop20</i> = 1	Percentage of obs. where <i>APCurMSTop20</i> = 1
<i>APCumIndExpTop20</i> = 0	15,291	1,671	<i>APCumIndExpTop20</i> = 0
<i>APCumIndExpTop20</i> = 1	1,671	2,564	39.46%

The Comparison between *APCurMSTop25* and *APCumIndExpTop25*

	<i>APCurMSTop25</i> = 0	<i>APCurMSTop25</i> = 1	Percentage of obs. where <i>APCurMSTop25</i> = 1
<i>APCumIndExpTop25</i> = 0	13,953	1,949	<i>APCumIndExpTop25</i> = 0
<i>APCumIndExpTop25</i> = 1	1,949	3,346	36.81%

(continued on next page)

TABLE 7 (continued)

Panel B: Analysis Based on Different Levels of *APCumIndExp* and Signal-Year Based Industry Expertise

Variables	(1) <i> DAC </i>	(2) <i>DAC</i>	(3) <i>ReportError</i>	(4) <i>Sanction</i>	(5) <i>Restatement</i>
<i>APHCumHCur</i>	-0.004** (-2.327)	-0.003** (-2.091)	-0.316** (-2.382)	-0.315** (-2.465)	-0.203 (-1.486)
<i>APHCumLCur</i>	-0.001 (-0.510)	-0.002 (-1.609)	-0.312** (-2.190)	-0.198* (-1.704)	-0.308** (-2.253)
<i>APLCumHCur</i>	0.002 (1.021)	-0.001 (-0.642)	0.197 (1.627)	-0.145 (-1.259)	0.168 (1.320)
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes
n	20,825	20,825	21,197	21,197	21,197
Adjusted/Pseudo R ²	0.136	0.676	0.029	0.083	0.046

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.

Panel A compares indicators of partner cumulative industry expertise based on *APCumIndExp* and indicators of industry specialist partners based on current year market share calculated using client assets (*APCurMS*) to assess the extent to which *APCumIndExp* differs from the proxies for partner industry expertise that rely on *APCurMS*. Panel B presents the results of the regressions in which three indicator variables are used to identify partners with different levels of *APCumIndExp* and *APCurMS*. *APHCumHCur* equals 1 if *APCumIndExp* is in the top quartile and *APCurMS* is also in the top quartile; *APHCumLCur* equals 1 if *APCumIndExp* is in the top quartile and *APCurMS* is not in the top quartile; *APLCumHCur* equals 1 if *APCumIndExp* is not in the top quartile and *APCurMS* is in the top quartile. Numbers reported are regression coefficients with *t/z*-statistics in parentheses. Standard errors are clustered at client level. All continuous variables are Winsorized at the 1st and 99th percentiles.

Variable definitions are presented in [Appendix B](#).

Table 7, Panel B extends our Panel A investigation by repeating our main analysis using three indicator variables to capture instances in which: (1) both *APCumIndExp* and *APCurMS* are in the top quartile (*APHCumHCur*), (2) *APCumIndExp* is in the top quartile, but *APCurMS* is not in the top quartile (*APHCumLCur*), and (3) *APCumIndExp* is not in the top quartile, but *APCurMS* is in the top quartile (*APLCumHCur*). The regression results reported in Table 7, Panel B indicate that *APHCumHCur* (*APHCumLCur*) loads significantly ($p < 0.10$ or better) for four (three) audit quality proxies. In contrast, the coefficient on *APLCumHCur* is not significant in any of the regressions. The contrasting results for *APHCumHCur* and *APLCumHCur* suggest that higher levels of current year industry expertise do not impact audit quality on their own but can promote audit quality when combined with higher levels of cumulative industry expertise. However, the significant results for *APHCumLCur* suggest that cumulative industry expertise can positively influence audit quality even in the absence of higher levels of current year industry expertise. These findings further support the view that using current year clientele data may not allow for capturing partner industry expertise in a meaningful manner that matters for promoting audit quality.

