



# Financial investment by non-financial firms: does it affect audit quality?

Litan Wang<sup>1</sup> · Kefei You<sup>2</sup>  · Hui Chen<sup>1</sup>

Accepted: 17 July 2024  
© The Author(s) 2024

## Abstract

In the context of the global trend of increasing financial investment by non-financial firms, this study investigates how this process affects the audit quality of these firms. Employing data of Chinese listed non-financial firms from 2011 to 2020, we first examine whether the increasing proportion of financial assets in the total assets has an adverse impact on the audit quality of these firms. We then analyze the mediation effect of operational volatility on such impact by adopting the mediation test of the modified Sobel's  $z$  and the bootstrap test. We find that a higher proportion of financial assets to total assets lowers the audit quality, confirming that the financialization of non-financial firms deteriorates their audit quality. Furthermore, the mediation tests show that operational volatility is an important channel for this negative effect.

**Keywords** Financial investment · Audit quality · Financialization · State ownership · Big 4 and non-big 4

**JEL Classification** G11 · G32 · M42 · C10

## 1 Introduction

Many prior pieces of literature investigate audit quality from the perspectives of firms' demand (Jensen & Meckling, 1976; DeFond & Zhang, 2014; Francis, 2011), auditors' supply (Knechel et al., 2007; Balsam et al., 2003; Lim & Tan, 2008; Payne,

---

✉ Kefei You  
K.You@greenwich.ac.uk

<sup>1</sup> Shanghai Lixin University of Accounting and Finance, Shanghai, China

<sup>2</sup> University of Greenwich, London SE10 9LS, UK

2008; Reichelt & Wang, 2010; Goldman et al., 2022; He et al., 2022) and regulatory policy (e.g., the Sarbanes-Oxley Act) (Fung et al., 2017).

However, less is known about how the financialization of non-financial firms affects audit quality. Financialization describes the increasing role of financial motives, financial markets, financial actors, and financial institutions in the operation of domestic and international economies (Epstein & Jayadev, 2005). Given the substitution effect between the real and financial assets subject to a certain amount of aggregate capital available for firms' investments (Tobin, 1965), the rise of the share of financial assets to aggregate capital, in contrast to the falling share of real assets, is referred to as financialization of non-financial firms (Zhang & Zheng, 2020).

Some studies have shown that the financialization of non-financial firms could generate cash in prodigious amounts, supporting the firm's operation and acting as the promotion effect (Theurillat et al., 2010), and that higher levels of financialization of non-financial firms result in less investment in riskier long-term projects (Wang & Mao, 2022). On the other hand, others argue that the financialization of non-financial firms leads to distortion of resource allocation on real sector investments, which is referred to as the "crowding-out" effect (Orhangazi, 2008; Demir, 2009a).

This study examines how the global movement of financialization of non-financial firms affects the audit quality of these firms. It is inspired by the fact that the financialization of non-financial firms alters not only the relative size of the financial assets, but also managers' behavior; the latter could have a significant influence on the audit quality of these firms. It is long established that managers manipulate information or real activities when presenting the profits or losses of their firms (Roychowdhury, 2006; Jin & Myers, 2006; Hutton et al., 2009). The shift from physical to financial investment has provided managers at non-financial firms with increasing room to manipulate the number of earnings or profits through financial assets, as by exploiting the challenges in identifying the fair values of financial assets, these managers are now allowed to choose accounting policies in the classification and subsequent measurement of financial assets to realize their personal goals. These goals include smoothing earnings (Graham et al., 2005), avoiding reporting annual losses (Roychowdhury, 2006), avoiding tax (Kim et al., 2011a), and keeping personal gains and career prospects (Xu et al., 2014). Therefore, such exploitation of managers following the rising proportion of financial assets makes it more difficult to assess the fair value of the financial assets. It subsequently induces potential adverse impact on the audit quality, especially when the auditors do not have enough knowledge and expertise to detect and correct the inaccuracy in accounting and audit evidence presented by the firms. However, studies analyzing such possible adverse impact of financialization on audit quality are scant in the existing literature. In view of this, this study addresses this gap by examining the important issue of whether financialization of non-financial firms leads to the deterioration of the audit quality of these firms.

To achieve this, our research design starts with investigating financialization's impact on audit quality. We then analyze the main channel through which such an effect occurs by examining the mediation effect of operational volatility. We employ the mediation tests of the modified Sobel's  $z$  plus bootstrap test for this part of the analysis. Finally, we carry out robustness checks and examine the issue of possible endogeneity. We consider auditor expertise (at both firm-level and office-level indus-

try), the investment horizon of the financial assets (i.e., short- or long-term), and the ownership of the non-financial firms (i.e., state- or non-state-owned) in all analysis.

Our findings can be summarized as follows. First, a higher proportion of financial assets to total assets lowers audit quality, confirming that the financialization of non-financial firms deteriorates the audit quality. Second, the mediation tests show that operational volatility is an important channel for the negative effect that financialization exerts on the audit quality of non-financial firms. Third, the state ownership nature of non-financial firms helps raise audit quality whilst the auditor expertise and investment horizon (e.g., short-term) of the financial assets do not seem to affect the audit quality. Finally, our results are robust to alternative measures of financialization and audit quality and have no issue of endogeneity.

We contribute to the existing literature in the following three aspects. First, although many studies have explored factors determining audit quality (see Sect. 2.2 for a review of the literature in this strand), there is a lack of analyses investigating how the process of financialization may influence the audit quality of non-financial firms. A recent study by Ahn et al. (2020) examines how auditors' task-specific fair value expertise contributes to higher audit quality. Compared to Ahn et al. (2020), our focus is on how audit quality is affected by non-financial firms' increasing investment in financial assets, as the fair value of these financial assets is intrinsically difficult to measure and hence they offer managers more room for accounting information manipulation. This would occur regardless of the expertise of the auditors. Building on previous literature on managers' manipulative behavior and how it leads to inaccurate accounting information, we provide a first analysis on how financialization exacerbates such improper behavior and eventually lowers audit quality. Second, this study investigates the mechanism via which the financialization of non-financial firms leads to the deterioration of the audit quality. Recently, Bryan and Mason (2022) have shown that earnings volatility is negatively associated with audit quality, as auditors perceive earnings volatility as affecting the risk associated with the audit. We go one step further by analyzing financialization as the cause of rising operational volatility due to the unverifiability of the precise value of financial assets and the high volatility in their prices, and we examine the increased operational volatility as a mediator in the financialization-audit quality relationship. In addition, we employ the mediation tests of the modified Sobel's  $z$  plus bootstrap test to analyze this mechanism. This method not only tests mediation but also shows the contribution made by the mediation effect towards the total effect between two parties. However, so far it has rarely been applied to the accounting and finance areas of research. Third, we consider several investment and firm-specific factors (i.e., investment horizon, state ownership and auditor expertise) in our analysis. The investment-specific factor, namely the short- and long-term investment horizon of financial assets, is understudied in previous literature as an aspect influencing audit quality.

To accomplish these objectives, we utilize the data of listed firms in China from 2011 to 2020. Most existing studies have primarily focused on the unequal capitalist core-periphery structure for developed economies and its role in economic growth (Xie et al., 2022; Rodrigues et al., 2018). However, little is known about how the financialization of non-financial firms listed in China affects audit quality. The average amount of financial assets held by each listed non-financial firm in China has

increased from 175.6 million Yuan or 2.2.% of total assets in 2011 to 953.5 million or 7.6% of total assets in 2020 (See Table 1). This trend may indicate that, on the one hand, non-financial firms allocate their assets in financial assets to achieve diversification and to mitigate risks of a capricious market; on the other hand, non-financial firms maximize their profit when the marginal profit from the return of financial assets is more than that from the physical assets. Compared to developed economies where the share of financial assets invested by all non-financial firms in the total assets has started to stabilize in the past decade (e.g., between 45 and 49% in the US during 2011–2020 based on FRED Economic Data), China is at an earlier stage of financialization, and its financialization exhibits a continuously rising trend. Moreover, the Chinese financial market is still under-developed, and its accounting standards are often ambiguous (Xu & Guo, 2021) and can be subject to local intervention (DeFond et al., 1999; Wang et al., 2008). Such an environment gives managers of non-financial firms more incentive and room to manipulate financial asset prices and accounting information, leading to a strong adverse effect on audit quality. Thus, China provides a fitting context for our analysis of the impact of non-financial firms' financialization on audit quality.

The rest of the paper is organized as follows. Section 2 briefly reviews the global background of financialization and relevant literature. Section 3 presents the development of Hypotheses 1 and 2. Section 4 outlines the methodology. Section 5 describes the data. Section 6 presents the empirical results and Sect. 7 concludes.

## 2 Global background of financialization and a brief review of relevant literature

### 2.1 Background of financialization

Non-financial firms, particularly manufacturing companies, have increasingly relied on financial income streams. For instance, US non-financial firms' proportion of financial assets relative to real assets increased from around 30% in the 1970s to over 100% in the early 2000s, and the return on these assets grew from 20% for most of the 1960s to a high of over 50% from the late 1980s to the early 2000s (Dutta, 2018). Such structural change in the portfolio allocation decision of non-financial firms is confirmed by many studies for developed economies (e.g., Epstein & Jayadev, 2005; Krippner, 2005) as well as for some developing markets (e.g., Demir (2009a) for Argentina, Mexico and Turkey and Zhang and Zheng (2020) for China).

Non-financial firms investing in financial assets are often driven by precautionary reasons and by the profit maximization motive (Demir, 2009a). Concerning capital flow, financial constraints, external environment, and other risks brought by market volatility, allocation of financial assets improves operational flexibility (Almeida et al., 2004), alleviates financial distress (DeAngelo et al., 2002), and avoids risks on fixed assets (Demir, 2009a). In terms of profit maximization, when the profit generated from the investment in physical assets is less than that from the investment in financial assets, firms tend to allocate more financial assets to maximize profits (Demir, 2009a). In fact, since the 1980s, the rate of return of most financial industries

**Table 1** Financial investment by non-financial firms in China (2011–2020)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Sum	2011–2020
Num/ <i>fin</i>	1118	1209	1308	1910	2143	2343	2663	2817	3063	3369	21,943	2194
Total	2087	2278	2331	2462	2670	2869	3296	3376	3503	3803	28,675	2868
Ratio (%)	53.6	53.1	56.1	77.6	80.3	81.7	80.8	83.4	87.4	88.6		76.5

*Note* Data are collected from the China Security Market and Accounting Research (CSMAR). “Num/*fin*”, “Total” and “Ratio (%)” denote the number of non-financial firms which are engaged in financial assets investment, the total number of non-financial firms, and the ratio of the former to the latter, respectively. The last number in the final column is a ratio of the period average number of non-financial firms which have made the financial investment to the period average total number of non-financial firms

has been higher than that of the physical industry (Xu & Guo, 2021). Epstein and Jayadev (2005) show that during an economic downturn, firms would divide more financial assets to achieve the purpose of asset preservation or appreciation.

## 2.2 Literature review

The quality of the audit report is closely linked to the interests of investors, shareholders, regulators, and even the stability of the financial market (Financial Stability Board (FSB), 2012). Given its importance, many studies have analyzed the reasons behind the demand for high audit quality. Jensen and Meckling (1976) theorize that clients' demand for high-quality audit reports is to reduce agency costs. DeFond and Zhang (2014) further point out that the higher the proxy conflict, the greater the demand for third-party assurance and high-quality audit reports. Indeed, many studies have confirmed the crucial role of audit quality in resolving problems generated by conflicts of interest between firms and their shareholders (e.g., Schauble, 2018). Even in a country with weak institutions, private firms will increase their demand for high-quality audit reports to improve investor protection (Francis, 2011). In contrast, some literature suggests that the demand for high-quality audit reports may not necessarily reduce agency costs but may in fact increase them. For example, Godfrey and Hamilton (2005) and Cahan et al. (2008) argue that firms with higher Initial Public Offering (IPO) risks and more earnings would hire top-tier auditors in order to conceal agency costs. Focusing on auditors with different levels and areas of expertise, Godfrey and Hamilton (2005) find that firms' research and development (R&D) intensity is positively associated with their choices of auditors who specialize in auditing R&D contracts, leading to R&D-intensive firms' tendency in appointing top-tier auditors. Based on industrial-level evidence, Cahan et al. (2008) demonstrate that auditor concentration in an industry relates positively to both the level and homogeneity of the investment opportunity set (IOS) in the industry, while auditor dominance relates negatively to industry IOS homogeneity.

Another strand of literature explains factors driving auditors to supply high-quality audit reports. Knechel et al. (2007) summarize that auditors' engagement risk comes from litigation risk, reputation risk, and regulatory risk. Litigation risk refers to an auditor's risk of being sued due to the bankruptcy, fraud, or illegal act of the client, and its mitigation is an important motivation for auditors to provide high-quality audits (Habib et al., 2014). A number of studies have shown that auditors improve the quality of audit reports in order to maintain their reputation (e.g., Weber et al., 2008; Cahan et al., 2011). Regulatory risk describes the threat of intervention by public and quasi-public bodies, including warnings, fines, and suspension or revocation of audit business, another important consideration for audit firms to enforce high requirements in their reports (Hu et al., 2022).

In addition to the engagement risk, the influence of various other factors has also been analyzed. Many studies have shown that a higher level of expertise provides high-quality audit reports and vice versa (Balsam et al., 2003; Lim & Tan, 2008; Payne, 2008; Reichelt & Wang, 2010). More recently, Goldman et al. (2022) illustrate that auditors with specialized tax knowledge significantly improve the quality of tax audits, and He et al. (2022) show that when audit firms with lower levels of exper-

tise are merged with ones with higher levels of expertise, the former's audit quality improves substantially via the reduction in misstatement. Chin and Chi (2009) demonstrate that auditors at the partner level reduce restatements. Garcia-Blandon et al. (2019) illustrate that female auditors provide higher quality audit services than male auditors, and Choi et al. (2012) find that the closer the geographical proximity between the auditor and client, the higher the audit quality.

Notwithstanding the growing literature around the important issue of audit quality, very limited attention has been devoted to investigating how the ongoing global trend of financialization of non-financial firms (discussed in Sect. 2.1) has impacted audit quality. As elaborated in Sect. 1, financialization provides managers of non-financial firms with new opportunities to manipulate the fair-value of the financial assets, lowering the quality of the accounting information and making it more challenging to achieve high-quality audits. Therefore, our study provides a much-needed investigation into the relationship between the financialization of non-financial firms and audit quality, examining whether the former leads to the deterioration of the latter and the main channel of such influence.