VII. ADDITIONAL ANALYSES

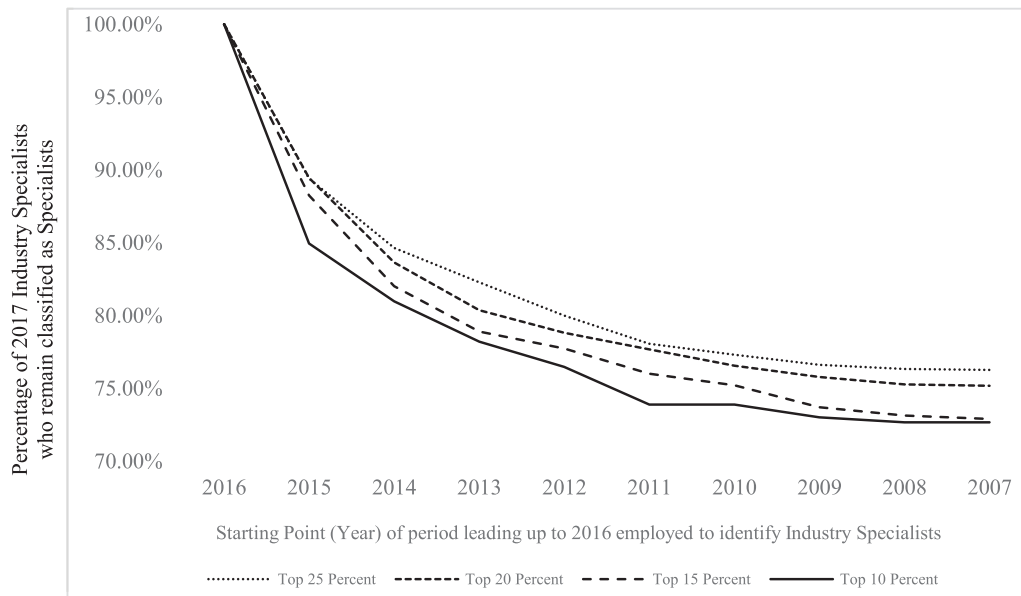
Cross-Sectional Analyses

We next consider cross-sectional analyses to shed light on situations in which the effect of partner-level cumulative industry expertise on audit quality will be reinforced or reduced.

Importance of Persistent Presence in an Industry

Our theoretical arguments suggest that partners develop a more profound understanding of relevant industry knowledge through acquiring knowledge in a persistent and nondisruptive manner. We assess this by testing whether persistent presence in an industry reinforces the positive effect of cumulative industry expertise on audit quality. To this end, we first compute the maximum number of consecutive years the partner spent auditing clients in the focal industry over the past decade (relative to the current year). We then divide the sample into high- and low-persistency subsamples

FIGURE 1
Decay in Industry Specialist Partners Designation after Incorporating Past Decade's Industry Experience



This figure depicts the percentage of partners classified as industry specialists in 2017 based on 2016 clientele data only who remain classified as industry specialists after gradually taking into account their prior experience in the industry over the past decade. The solid line depicts the pattern for a set of partners who are classified as industry specialists if they rank in the top 10 percent based on values for our measure of industry specialist partners (*APCumIndExp*). The starting point of the line represents the full set (i.e., 100 percent) of specialist partners in 2017 identified based on 2016 clientele data only. We then assess the percentage of these partners that remain ranked in the top 10 percent after remeasuring *APCumIndExp* using clientele data from 2016 and 2015, 2016 and the preceding two years, 2016 and the preceding three years, and so on. The resulting percentage values are summarized in the solid line, which reflects the extent to which partners who rank in the top 10 percent in *APCumIndExp* in 2016 remain classified in the top 10 percent group after gradually taking into account their industry experience from an increasing number of prior years. For ease of interpretation, we limit our illustration to industry experience gained over the past decade only (2016–2007). The other lines replicate this analysis after classifying partners as industry specialists if they have values for our measure of cumulative industry expertise (*APCumIndExp*) ranking in the top 15, 20, and 25 percent, respectively.

based on the median value of persistency in an industry, and replicate our main analysis in each subsample.²⁸ The results presented in Table 8, Panel A indicate negative and significant coefficients on *APCumIndExp* for four audit quality proxies (except for *Sanction*) in the subsample of high persistency. The comparable coefficients in the low-persistency subsample are significant in the analyses for three proxies of audit quality. Further tests indicate significant differences between the coefficients across the two subsamples in two out of five regressions. These results suggest that the effect of cumulative industry expertise on promoting audit quality is more pronounced for partners who acquire expertise through more persistent presence in an industry and provide some support for our argument that emphasizes the importance of continuously auditing clients in an industry across many years for developing partner-level industry expertise.