Two recent studies are closely linked to ours. Ahn et al. (2020) examine how auditors' task-specific fair value expertise contributes to higher audit quality. The paper analyzes the fair value expertise gained from work experience during the audit of fair value measurements and how it influences the audit quality. Hence it broadly belongs to studies investigating how auditor expertise affects auditor quality (e.g., Balsam et al., 2003; Lim & Tan, 2008; Payne, 2008; Reichelt & Wang, 2010). The focus of our paper is on the impact of the financialization of non-financial firms on audit quality. Financialization presents managers with more space for manipulating accounting information, making it more challenging to assess the fair value of the financial assets and to accurately audit these firms. This would take place regardless of the expertise of the auditors, although auditor firms with more expertise may show stronger defense against such adverse impact of financialization on audit quality. Furthermore, as mentioned in Sect. 1, our study also assesses the mediation effect of operational volatility. Bryan and Mason (2022) show a negative association between earnings volatility and audit quality. They argue that auditors perceive earnings volatility as affecting the risk associated with the audit. Compared to Bryan and Mason (2022), our paper examines the increased operational volatility as a mediator in the relationship between financialization on audit quality. As explained in Sect. 3.2 below, here, operational volatility rises due to the unverifiability of the precise value of financial assets and the high volatility in their prices, especially during periods of crisis. In the process of financialization where a non-financial firm increases its holding of financial assets, the operational volatility brought by these financial assets makes it harder to evaluate their fair value, which enables managers' manipulation and creates barriers to high-quality audits. Additionally, we employ the modified Sobel's z plus bootstrap test for the mediation analysis. A major advantage of this method is that it not only tests mediation but also shows the contribution made by the mediation effect towards the total effect between two parties. Despite the merit of the method, its applications in the accounting and finance areas of research have been scarce.

### 3 Hypotheses development

#### 3.1 Financial investment of non-financial firms and audit quality

When a non-financial firm invests in financial assets, its managers are presented with the opportunity to choose accounting policies in the classification and subsequent measurement of financial assets (Mao & Xu, 2018). A most striking example is the measurement of the fair value of financial assets. This arises as the increase in fair value manipulation of financial assets can be positively correlated with the proportion of financial assets measured at fair value through profit or loss, as found in Luo (2021). For instance, in China, According to The Accounting Standards for Business Companies No. 22 - Recognition and Measurement of Financial Instruments, the cost of trading assets is measured at the price at the time of acquisition and confirmed as the fair value of financial assets at the end of the period. If the fair value of these financial assets changes during the period, a change of fair value is recorded in the current profit or loss. Meanwhile, the cost of financial assets available for sale is recorded as the price at the time of acquisition, and the values at the end of the period are measured as fair value, with the change of fair value recorded in the owner's equity. This regulation generates opportunities for the managers of non-financial firms to manipulate profits through financial assets classification and could also be used as a tool to whitewash short-term performance and market performance (Jin & Myers, 2006; Roychowdhury, 2006; Hutton et al., 2009). If the firm's profit declines, managers will often dispose of financial assets available for sale to achieve the purpose of improving profits in the short term. If the profit increases, the managers may have achieved the purpose of tax savings by recording the losses of financial assets (Kim et al., 2011a). Many studies have highlighted the challenging task of auditing fair value measurements (e.g., Glover et al., 2017). For instance, according to PCAOB inspections, audit deficiencies attributable to fair value measurement and impairment engagements continue to be significant and made up approximately 31% of all audit deficiencies in 2015 (Acuitas, 2017).

In addition, managers in non-financial firms would obtain some level of discretion because financial assets are not strictly classified under accounting standards (Li et al., 2018; Ye et al., 2009). For instance, when non-financial firms hold stocks and bonds that are determined to be traded in a short period, managers may selectively classify the trading financial assets as financial assets for sale without a clear intention of trading in order to reduce the impact of the transaction on current profits. Ye et al. (2009) show that listed companies with a large number of trading and available-for-sale financial assets tend to classify them as available-for-sale financial assets in order to create a "reservoir" for earnings management, so that they can dispose of these assets in the short term (contrary to the initial intention of holding them) if there is a need to avoid a decline in profits. Empirical studies in the existing literature have indeed shown that managers will use financial investment to hide negative news in the operation of companies (Peng et al., 2018), and when financial dilemma or distress becomes more serious, managers of these firms have greater pressure and willingness to hide unfavorable information (Zhu, 2016).



Furthermore, managers of non-financial firms are prone to manipulating accounting information to maximize personal utilities such as personal gains and career prospects, which damages the robustness and reliability of accounting information (Graham et al., 2005; Xu et al., 2014). Managers may also provide inaccurate accounting information in order to paint a better picture of firm performance as they need to justify their high levels of perk consumption. For instance, Kim et al. (2011b) examine CEO and CFO incentives arising from stock and stock option compensation and find that executives hide bad news until it is absolutely necessary to disclose it to the public. Xu et al. (2014) reach similar conclusions. In both cases, they reveal that once a large amount of accumulated bad news withheld by managers is disclosed to the market, it causes the stock price to crash. These adverse incentives prevent managers from providing reliable and high-quality accounting information, and they are further exacerbated by the opacity and subjectivity in evaluating the value of financial assets discussed above (Jin & Myers, 2006; Hutton et al., 2009; Kim & Zhang, 2014). The low quality of accounting information increases the difficulty for audit firms in detecting such inaccuracy in the audit evidence, which eventually harms the quality of the audit report, especially when the auditors do not have a sufficient level of knowledge and expertise.

Therefore, a higher proportion of financial assets in total assets grants managers more room to manipulate accounting policies, lowering the quality of audit evidence presented to auditors and eventually leading to the decline of audit quality. Some recent studies such as Ahn et al. (2020) investigate whether auditor task-specific fair value expertise contributes to higher audit quality and find it to be the case. We extend these studies by linking financialization which brings the challenging task of auditing the fair value of financial assets with the reduction in audit quality of non-financial firms.

**Hypothesis 1** A higher proportion of financial assets to total assets in a non-financial firm leads to lower audit quality.

### 3.2 The mediation effect of operational volatility

Whilst accounting standards expect managers to use fair value estimates to convey private information on future cash flows, the current fair value of financial assets is unverifiable because it depends in part on management's future actions (Ramanna & Watts, 2012). In addition, it is a challenge to measure the fair value of financial instruments whose active markets do not readily exist (Landsman, 2006). Studies on bank loans and share prices show that fair value accounting may not be reliable as not all risks (e.g., default and interest rate risks) and useful information in valuing a firm are reflected in the fair value estimates ((Barth & Clinch 1996, 2001). Securities' gains and losses estimates often contain too many measurement errors relative to the true underlying changes in the market values that Škoda and Sláviková (2015) find that fair value-based measures of net income are more volatile than historical-based measures. Recent development in financial technology also introduces new challenges in verifying the fair value of innovative financial assets (Hsieh & Brennan, 2022).

Furthermore, the price of financial assets is subjected to high volatility (Bank of International Settlements, 1996; IMF, 2020). Fair value measurement is not a static discipline and markets are demonstrating increasing interconnectedness (KPMG, 2017). Financial markets are particularly connected, especially given the advancement in financial technology and digital transformation in the past two decades (Feyen et al., 2021). The prices of financial assets are determined by not only domestic but also global factors (Ehrmann et al., 2011). Such interconnectedness causes high volatility in financial asset prices, especially during crisis periods due to the spillover effects (Caporale et al., 2019; IMF, 2022). The volatile nature of financial assets' prices generates more challenges for auditors in achieving fair value estimates.

Therefore, when a non-financial firm shifts its investment allocation toward financial assets, the two intrinsic characteristics of financial assets, namely the unverifiability of their precise fair value and high volatility in their prices, not only increase the complexity of accounting information but also enable managers' discretion or manipulation on the fair value of these assets (for motivations mentioned in Sect. 3.1) whilst still appearing to be adhering to the accounting standards.

We refer to these two intrinsic attributes of financial assets as operational volatility as it is generated by the non-financial firms' operations in financial investment and it gives rise to managers' manipulated volatility in the fair value estimates of financial assets. As such, operational volatility serves as a mediator through which the financialization of non-financial firms leads to inaccurate assessments of financial assets' fair value, reducing the precision of accounting information and audit evidence. Given that higher audit quality is associated with more informative and predictable earnings (Tache, 2021), investment in financial assets makes it harder for auditors to discover, identify, evaluate and respond to any possible intentional discretion and manipulation, and subsequently lowers the audit quality.

Several studies have examined how earning volatility affects audit quality (e.g., Bryan & Mason, 2022), audit fees (e.g., Bryan et al., 2018), audit report lag (e.g., Bryan and Meson 2020a) and auditor resignation (e.g., Bryan and Meson, 2020b). The study most closely linked to ours is Bryan and Mason (2022) that earnings volatility is negatively associated with audit quality, as auditors perceive earnings volatility as affecting risk in the audit. As discussed in Sect. 2.2, compared to Bryan and Mason (2022), our paper presents a fresh examination of the adverse effect of the financialization of non-financial firms on audit quality. We analyze the mediator of increased operational volatility where the mediation effect arises due to the unverifiability of the fair value of financial assets and the high volatility in their prices. We also employ the novel mediation test of the modified Sobel's  $z$  plus bootstrap test.

**Hypothesis 2** A higher proportion of financial assets to total assets in a non-financial firm lowers the audit quality via the mediator of increased operational volatility.

## 4 Methodology

To test **Hypothesis 1**, the following specification is employed:

$$AQ_{i,t} = \alpha_0 + \alpha_1 FIN_{i,t} + x'_{i,t} \delta + Ind + Year + \varepsilon_{i,t} \tag{1}$$

where the Chinese listed non-financial firms and time are denoted by  $i = 1, 2, \dots, N$  and by  $t = 1, 2, \dots, T$ , respectively,  $AQ$  represents audit quality,  $FIN$  is the ratio of financial assets to total assets,  $x$  is a column vector of control variables,  $\delta$  is a row vector of parameters,  $Ind$  and  $Year$  denotes industry and year fixed effect, respectively,  $\alpha_0$  is the constant,  $\alpha_1$  is the coefficient of  $FIN$ , and  $\varepsilon$  is the error term. According to Hypothesis 1,  $FIN$  is expected to have an adverse impact on  $AQ$  (i.e.,  $\alpha_1$  being negative and statistically significant).

Following the benchmark Ordinary Least Square (OLS) panel regression analysis in Eq. (1), we employ alternative measurements of audit quality and financialization, respectively, to investigate whether the results remain robust. In addition, we further employ instrumental variables and Two-Stage least squares (2SLS) regression to assess whether the possible issue of endogeneity alters the results.

For Hypothesis 2, we need to examine whether operational volatility is the mediator through which the financialization of non-financial firms affects audit quality. To do so, we employ the mediation test of Sobel's  $z$ . The Sobel test was initially presented by Sobel (1982) and was later revised by Baron and Kenny (1986). However, the revised Sobel test requires that the indirect effect (measured by the product term of two designated parameters) follows rigorously the normal distribution at large sample sizes. This requirement limits the scope this method could be applied to. To circumvent this, Preacher and Hayes (2004) present the bootstrapping technique to overcome the non-normality in the distribution of the product of coefficients, and since then this method has been increasingly employed in existing literature (Zhao et al., 2010), especially in the psychology and medical field to test mediation. Yet, its application in accounting and finance literature remains very limited. The Sobel test is ideally suited for our examination of Hypothesis 2 which requires mediation analysis to evaluate whether the operational volatility is the channel via which financialization causes a reduction in audit quality. A key advantage of the Sobel test is that it not only assesses whether the mediation effect is significant but also provides information on the percentage of the indirect effect (generated through the mediator) about the total effect that goes from one to the other party.

As such, following Baron and Kenny (1986), we estimate three regression equations below to test mediation:

$$\left\{ \begin{array}{l} OPVOL_{i,t} = \beta_0 + \beta_1 FIN_{i,t} + x'_{i,t} \eta + Ind + Year + \epsilon_{i,t} \tag{2} \\ AQ_{i,t} = \alpha_0 + \alpha_1 FIN_{i,t} + x'_{i,t} \delta + Ind + Year + \epsilon_{i,t} \tag{3} \\ AQ_{i,t} = \gamma_0 + \gamma_1 FIN_{i,t} + \gamma_3 OPVOL_{i,t} + x'_{i,t} \theta + Ind + Year + \epsilon_{i,t} \tag{4} \end{array} \right.$$

where  $OPVOL$  denotes operational volatility. Note that Eq. (3) is identical to Eq. (1) but was given a different number as a part of the procedure in Baron and Kenny (1986). First, Eq. (2) regresses the mediator ( $OPVOL$ ) on the independent variable ( $FIN$ ), then Eq. (3) regresses the dependent variable ( $AQ$ ) on the independent variable ( $FIN$ ), and finally, Eq. (4) regresses the dependent variable ( $AQ$ ) on both the independent variable ( $FIN$ ) and the mediator ( $OPVOL$ ). To establish mediation,  $FIN$  must affect the mediator  $OPVOL$  in Eq. (2),  $FIN$  must affect  $AQ$  in Eq. (3), and mediator

*OPVOL* must affect the *AQ* in Eq. (4). The Sobel's z test examines the effectiveness of the indirect effects going from *FIN* to *OPVOL* and then to *AQ*.

## 5 Data

This section provides information on variable measurement, data source and sample selection for variables employed in our analysis in Sect. 6.

### 5.1 Audit quality

Audit quality is widely measured in two directions in the existing literature: output measures and input measures in the audit process (Defond and Zhang, 2014). In the output measures, there are four proxy variables to measure audit quality, namely restatements and Accounting and Auditing Enforcement Releases (AAERs) (e.g., Chin & Chi, 2009; Lennox & Pittman, 2010); Going-Concern (GC) Opinions (e.g., Lennox & Li, 2012); discretionary accruals (DA), Meet/Beat, Accrual Quality, Conservation (e.g., Jones, 1991; Reichelt & Wang, 2010); and PCAOB Conforms, Cost of Capital (e.g., Weber et al., 2008). The input measures focus on whether the audit firm is BigN, its industry specialization, audit fees, and changes in fees (Lennox & Park, 2007).

The proxy variables above represent different stages in the audit process, each with its unique strengths and weaknesses (see Defond and Zhang (2014) for a systematic discussion on this). As the GC opinions are directly related to audit quality and capture the changes in audit quality under large samples, Gul et al. (2013) propose the audit reports' aggressiveness as a proxy of audit quality. The underlying assumption is that high-quality auditors maintain lower thresholds for issuing modified audit opinions (MAOs) and constrain aggressive earnings management. Our study employs the audit reports' aggressiveness as the main measurement of audit quality. Our choice is first incentivized by the construction of this measurement which highlights the importance of individual auditors in determining audit outcomes, an issue that has not been widely examined (Gul et al., 2013). Furthermore, MAOs also capture information on the operations and transactions of firms. This is an important feature as audit as a service can be viewed as a process of "co-creation of value" (Vargo et al., 2010). In this process, audit quality as an explicit output of "value" depends upon all parties contributing to this process respectively (Knechel et al., 2020). Audit quality based on the MAOs of Gul et al. (2013) has been employed by a number of previous studies (e.g., He et al., 2017; Xiao et al., 2020).

Specifically, following Gul et al. (2013), we employ a Logit regression of the model (i.e., Eq. (5) to predict the auditors' propensity to issue MAOs to clients:

$$\begin{aligned}
 MAOs_{i,t} = & \alpha_0 + \alpha_1 QuickR_{i,t} + \alpha_2 AR_{i,t} + \alpha_3 Other_{i,t} \\
 & + \alpha_4 Inv_{i,t} + \alpha_5 ROA_{i,t} + \alpha_6 Loss_{i,t} + \alpha_7 Lev_{i,t} \\
 & + \alpha_8 Size_{i,t} + \alpha_9 Age + \alpha_{10} Ind + \alpha_{11} Year + \varepsilon_{i,t}
 \end{aligned} \quad (5)$$

$$AQ_{i,t} = - (Predicted Opinions_{i,t} - Actual Opinion_{i,t}) \tag{6}$$

where *MAOs* denotes the modified audit opinions which equals 1 if a client receives a modified audit option, and 0 otherwise. A set of client characteristics are included as explanatory variables which include *QuickR* (the sum of cash, short-term investments, notes receivables, and accounts receivables divided by current liabilities), *AR* (accounts receivable divided by total assets), *Other* (other receivables divided by total assets), *Inv* (the ratio of inventory to total assets), *ROA* (return on assets), *Loss* (an indicator for companies that report losses), *Lev* (liabilities divided by total assets), *Size* (the natural logarithm of the ending total assets), *Age* (the number of years that the firm is listed in the public market), *Ind* and *Year* (industry and year).  $\alpha_i$  represents the coefficient of each variable.