Multi-Industry Operations and Financial Reporting Comparability

Industry knowledge can help partners assess industry-level risks and benchmark the focal client’s operations and associated financial reporting against its peers in the same industry. Such benefits are likely to diminish (1) when the focal client operates in multiple industries, which requires partners to have knowledge in more than one industry, and

²⁸ To be consistent with selecting the highest *APCumIndExp* among the two partners, we rely on the partner who has the highest *APCumIndExp* to evaluate the degree of persistency in an industry. We limit the measurement of this variable to the past decade only to allow for the decay of too-distant knowledge. Our results remain similar if we use all years instead of the past decade to measure partners’ persistent presence in an industry. In addition, our measure of persistent presence in an industry is different from partners’ general auditing experience. For example, if we classify partners into relatively less and more experienced ones based on the median value of *APGenYearExp* (equivalent to ten years of auditing experience), 54 percent of the less experienced partners will be classified into the high-*Persistency* group, and 32 percent of the more experienced ones will be classified into the low-*Persistency* group.

TABLE 8
Cross-Sectional Analyses

Panel A: Persistent Presence in an Industry

Variables	(1) <i> DAC </i>	(2) <i>DAC</i>	(3) <i>ReportError</i>	(4) <i>Sanction</i>	(5) <i>Restatement</i>
Partners with higher persistent presence in industries					
<i>APCumIndExp</i>	−0.003*** (−2.693)	−0.002** (−1.960)	−0.324*** (−2.921)	−0.120 (−1.257)	−0.317*** (−2.963)
n	10,577	10,577	10,737	10,737	10,737
Partners with lower persistent presence in industries					
<i>APCumIndExp</i>	−0.003** (−2.478)	−0.003** (−2.345)	−0.149 (−1.316)	−0.268** (−2.422)	−0.127 (−1.226)
n	10,248	10,248	10,460	10,460	10,460
Test of Coeff. diff. of variable <i>APCumIndExp</i>					
Differences	0.000	0.001	−0.175*	0.148	−0.190**
p-value	0.440	0.180	0.080	0.180	0.050
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

Panel B: Degree of Diversified Operations in Multiple Industries

Variables	(1) <i> DAC </i>	(2) <i>DAC</i>	(3) <i>ReportError</i>	(4) <i>Sanction</i>	(5) <i>Restatement</i>
Clients with a higher degree of diversified operations in multiple industries					
<i>APCumIndExp</i>	−0.003** (−2.184)	−0.002 (−1.533)	−0.167 (−1.494)	−0.028 (−0.279)	−0.189* (−1.736)
n	8,903	8,903	9,091	9,091	9,091
Clients with a lower degree of diversified operations in multiple industries					
<i>APCumIndExp</i>	−0.003** (−2.350)	−0.003** (−2.442)	−0.458*** (−3.427)	−0.457*** (−3.755)	−0.383*** (−3.251)
n	8,942	8,942	9,088	9,088	9,088
Test of Coeff. diff. of variable <i>APCumIndExp</i>					
Differences	0.000	0.001	0.291**	0.429***	0.194*
p-value	0.430	0.230	0.030	0.000	0.080
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

Panel C: Comparability of Accounting Information

Variables	(1) <i> DAC </i>	(2) <i>DAC</i>	(3) <i>ReportError</i>	(4) <i>Sanction</i>	(5) <i>Restatement</i>
Clients with more comparable accounting information					
<i>APCumIndExp</i>	−0.004** (−2.497)	−0.004** (−2.574)	−0.250 (−1.539)	−0.275* (−1.822)	−0.248* (−1.725)
n	5,925	5,925	6,019	6,019	6,019
Clients with less comparable accounting information					
<i>APCumIndExp</i>	−0.001 (−0.584)	−0.001 (−1.017)	−0.227 (−1.439)	−0.129 (−1.031)	−0.185 (−1.229)
n	6,009	6,009	6,105	6,105	6,105

(continued on next page)

TABLE 8 (continued)

Variables	(1) <i> DAC </i>	(2) <i>DAC</i>	(3) <i>ReportError</i>	(4) <i>Sanction</i>	(5) <i>Restatement</i>
Test of Coeff. diff. of variable <i>APCumIndExp</i>					
Differences	-0.003**	-0.003**	-0.023	-0.146	-0.063
p-value	0.020	0.050	0.510	-0.170	0.420
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.

This table presents the regression results of cross-sectional analyses. Panel A reports the results based on the partners' persistent presence in industries. Panel B reports the results based on clients' degree of diversified operations in multiple industries. Panel C reports the results based on clients' accounting information comparability. Comparisons of the coefficients are based on Fisher's permutation test. Numbers reported are regression coefficients with *t/z*-statistics in parentheses. Standard errors are clustered at client level. All continuous variables are Winsorized at the 1st and 99th percentiles.