In Gul et al. (2013), the audit quality is then measured by the difference between the predicted opinions which is the probability of *MAOs* derived from the logit regression (Eq. (5)) and the actually published option (=1 if a client receives a modified audit option, and =0 if not). A higher value of the difference suggests that auditors are likely to issue a clean report despite a modified audit option that could be warranted according to the predicted probability, or in other words, aggressiveness in audit reporting which indicates lower accounting quality. As shown in Eq. (6), in our analysis we add a negative sign in front of the difference, and thus a higher (lower) value of *AQ* indicates higher (lower) audit quality.

As a robustness check, we also employ the widely used Dechow et al.'s (1995) modified Jones model as an alternative measurement for audit quality (e.g., DeFond and Zhang (2014) and Francis et al. (2013)). Specifically, the model is based on the concept of discretionary accruals as follows:

$$\frac{TA_{i,t}}{A_{i,t-1}} = \beta_0 \frac{1}{A_{i,t-1}} + \beta_1 \frac{\Delta REV_{i,t}}{A_{i,t-1}} + \beta_2 \left( \frac{PPE_{i,t}}{A_{i,t-1}} \right) + \epsilon_{i,t} \tag{7}$$

$$NDA_{i,t} = \hat{\beta}_0 \frac{1}{A_{i,t-1}} + \hat{\beta}_1 \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} + \hat{\beta}_2 \left( \frac{PPE_{i,t}}{A_{i,t-1}} \right) \tag{8}$$

$$DA_{i,t} = - \left( \frac{TA_{i,t}}{A_{i,t-1}} - NDA_{i,t} \right) \tag{9}$$

where  $\frac{TA_{i,t}}{A_{i,t-1}}$ ,  $A_{i,t-1}$ ,  $\frac{\Delta REV_{i,t}}{A_{i,t-1}}$  and  $\frac{PPE_{i,t}}{A_{i,t-1}}$  denote the total accruals scaled by lagged total assets, total assets at ( $t - 1$ ), revenues in year  $t$  less revenues in year ( $t - 1$ ) scaled by total assets at ( $t - 1$ ), and gross property plant and equipment in year  $t$  scaled by total assets at ( $t - 1$ ), respectively.  $\beta_i$  ( $i = 0, 1, 2$ ) represent firm-specific parameters and  $\epsilon$  is the error term.  $NDA_{i,t}$ ,  $\hat{\beta}_i$ ,  $\frac{\Delta REC_{i,t}}{A_{i,t-1}}$  and  $DA_{i,t}$  denote the estimated non-discretionary accruals, estimated firm-specific parameters, net receivables in year  $t$  less net receivables in year ( $t - 1$ ) scaled by total assets at ( $t - 1$ ), and discretionary accruals scaled by lagged total assets, respectively.

To obtain the discretionary accruals, the coefficients on  $\beta_0$ ,  $\beta_1$ , and  $\beta_2$  in Eq. (7) are estimated. The estimated values are then substituted into Eq. (8) to obtain the

estimates for nondiscretionary accruals ( $NDA$ ). Finally, in Dechow et al.'s (1995), the difference between estimated  $\frac{TA_{i,t}}{A_{i,t-1}}$  and  $NDA_{i,t}$  gives the revised discretionary accrual. In our study, we added a negative sign in front of the difference as shown in Eq. (9), and as such a higher (lower) value of  $DA_{i,t}$  indicates higher (lower) audit quality.

## 5.2 The process of financialization in non-financial firms

In the existing literature, three types of measurement have been widely employed to evaluate financial investment by non-financial firms. The first focuses on the assets side of the balance sheet (Demir, 2009a, b; Krippner, 2005), the second is based on the liability side (Orhangazi, 2008), and the third concerns the shareholder value orientation (Van Treeck, 2008). Among the three categories, the latter two emphasize the outcome of the financial investment for the non-financial firms, while the first focuses more comprehensively on corporate behavior. Given this, our paper follows Demir's (2009a, Demir, 2009b) and employs the ratio of financial assets to total assets ( $FIN$ ) to measure the financial investment by non-financial firms. Here, financial assets include transactional financial assets, derivative financial assets, loans issued and advances, financial assets available for sale, hold-to-maturity investments, and investments in real estate (see Table 2).

To check the robustness of our results, we further employ an alternative measurement of the process of financialization of non-financial firms. In particular, we adopt a dummy variable ( $FINdummy$ ) instead of the ratio of the financial assets to total assets ( $FIN$ ) mentioned above.  $FINdummy$  takes a value of 0 if a non-financial firm does not invest in financial assets and a value of 1 if  $FINdummy$  does. Hence the focus of  $FINdummy$  is on whether or not a non-financial firm is engaged in financial investment.

## 5.3 Operational volatility

According to Hypothesis 2 discussed in Sect. 4, when a non-financial firm allocates its assets towards financial investment, it increases the operating volatility as it not only increases the complexity of accounting information but also provides managers with more room for discretion and manipulation in the determination of fair values, affecting the supply of accurate accounting and audit evidence and ultimately lowering the audit quality. To capture the operational volatility, we follow John et al. (2008) and construct two alternative measurements that are based on the earning volatility of non-financial firms as follows:

$$DEV_{i,t} = \frac{EBIT_{i,t}}{ASSET_{i,t}} - \frac{1}{X} \sum_{k=1}^X \frac{EBIT_{k,t}}{ASSET_{k,t}} \quad (10)$$

$$OPVOL_{i,t} = \sqrt{\frac{1}{T-1} \sum_{t=1}^T \left( DEV_{i,t} - \frac{1}{T} \sum_{t=1}^T DEV_{i,t} \right)^2} \quad |T=3 \quad (11)$$

**Table 2** Sectoral distribution of non-financial firms with financial investments in China

Year Industry	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2011– 2020 (%)
A Agriculture	14	13	15	25	34	34	34	32	32	35	70.2
B Mining	27	33	36	58	66	60	58	63	67	64	78.2
C Manufacture	615	679	752	1164	1306	1433	1639	1746	1951	2189	72.4
D Energy	49	51	56	77	80	87	95	95	92	97	85.8
E Architecture	37	41	45	53	67	75	88	83	79	85	85.4
F Wholesale and retail	96	114	121	135	140	142	149	152	151	151	90.4
G Transportation & Logistics	49	53	52	68	71	77	84	90	88	91	83.8
H Catering & Accommodation	6	7	8	11	10	9	7	8	8	9	91.2
I Information service	44	43	45	99	126	162	201	229	254	292	77.3
K Real estate	100	112	108	120	123	117	115	113	114	113	93.1
L Business leasing	16	18	19	22	23	32	39	42	43	48	84.8
M Technological service	3	4	5	14	16	19	35	42	52	52	80.4
N Environmental protection	4	12	12	19	23	25	35	40	42	61	76.7
O Residents service	10	0	0	0	0	0	0	0	0	0	66.7
P Education	0	1	1	1	1	3	2	3	8	8	100.0
Q Social hygiene	1	1	1	4	4	6	9	9	10	11	84.9
R Entertainments	11	16	17	21	33	43	53	53	55	51	89.6
S Social Management	36	11	15	19	20	19	20	17	17	12	85.7
Total	1118	1209	1308	1910	2143	2343	2663	2817	3063	3369	

*Note* Data are collected from CSMAR. The final column is the sectoral ratio of the period average number of non-financial firms which have made the financial investment to the period average total number of non-financial firms

$$OPVOL_{i,t} = Max(DEV_{i,t}) - Min(DEV_{i,t}) \tag{12}$$

where  $EBIT_{i,t}$  and  $EBIT_{k,t}$  denote the earnings before interest and taxes of firm  $i$  and firm  $k$  in year  $t$  ( $k = 1, 2, \dots, X$  and  $X$  is the number of firms in an industry).  $ASSET_{i,t}$  and  $ASSET_{k,t}$  represent the total assets of firm  $i$  and firm  $k$ . Therefore,  $DEV_{i,t}$  in Eq. (10) reflects the deviation of a firm  $i$ 's  $EBIT$  to  $ASSET$  ratio from the industry average for the corresponding year. Then, taking year  $t$ , year  $(t + 1)$  and year  $(t + 2)$  as a three-year observation interval, we obtain our first series of operational volatility ( $OPVOL$ ) as the standard deviation of  $DEV$  in three years (Eq. (11)). We also construct a second series of operational volatility ( $OPVOL$ ) based on the range of  $DEV$  for firm  $i$  at the time  $t$  (Eq. (12)).

### 5.4 Control variables

Given the differences between the accounting standards applicable to non-financial and financial firms, financial investment by non-financial firms poses challenges to the existing expertise and resources of audit firms, especially when it comes to the measurement of the fair value of financial assets. It is widely documented that auditors from big firms have fewer material misstatements (Lennox & Pittman, 2010;

Francis et al., 2013), smaller discretionary accruals (Kim et al., 2003), and stronger incentives to manage earnings (Chen et al., 2011). They also play a stronger governance role (Choi & Wong, 2007) and are better at reducing the impact of the market condition on clients' financial decisions and capital structure (Chang et al., 2009). More recently, He et al. (2022) found that the audit quality of audit firms with low expertise increases significantly (as reflected in a reduction in financial misstatements) after merging with audit firms with stronger expertise. Therefore, given the stronger competency and expertise of big audit firms, we expect that non-financial firms that do not employ auditors from the Big 4 (Deloitte, Ernst & Young, KPMG, PricewaterhouseCoopers (PwC) would experience a reduction in audit quality.

In addition to the auditors' firm-level expertise, following Ferguson et al. (2003) and Cohen et al. (2014), we also include the audit firms' office-level industry expertise. It enables us to view each individual practice office as a unique and relevant unit of analysis, as audit contracting is conducted through local offices and audit engagements are administered by an audit team typically located in an office in the same city as the client's headquarters (Ferguson et al., 2003).

Non-financial firms have the choice of dividing their financial investment between long- and short-term financial assets. Compared with short-term financial assets, long-term financial assets face a lengthy investment horizon and hence more macroeconomic uncertainty and possible capital flow volatility. This nature of long-term financial assets gives managers more flexibility in influencing the fair value of these assets and hence making high-quality audits less likely. On the other hand, short-term financial assets are more agile and can better cope with the negative effects brought by economic uncertainty and financial market volatility (Demir, 2009b) and may even prevent firms from chasing risky long-term projects (Wang & Mao, 2022). As such, although both are expected to negatively affect audit quality, we anticipate that the short-term financial assets would have a less severe adverse impact than the long-term financial assets.

State ownership is a unique type of ownership as the state representatives are often not the true owners and do not personally have cash flow rights (Alhababsah, 2019). State-appointed managers may have less incentive for effective monitoring because their tasks could be largely political (Lim et al., 2014). Furthermore, they may deliberately create an opaque information environment to avoid the discovery of inefficiency and corruption (Johnson & Mitton, 2003). In addition, the government backing and implicit bailout guarantee further reduce the necessity of hiring high-quality auditors (Wang et al., 2008). As such, there is a lack of incentive for state-owned firms to maintain high-quality audits, and there is also a lack of consequence when low-quality auditing does occur. Therefore, when a state-owned non-financial firm reallocates its assets towards financial investments, the reduction in audit quality is expected to be more profound than that for a non-state-owned firm.

Therefore, we consider auditors' firm-level expertise (1 if the auditor hired by a non-financial firm is non-Big4 and 0 otherwise) and office-level industry expertise (i.e., market share of fair value audited for clients (other than client *i*) within a city and industry market), financial investment horizon (the ratio of short-term financial assets to total assets), and ownership (1 if a non-financial firm is state-owned and 0 otherwise) in all our investigations. We expect non-financial firms that hire auditors with



less expertise, invest more in short-term financial assets and are state-owned would experience a greater reduction in audit quality during the process of financialization.

In addition, we incorporate in our analysis a range of firm-specific characteristics which include firms' size (*Ln\_Size*), liability to total assets ratio (*Lev*), and liquidity ratio (*LR*) following Abbott et al. (2016), profitability (*ROA*) as in Lee et al. (2022), merger and acquisition (*MA*) and losses reported in the preceding year (*Lag\_loss*) following Beardsley et al. (2021), sale growth (*Growth*) as in Minutti-Meza (2013), and auditor tenure (*Tenure*) and operating cash flow (*CFO*) following Fung et al. (2017).

## 5.5 Sample selection

We collect our data from the China Security Market and Accounting Research (CSMAR). It is a widely used database for studies on Chinese firms (e.g., Liu et al., 2017; Wang & You, 2022).

Our annual sample of non-financial firms in China covers the period 2011–2020. We start our sample period from the year 2011, three years after the 2008 global financial crisis to avoid any of its pulling effects.

Table 3 reports the annual number of non-financial firms allocating financial assets (*Num<sub>fin</sub>*), the total number of non-financial firms (*Total*), and the ratio of the former to the latter (*Ratio (%)*) over the period from 2011 to 2020. All three numbers have been growing steadily. More importantly, the number of non-financial firms with financial investment (*Num<sub>fin</sub>*) has increased at a much faster pace than the total number of non-financial firms (*Total*). This fact is further verified by the rising trend in the ratio of the former to the latter from 53.6% in 2011 to 88.6% in 2020 as shown in the third row of the table. Even when we take a period average, the ratio is as high as 76.5% (last column of Table 3). It demonstrates the consistent progress in the financialization of non-financial firms and that financial investment by non-financial firms has become a widely observed phenomenon in China.

Table 4 reports the sectoral distribution of non-financial firms investing in financial assets over the period from 2011 to 2020. In nearly all sectors, the number of non-financial firms engaged in financial investments has been increasing throughout

**Table 3** Size of the financial assets in China

Year	Average financial assets per non-financial firm (100 million Chinese yuan)			Ratio of financial assets to total assets (%)
	Financial Assets	Long-term	Short-term	Financial Assets
2011	1.756	1.676	0.080	2.159
2012	1.989	1.895	0.094	2.162
2013	2.266	2.144	0.122	2.261
2014	3.899	3.712	0.187	3.538
2015	5.267	5.033	0.234	3.775
2016	6.099	5.771	0.328	3.974
2017	6.697	6.084	0.613	3.832
2018	7.389	6.384	1.004	3.901
2019	9.397	6.388	3.009	6.981
2020	9.535	6.402	3.133	7.622

*Note* Data are collected from CSMAR. See Table 5 for definitions of long- and short-term financial assets

**Table 4** Sample selection

	1	Total sample	31,550
<i>Note</i> All data are collected from CSMAR. The data is annual covering 2011–2020. The panel data is unbalanced	2	Less: Observations of firms under special treatment	1971
		Financial firms	904
	3	Final sample	28,675

this period. The sector with the largest number is the Manufacturing sector which has 2189 non-financial firms allocating assets to financial investments in 2020, followed by the Information service (292 firms) and the Wholesale and retail sector (151 firms). We also calculate the period average ratio of non-financial firms that have financial investments to the total number of non-financial firms for each sector in the last column in Table 4. Compared with the national ratio of 76.5% (as shown in Table 3), Agriculture, Manufacturing, and Residential services have ratios slightly below whilst all other sectors have ratios above with Education, Real estate, and Catering and accommodation sectors leading the way. Therefore, the financialization of non-financial firms is growing with a noticeable speed across almost all sectors in China.