Variable definitions are presented in [Appendix B](#).

(2) when the focal client's financial reporting is less comparable to other firms in the same industry, a situation that renders information gathered from industry peers less relevant for the focal audit engagement.

We test the above conjectures by performing two sets of subsample analyses. In the first analysis, we measure the client's degree of operations in multiple industries by calculating its concentration of revenues across industries (i.e., the Herfindahl index of revenues). We consider client companies with resulting Herfindahl index values below (above) the sample median as those with a relatively high (low) degree of multi-industry operations. Consistent with our expectation, results from subsample regressions, as reported in [Table 8](#), Panel B, show that *APCumIndExp* loads negatively and significantly in all of five regressions for the subsample of firms with a low degree of multi-industry operations. Conversely, the coefficient on *APCumIndExp* is statistically significant in two of five regressions for the subsample of firms with a high degree of multi-industry operations. Comparisons of coefficients reveal significant differences across three of the five regressions. In the second analysis, we follow [De Franco, Kothari, and Verdi \(2011\)](#) to measure clients' financial reporting comparability and divide the sample into a high-comparability subsample and a low-comparability subsample based on the industry median. The regression results, reported in [Table 8](#), Panel C, show that the coefficients on *APCumIndExp* are negative and significant for four of five audit quality proxies in the high-comparability group. In contrast, *APCumIndExp* is insignificant in all regressions for the low-comparability group. Comparisons of coefficients reveal that the differences are significant in two of five regressions. Taken together, the results in Panels B and C provide some support for the finding that the audit quality effects of partner-level cumulative industry expertise weaken when the client company has diversified operations and less comparable accounting information.

Generalizability of Findings

The research issue of partner-level cumulative industry expertise considered in this study has universal appeal. However, the fact that the Chinese audit market has relatively weak institutions and Big 4 audit firms hold a small fraction of the Chinese audit market highlights the importance of enhancing the generalizability of our findings to other countries. To alleviate the concern that medium- and small-sized audit firms drive our findings, we re-estimate our main analysis based on clients of the top ten audit firms in China.²⁹ To alleviate the concern about weak institutions, we restrict our analysis to firms located in provinces with more developed markets and institutions (i.e., local market development index greater than the sample median); such firms are more likely to adhere to international accounting practices. The results from these analyses, reported in [Table 9](#), Panels A and B, continue to indicate a negative and significant relation between *APCumIndExp* and all proxies of audit quality ($p < 0.10$ or better).

²⁹ We use the total client revenues to rank audit firms. We select the top ten audit firms instead of Big 4 audit firms because Big 4 audit firms have a small market share in China in terms of number of listed company clients. The top ten audit firms include the Big 4 firms and collectively command a market share of about 57 percent of total listed clients (in terms of client revenues).

TABLE 9
Generalizability of Findings

Panel A: Clients with Top Ten Audit Firms

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
<i>APCumIndExp</i>	-0.003** (-2.220)	-0.002** (-2.001)	-0.215* (-1.832)	-0.203** (-1.976)	-0.202* (-1.822)
n	11,891	11,891	12,085	12,085	12,085
Adjusted/Pseudo R ²	0.148	0.677	0.042	0.087	0.047
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

Panel B: Clients Located in Provinces with Market Development Index above the Sample Median

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
<i>APCumIndExp</i>	-0.004*** (-2.601)	-0.003*** (-2.616)	-0.292** (-2.437)	-0.289** (-2.376)	-0.305*** (-2.608)
n	10,440	10,440	10,617	10,617	10,617
Adjusted/Pseudo R ²	0.132	0.706	0.060	0.118	0.068
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

Panel C: Clients Audited by Partners from Offices Located in Beijing/Shanghai

Variables	(1) DAC	(2) DAC	(3) ReportError	(4) Sanction	(5) Restatement
<i>APCumIndExp</i>	-0.004*** (-3.104)	-0.002 (-1.441)	-0.368*** (-3.047)	-0.229** (-2.164)	-0.349*** (-3.037)
n	8,659	8,659	8,832	8,832	8,832
Adjusted/Pseudo R ²	0.151	0.651	0.066	0.101	0.074
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

(continued on next page)

Another important attribute of the Chinese market is that audit firms have a greater presence in big cities such as Beijing and Shanghai, which provide partners with larger clients and resources to develop industry expertise. To ensure that our results are generalizable to audit offices in both large and small cities, we replicate our main analysis separately for clients audited by at least one partner in Beijing and Shanghai, that collectively make up a third of our sample, and for clients with partners in other cities. The results from these analyses are reported in Table 9, Panels C and D. We find that our findings for *APCumIndExp* hold for partners located in Beijing and Shanghai ($p < 0.05$ or better, except for *DAC*) as well as those located in other cities ($p < 0.10$ or better).

Applicability to Countries with Limited Partner Clientele Data

Our framework for capturing cumulative industry expertise could be challenging to adopt in countries that have only recently introduced engagement partner disclosure requirements (e.g., the U.S.) or in other countries where the

TABLE 9 (continued)

Panel D: Clients Audited by Partners from Offices Located outside Beijing/Shanghai

Variables	(1) <u> DAC </u>	(2) <u>DAC</u>	(3) <u>ReportError</u>	(4) <u>Sanction</u>	(5) <u>Restatement</u>
<i>APCumIndExp</i>	-0.003** (-2.045)	-0.002* (-1.931)	-0.207* (-1.947)	-0.183* (-1.843)	-0.191* (-1.923)
n	12,166	12,166	12,365	12,365	12,365
Adjusted/Pseudo R ²	0.128	0.699	0.042	0.087	0.045
Controls	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes
Audit firm FEs	Yes	Yes	Yes	Yes	Yes

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.

This table presents the regression results from the analyses to ensure the generalizability of our main findings. Panel A reports the results based on client-years audited by the top ten audit firms in China. Panel B reports the results for companies located in provinces with more developed capital markets and stronger institutions (i.e., market development index above the sample median). Panel C reports the results for client-years with at least one partner located in Beijing or Shanghai. Panel D reports the results for client-years with both partners from offices located outside Beijing or Shanghai. Numbers reported are regression coefficients with *t/z*-statistics in parentheses. Standard errors are clustered at client level. All continuous variables are Winsorized at the 1st and 99th percentiles.

Variable definitions are presented in [Appendix B](#).

manual hand collection of partner data is tedious and time-consuming (e.g., Australia). As such, we explore the minimum number of years for which the partners' clientele should be accounted for before our measure of partner-level cumulative industry expertise affects all proxies of audit quality, as observed in our main results. Our untabulated findings from these tests reveal that we require data from four years prior to the current year to construct our measure of partner-level cumulative industry expertise before we witness a significant ($p < 0.10$) relation between cumulative industry expertise and all five proxies of audit quality. This analysis helps guide researchers who can access data from only a limited number of years to consider the cumulative industry expertise of partners.³⁰

VIII. CONCLUSION

Relying on extensive historical partner-level audit engagement data from China, we examine the relation between audit quality and partner-level cumulative industry expertise. We commence by showing the role that early partner experiences as well as the size, growth, and homogeneity of the industry can play in the development of partner-level cumulative industry expertise. Our main results reveal that partner-level cumulative industry expertise has an incremental positive effect on audit quality after controlling for the current-year-based measure of partner industry expertise commonly used in prior studies, general auditing experience of the partners, and partners' client-specific knowledge. In contrast, single-year-based measures of partner industry expertise yield insignificant results in our setting. Additional analyses show that our findings are likely to be generalizable to conditions found in developed countries (e.g., large audit firms that dominate the audit markets).

Collectively, our findings emphasize the importance of future studies adopting a longitudinal approach to capturing partners' industry expertise. Our findings are timely and relevant, given the dramatic increase in audit-partner-level studies, following the newly introduced disclosures in identifying audit partners in the U.S. These findings also present several avenues for future research. For example, it is reasonable to expect that individuals differ in their ability to transform cumulative experience in an industry into expertise. Hence, future studies can explore contextual factors that can explain individual auditors' ability and speed in developing industry expertise. Further, although this study employs a cumulative market-share-based approach to capture industry expertise, future studies can consider other approaches allowing partners to acquire industry expertise across their careers, such as knowledge spillovers from other members of the audit team. Finally, one caveat in our study is that our measure is only based on partners' experience in auditing

³⁰ Consistent with this finding, five of the seven respondents from our small-scale survey also indicated that a partner needs four to six years of auditing experience in an industry to develop industry expertise.

public clients. Future studies can improve this measure by accounting for other elements of partners' experience (e.g., experience prior to becoming partners, experience auditing private firms) when data is available.