We further present information on the average size of the financial investments per non-financial firm in China during 2011–2020 (in Table 1). As illustrated in the first column, the average size of the financial investments per non-financial firm has increased from 175.6 million in 2011 to 953.5 million in 2020. This growing trend is also true for both long- and short-term financial assets underneath the overall financial investments in the second and third column, respectively (see Table 2 for definitions of long- and short-term financial assets). We also illustrate the ratio of the sum of financial assets invested by all non-financial firms in China to the sum of the total assets each year in the last column, where a rising tendency is observed over the period 2011–2020. The clear and steady growing trend compared to the total assets (e.g., reaching 7.622% of the total assets in 2020 as shown in Table 2) shows that financial assets held by non-financial firms have experienced substantial growth in China in the past decade and are expected to grow further.

We adopt China for our analysis for two important reasons. First, in developed countries where the process of financialization started several decades ago, the proportion of financial assets invested by all non-financial firms in the total assets has not seen strong growth as witnessed in China in the past two decades. Instead, it has shown signs of stabilizing. For instance, according to the FRED Economic Data, the ratio of financial to total assets for non-financial firms in the US was 45% in 2011 and it only increased gradually to 49% in 2020. Compared to developed markets, China is at an earlier stage of financialization. As shown above, its financialization exhibits a more dynamic and growing trend. Hence, a timely investigation of China is needed for a better understanding on the implications of financialization on audit quality.

Furthermore, in contrast to the advanced financial markets and accounting standards in developed nations, it is well-recognized that the Chinese financial market is still under-developed and the accounting standards in China are often ambiguous and lack clarity (Xu & Guo, 2021). Local administration authorities often extend their hands to intervene in the auditing regulatory environment (DeFond et al., 1999; Wang et al., 2008). The awareness of compliance with accounting standards among

the firms and the enforcement of penalties for violation of the accounting rules are also weaker in China than in developed economies. In such an environment, we expect the managers of non-financial firms to have not only more incentive but also more room to manipulate financial asset prices and accounting information, exerting a strong adverse effect on audit quality. Therefore, China provides an ideal context for examining the financialization and audit quality relationship.

To fully reflect the scale of non-financial firms in an economy, we check all non-financial firms in China (see Table 3 for the number of these firms each year in China) and include ones whose data are available. These firms are from all 18 sectors (see Table 4 for the list of sectors) in China, providing a full coverage of economic sectors. We exclude from our sample firms in the financial industry and Special Treatment (ST) firms (i.e., firms under financial difficulties). To eliminate the disturbance of outliers, all continuous variables' values in the top and bottom 1% are excluded. As such, 4049 companies with a total of 28,675 observations are obtained (see Table 5).

## 6 Empirical results

Table 2 summarizes the measurement of all variables employed in our analysis. Table 6 reports the descriptive statistics. In terms of the non-financial firms' ratio of financial assets to total assets (*FIN*), the maximum and the minimum of 0.437 and 0, respectively, indicate a difference in the process of financialization amongst non-financial firms in China. The mean proportion of financial assets to total assets is about 4.3%, within which on average the long- (*Long*) and short-term financial assets (*Short*) account for 3.0% and 1.3%, respectively, suggesting that overall, Chinese listed non-financial firms seem to prefer long-term financial assets to short-term financial assets.

In addition to the mean value (-0.050) and the standard deviation (0.15) information of audit quality (*AQ*) in Tables 6 and 7 further reports the year-by-year description of *AQ*. As shown in Table 7, there is an overall downward trend in the mean value of audit quality declining from -0.029 in 2011 to -0.070 in 2019. There was a noticeable increase in the value of *AQ* in 2020, possibly due to the conference held by the Ministry of Finance that year on audit supervision of companies' annual reports emphasizing the severe penalty for violations in the audit of annual reports.

Table 8 reports Pearson's correlation coefficients and shows a significant negative correlation between the financial assets to total assets ratio (*FIN*) and audit quality (*AQ*). Overall, the absolute value of all correlation coefficients is less than 0.604, indicating there is no serious concern about multi-collinearity among variables. Note that *OPVOL* and *OPVOL<sub>t</sub>* do not appear in the same analysis and hence their high correlation coefficient is of no concern.

### 6.1 Financialization of non-financial firms and audit quality (hypothesis 1)

Table 9 reports the benchmark results on the impact of financial investment on audit quality. Column (1) includes the ratio of financial assets to total assets (*FIN*) only, and it has a negative and highly significant (at 1% significance level) coefficient (-0.033).

**Table 5** Variable definitions

Variables	Definitions
<b>Dependent variable</b>	
<i>AQ</i>	Audit quality: following Gul et al. (2013), it is measured as the negative value of the difference between the predicted auditing opinion and the actual published auditing opinion (see Eqs. (5)-(6) in Sect. 5.1).
<i>DA</i>	An alternative measurement for audit quality: the negative value of discretionary accruals following Dechow et al.'s (1995) modified Jones model (see Eqs. (7)-(9) in Sect. 5.1).
<b>Independent variable</b>	
<i>FIN</i>	The process of financialization of a non-financial firm: it is measured as the ratio of financial to total assets as (transactional financial assets+derivative financial assets+loans issued and advances+financial assets available for sale+hold-to-maturity investments+investment real estate)/total assets.
<i>FINdummy</i>	Second measurement for the process of financialization of a non-financial firm. It equals to one if a financial firm has assets allocated to financial assets, and zero otherwise.
<b>Mediating variable</b>	
<i>OPVOL</i>	Operational volatility: following John et al. (2008), it is measured as the standard deviation of the difference between the firm's ratio of EBIT to the total assets and the average value of the ratio of EBIT to the total assets in the industry (see Eqs. (11) and (12) in Sect. 5.3).
<i>OPVOL'</i>	Second measurement for operational volatility: following John et al. (2008), it is the range of the difference between the firm's ratio of EBIT to the total assets and the average value of the ratio of EBIT to the total assets in the industry (see Eqs. (11) and (13) in Sect. 5.3).
<b>Control variables</b>	
<i>Non-Big4</i>	It is 1 if the sample is not from the Big 4 audit firms, and 0 otherwise. The Big 4 audit firms refer to Deloitte, Ernst & Young, KPMG and PricewaterhouseCoopers (PwC).
<i>C_eps</i>	The market share of fair value audited for clients (other than client i) within a city and industry market.
<i>Short</i>	The ratio of short-term financial assets to total assets. (Short-term financial assets=transactional financial assets)
<i>SOE</i>	It is 1 if the sample is the firm is state-owned and 0 otherwise.
<i>Ln_Size</i>	Size of a non-financial firm: natural logarithm of the total assets of the firm.
<i>LR</i>	Liquidity ratio: current assets/current liabilities.
<i>ROA</i>	Return on assets: income before extraordinary items scaled by total assets
<i>Lev</i>	Leverage ratio: total liability/total assets.
<i>Growth</i>	Sales growth: (sales at time t – sales at time t-1)/sales at time t.
<i>Tenure</i>	The tenure of the auditor: the number of years the auditor serves the non-financial firm.
<i>MA</i>	Merger and acquisition: it is 1 if MA has taken place in the year for the non-financial firm, and 0 otherwise.
<i>Lag_Loss</i>	Lag of loss: it equals to one if the non-financial firm reports a loss in the preceding year.
<i>CFO</i>	Operating cash flow: net cash flow/total assets
<b>Instrumental variables</b>	