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APPENDIX A

TABLE A1

Illustration of Computation of Partner-Level Cumulative Industry Expertise (*APCumIndExp*)

Panel A: *APCumIndExp* Computation for Partner A in Industry “C1” in Year 2017

Year	Total Client Assets (Billion RMB) in Industry “C1” Audited by Partner A in Each Year (<i>Client Size CI</i>)	Total Client Assets (Billion RMB) in Other Industries Audited by Partner A in Each Year (<i>Client Size Other</i>)	Total Client Assets (Billion RMB) in Industry “C1” in Each Year (<i>TotalClientSize CI</i>)	MS ((<i>Client Size CI</i> / <i>TotalClientSize CI</i>) × 100)	TW	MS × TW
2004	6.82	0.00	221.18	3.08	0.10	0.31
2005	6.37	0.00	232.44	2.74	0.10	0.27
2006	12.76	0.00	264.80	4.82	0.10	0.48
2007	25.13	0.00	333.99	7.52	0.10	0.75
2008	28.26	0.00	338.71	8.34	0.20	1.67
2009	14.87	0.00	412.34	3.61	0.30	1.08
2010	17.78	0.00	506.86	3.51	0.40	1.40
2011	21.63	0.00	652.17	3.32	0.50	1.66
2012	0.00	0.00	753.78	0.00	0.60	0.00
2013	0.00	0.00	830.04	0.00	0.70	0.00
2014	27.00	0.00	1,034.10	2.61	0.80	2.09
2015	28.50	0.00	1,033.12	2.76	0.90	2.48
2016	30.08	17.96	1,192.93	2.52	1.00	2.52
2017	30.97	19.39	1,391.35	2.23		

14.71

$$APCumIndExp = \ln(\sum_{2004}^{2017} MS \times TW + 1) = \ln(14.71 + 1) = 2.75$$

(continued on next page)

TABLE A1 (continued)

Panel B: *APCumIndExp* Computation for Partner B in Industry “C1” in Year 2017

Year	Total Client Assets (Billion RMB) in Industry “C1” Audited by <i>Partner B</i> in Each Year (<i>Client Size CI</i>)	Total Client Assets (Billion RMB) in Other Industries Audited by <i>Partner B</i> in Each Year (<i>Client Size Other</i>)	Total Client Assets (Billion RMB) in Industry “C1” in Each Year (<i>TotalClientSize CI</i>)	MS ((<i>Client Size CI</i> / <i>TotalClientSize CI</i>) × 100)	TW	MS × TW
2013	18.71	6.48	830.04	2.25	0.70	1.58
2014	20.75	0.00	1,034.10	2.01	0.80	1.61
2015	25.30	0.00	1,033.12	2.45	0.90	2.21
2016	26.91	49.27	1,192.93	2.26	1.00	2.26
2017	31.39	49.03	1,391.35	2.26		
						7.66

$$APCumIndEXP = \ln(\sum_{2013}^{2017-1} MS \times TW + 1) = \ln(7.66 + 1) = 2.16$$

Panel C: *APCumIndExp* Computation for Partner C in Industry “C1” in Year 2017

Year	Total Client Assets (Billion RMB) in Industry “C1” Audited by <i>Partner C</i> in Each Year (<i>Client Size CI</i>)	Total Client Assets (Billion RMB) in Other Industries Audited by <i>Partner C</i> in Each Year (<i>Client Size Other</i>)	Total Client Assets (Billion RMB) in Industry “C1” in Each Year (<i>TotalClientSize CI</i>)	MS ((<i>Client Size CI</i> / <i>TotalClientSize CI</i>) × 100)	TW	MS × TW
2003	2.59	4.79	198.45	1.31	0.10	0.13
2004	3.99	6.15	221.18	1.80	0.10	0.18
2005	0.00	0.00	232.44	0.00	0.10	0.00
2006	4.99	3.41	264.80	1.88	0.10	0.19
2007	5.87	0.00	333.99	1.76	0.10	0.18
2008	7.09	4.41	338.71	2.09	0.20	0.41
2009	6.30	5.85	412.34	1.53	0.30	0.46
2010	7.02	9.77	506.86	1.38	0.40	0.55
2011	0.00	11.96	652.17	0.00	0.50	0.00
2012	0.00	16.30	753.78	0.00	0.60	0.00
2013	8.41	21.47	830.04	1.01	0.70	0.71
2014	8.63	7.27	1,034.10	0.83	0.80	0.66
2015	9.09	0.00	1,033.12	0.88	0.90	0.79
2016	9.41	0.00	1,192.93	0.79	1.00	0.79
2017	10.17	5.61	1,391.35	0.73		
						5.06

$$APCumIndExp = \ln(\sum_{2003}^{2017-1} MS \times TW + 1) = \ln(5.06 + 1) = 1.80$$

TW = a weighting term that discounts more distance experience of the partner with clients in an industry; MS = the industry market share of the assets audited by the partner in a year. For more detailed explanations, please refer to [Section IV](#).

APPENDIX B

Variable Definitions

Panel A: Variables Used in Main Empirical Tests

Dependent Variables (Audit Quality Proxies)

<i>DAC</i>	Performance-adjusted discretionary accruals as described in Kothari, Leone, and Wasley (2005) .
$ DAC $	The absolute value of performance-adjusted discretionary accruals.
<i>ReportError</i>	An indicator variable equal to 1 if the auditor issues a clean opinion to a given client firm in year t , but the annual financial statements for the firm in year t are restated in subsequent years, and 0 otherwise.
<i>Sanction</i>	An indicator variable equal to 1 if the client is subsequently sanctioned by CSRC, MOF, or stock exchanges due to problematic accounting practices, and 0 otherwise.
<i>Restatement</i>	An indicator variable equal to 1 if earnings in the current year t are subsequently restated due to accounting issues or accounting frauds, and 0 otherwise. We exclude restatements that are due to changes in accounting standards or tax rules, or mergers and acquisitions.

Treatment Variables

<i>APCumIndExp</i>	Partner-level cumulative industry expertise measure developed in this study. We use the maximum <i>APCumIndExp</i> of the two signing partners in our main analysis.
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Control Variables

<i>APCumOthExp</i>	Partner-level expertise in industries other than the current client's focal industry; the construction of this variable is similar to the approach used to measure <i>APCumIndExp</i> , except that the industries considered are those other than the current client's industry.
<i>APGenYearExp</i>	Natural logarithm of 1 plus the total number of years since the partner started signing audit reports of public clients.
<i>Multinational</i>	An indicator variable equal to 1 if a client company generates foreign revenues, and 0 otherwise.
<i>SdROA</i>	Standard deviation of ROA in the past three years.
<i>Growth</i>	Sales growth, measured as the difference between current year and last year sales divided by last year sales.
<i>Zscore</i>	Degree of financial distress measured by Z-scores developed in Altman (1968) .
<i>OCF</i>	Operating cash flows divided by total assets.
<i>Intangible</i>	Intangible asset intensity measured by the value of intangible assets divided by total assets.
<i>TobinQ</i>	Industry-year median adjusted Tobin's q .
<i>Size</i>	Natural logarithm of year-end sales.
<i>Lev</i>	Total liabilities divided by total assets at the end of a year.
<i>ROE</i>	Return on equity calculated as net income divided by the average of beginning and ending shareholder equity.
<i>Loss</i>	An indicator variable equal to 1 if net income is negative, and 0 otherwise.
<i>Inv</i>	The ending balance of inventories divided by year-end total assets.
<i>AR</i>	The ending balance of accounts receivable divided by year-end total assets.
<i>Quick</i>	Quick ratio, calculated as the sum of cash and cash equivalents and short-term investments, divided by year-end current liabilities.
<i>Age</i>	Natural logarithm of 1 plus the number of years a client company has been listed.
<i>Big10</i>	An indicator variable equal to 1 for Big 10 audit firms, and 0 otherwise.
<i>BHShare</i>	An indicator variable equal to 1 if the firm has issued B-shares and/or H-shares, and 0 otherwise.
<i>MktIndex</i>	Annual marketization index of the provinces in which the client firm is located, derived from Wang, Fan, and Hu (2018) and Fan, Wang, and Zhu (2011) .
<i>APCI</i>	Client importance measured as the natural logarithm of 1 plus the total assets of a given client, divided by the client portfolio size (the natural logarithm of 1 plus the sum of total assets of all clients) of the individual auditors.
<i>Subs</i>	Natural logarithm of 1 plus the number of subsidiaries of a listed company.
<i>InsOwn</i>	Institutional ownership calculated as the ownership percentage of institutional investors.
<i>APCurLeader</i>	An indicator variable equal to 1 if the client company is audited by the partner who has either the largest or the second largest market shares measured by client assets in an industry-year, and 0 otherwise.

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APPENDIX B (continued)

<i>AFCurLeader</i>	An indicator variable equal to 1 if the client company is audited by the audit firm that has the largest market share measured by client assets in an industry-year, and 0 otherwise.
<i>APTenure</i>	Partner tenure with a given client (maximum tenure of the two partners).
<i>AFTenure</i>	Audit firm tenure with a given client.
<i>APGender</i>	An indicator variable equal to 1 if at least one of the partners is female, and 0 otherwise.
<i>APSchool</i>	A discrete variable that indicates the reputation of partner's graduating university, equal to 3 if at least one of the partners graduates from a "985 project" university, 2 if at least one of the partners graduates from a "211 project" university, and 1 otherwise.
<i>APEducation</i>	A discrete variable that indicates the partners' education levels, equal to 5 if least one partner holds a doctoral degree, 4 if at least one partner holds a Master's degree, 3 if at least one partner holds a Bachelor's degree, 2 if at least one partner holds a degree from vocational schools, and 1 otherwise.
<i>APMajor</i>	A discrete variable that indicates the partners' education background, equal to 3 if at least one partner has a major in accounting, auditing, financial management, or tax, 2 if at least one partner has a major in economics, business administration, or public finance, and 1 otherwise.
<i>APPosition</i>	A discrete variable that indicates the partners' seniority in the audit firm, equal to 4 if at least one partner is a (deputy) director or (deputy) general manager, 3 if at least one partner is a (deputy) senior manager or (deputy) department manager, 2 if at least one partner is a (deputy) project manager, and 1 otherwise.
<i>APEPartner</i>	An indicator variable equal to 1 if at least one of the partners is an equity partner of the audit firm, and 0 otherwise.
<i>APOtherQualification</i>	An indicator variable equal to 1 if at least one of the partners has asset appraisal certificate, certified tax agent certificate, and other related qualifications, and 0 otherwise.
<i>APBig4Experience</i>	An indicator variable equal to 1 if at least one of the partners has auditing experience in an international Big 4 audit firm, and 0 otherwise.

Panel B: Other Variables Used in Determinant Analysis, Robust Checks, and Additional Tests

<i>APCumIndExpTop10</i>	An indicator variable equal to 1 for a client when the partner's <i>APCumIndExp</i> is above the 90th percentile of the distribution in a year, and 0 otherwise.
<i>APCumIndExpTop15</i>	An indicator variable equal to 1 for a client when the partner's <i>APCumIndExp</i> is above the 85th percentile of the distribution in a year, and 0 otherwise.
<i>APCumIndExpTop20</i>	An indicator variable equal to 1 for a client when the partner's <i>APCumIndExp</i> is above the 80th percentile of the distribution in a year, and 0 otherwise.
<i>APCumIndExpTop25</i>	An indicator variable equal to 1 for a client when the partner's <i>APCumIndExp</i> is above the 75th percentile of the distribution in a year, and 0 otherwise.
<i>APCurMSTop10</i>	An indicator variable equal to 1 for a client when the partner's current year market share in a year is above the 90th percentile of the distribution in a year, and 0 otherwise.
<i>APCurMSTop15</i>	An indicator variable equal to 1 for a client when the partner's current year market share in a year is above the 85th percentile of the distribution in a year, and 0 otherwise.
<i>APCurMSTop20</i>	An indicator variable equal to 1 for a client when the partner's current year market share in a year is above the 80th percentile of the distribution in a year, and 0 otherwise.
<i>APCurMSTop25</i>	An indicator variable equal to 1 for a client when the partner's current year market share in a year is above the 75th percentile of the distribution in a year, and 0 otherwise.
<i>FirstYearLowRisk</i>	An indicator variable equal to 1 if the current client's industry is one of the industries that did not have any lawsuits in the first year of the partner's handling audit engagements of listed firms, and 0 otherwise.
<i>FirstYearIndustry</i>	An indicator variable equal to 1 if the current client's industry is the industry in which the partner had most clients in her first year of handling audit engagements of listed firms, and 0 otherwise.
<i>PairAPCumIndExp</i>	Cumulative industry expertise of the paired partner using the <i>APCumIndExp</i> of the paired partner from the first client handled by the focal partner in an industry.
<i>IndIntangible</i>	Intensity of intangible assets in the industry in the past three years.
<i>IndGrowth</i>	Average sales growth of firms in an industry in the past five years.

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APPENDIX B (continued)*Top5Province*

An indicator variable equal to 1 for partners located in the top five cities and provinces in terms of economic development, namely Beijing, Shanghai, Guangdong, Zhejiang, and Jiangsu. Beijing and Shanghai are municipalities under the jurisdiction of the central government, which are equivalent to provinces in China, and 0 otherwise.

Homogeneity

Industry operation homogeneity measure following [Bills et al. \(2015\)](#).