**Table 5** (continued)

Variables	Definitions
<i>BC</i>	1 if either the firm holds shares in a bank or the bank holds firm shares; otherwise, it is 0.
<i>BCM</i>	1 if the senior executive has a banking background; otherwise, it is 0

*Note* All data are collected from CSMAR unless otherwise stated. The data is annual for the period 2011–2020. Note that for variable *FIN*, although monetary assets can be regarded as financial assets in a broad sense, it is excluded from our financial assets in our analysis due to the difficulties in clearly determining its purpose

**Table 6** Descriptive statistics

Variable	<i>N</i>	mean	s.d.	min	max
<i>AQ</i>	28,259	-0.050	0.150	-0.998	-0.001
<i>FIN</i>	28,675	0.043	0.079	0.000	0.437
<i>DA</i>	26,641	-0.073	0.070	-0.392	-0.001
<i>OPVOL</i>	24,714	0.031	0.036	0.002	0.222
<i>OPVOL'</i>	24,714	0.059	0.067	0.003	0.406
<i>Non-Big4</i>	28,659	0.056	0.230	0.000	1.000
<i>C_eps</i>	28,675	0.051	0.063	0.000	0.308
<i>Short</i>	28,675	0.013	0.053	-0.001	0.845
<i>SOE</i>	28,675	0.036	0.472	0.000	1.000
<i>Ln_Size</i>	28,675	22.140	1.293	19.800	26.140
<i>LR</i>	28,675	2.594	2.738	0.311	17.550
<i>ROA</i>	28,675	0.042	0.066	-0.253	0.215
<i>Lev</i>	28,674	0.419	0.214	0.007	3.919
<i>Growth</i>	28,675	0.153	0.407	-0.582	2.607
<i>Tenure</i>	28,658	7.231	5.375	1.000	33.000
<i>MA</i>	28,669	0.330	0.470	0.000	1.000
<i>Lag_Loss</i>	26,934	0.079	0.270	0.000	1.000
<i>FCO</i>	28,675	0.045	0.070	-0.167	0.239
<i>BC</i>	44,792	0.335	0.472	0.000	1.000
<i>BCM</i>	44,792	0.293	0.455	0.000	1.000

*Note* All data are collected from CSMAR. The data is annual, and the sample period is 2011–2020. See Table 5 for variable definitions

**Table 7** More information on audit quality of non-financial firms

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mean of <i>AQ</i>	-0.029	-0.035	-0.047	-0.051	-0.045	-0.042	-0.041	-0.061	-0.070	-0.058
Median of <i>AQ</i>	-0.009	-0.010	-0.012	-0.013	-0.011	-0.012	-0.013	-0.015	-0.017	-0.013

*Note* same as under Table 6

Columns (2) and (3) include the list of control variables with the latter additionally controlling for the fixed effects of industry and year. In both cases (*FIN*) remains negative and statistically significant at a 1% level. The coefficients in Column (2) (i.e., -0.069) and Column (3) (i.e., -0.064) are very similar. Therefore, results across Columns (1)–(3) consistently document that when a non-financial firm allocates its assets towards financial investment, it deteriorates its audit quality. It strongly confirms that Hypothesis 1 holds, i.e., a higher proportion of financial assets to total assets in a non-financial firm leads to lower audit quality.

**Table 8** Pearson's correlation matrix

	AQ	FIN	DA	Ln Size	LR	ROA	Lev	Growth	Tenure	MA	Lag Loss	CFO	OPVOL	Short	SOE	Non-Big4	C_eps	
AQ	1																	
FIN	-0.018***	1																
DA	0.059***	-0.023***	1															
Ln_Size	0.043***	0.010*	0.037***	1														
LR	0.102***	0.065***	0.100***	-0.359***	1													
ROA	0.392***	0.008	-0.137***	-0.034***	0.254***	1												
Lev	-0.199***	-0.082***	-0.178***	0.505***	-0.637***	-0.401***	1											
Growth	0.082***	-0.056***	0.173***	0.051***	-0.051***	0.214***	0.029***	1										
Tenure	0.018***	0.118***	-0.064***	0.094***	-0.095***	-0.011*	0.042***	-0.048***	1									
MA	-0.107***	0.029***	0.029***	0.045***	-0.110***	-0.141***	0.040***	0.118***	0.009	1								
Lag Loss	-0.211***	0.010*	-0.009	-0.063***	-0.076***	-0.261***	0.144***	0.002	-0.018***	0.075***	1							
CFO	0.115***	0.011*	0.013**	0.065***	0.032***	0.375***	-0.164***	0.011*	0.050***	-0.051***	-0.071***	1						
OPVOL	-0.339***	0.065***	-0.188***	-0.193***	0.018***	-0.410***	0.032**	-0.049***	-0.057***	0.176***	0.324***	-0.071***	1					
OPVOL'	-0.338***	0.065***	-0.320***	-0.194***	0.018***	-0.406***	0.030***	-0.047***	-0.057***	0.175***	0.328***	-0.070***	0.999***	1				
Short	0.029***	0.604***	-0.024***	-0.062***	0.151***	0.092***	-0.173***	-0.002	0.004	-0.012**	-0.009	0.080***	0.048***	0.050***	1.000			
SOE	0.000	-0.007	0.041***	0.361***	-0.161***	-0.083***	0.291***	0.008	0.042***	-0.131***	0.026***	0.001	-0.101***	-0.102***	-0.091***	1.000		
Non-Big4	0.003***	0.017***	0.000	0.348***	-0.055***	0.028***	0.103***	-0.002	-0.031***	-0.077***	-0.024***	0.068***	-0.057***	-0.057***	-0.006	0.122***	1.000	
C_eps	-0.020***	0.198***	0.001	-0.011*	0.040***	0.002	-0.055***	-0.004	0.023***	0.158***	0.034***	0.038***	0.115***	0.115***	0.281***	-0.137***	-0.009	1.000

Note same as under Table 6

For the firm-level auditor expertise reflected by *non Big4*, its coefficients in both Columns (2) and (3) are negative (i.e., -0.008 at 10% and -0.009 at 5%, respectively). It suggests that, when non-financial firms hire auditors with less expertise (i.e., from non-Big 4 firms), it leads to lower audit quality. This finding is in line with previous studies that suggest that an auditor's expertise plays an important role in enhancing audit quality (e.g., He et al., 2022). For the office-level industry expertise captured by *C\_eps*, its coefficient is insignificant in Column (2) and negative at 5% significance level in Column (3). Higher *C\_eps* implies more meticulous and rigorous financial scrutiny which puts pressure on managers to complete short-run earnings that the boards and auditors require (He & Tian, 2013). Such managerial myopia is also evidenced in Roychowdhury et al. (2019), and it makes accurate auditing more challenging, undermining the audit quality. It is worth noting that the coefficients of *C\_eps* are near zero, indicating that any negative effect can be very small. In Column (3), *Short* has a positive (0.039) coefficient at a 10% significance level, which turned to become insignificant in Column (3) when year and industry fixed effects are accounted for<sup>1</sup>. It indicates that short-term financial assets have no adverse impact on audit quality, probably due to that they are better at dealing with negative effects brought by economic uncertainty of financial market volatility (Demir, 2009b) than long-term financial assets. In terms of *SOE*, surprisingly, it has positive (0.007 and 0.008) and highly significant (at 1% significance level) coefficients in respective Columns (2) and (3), implying that the state-ownership characteristic of the non-financial firms raises audit quality. Despite the adverse effect state ownership could have on audit quality discussed in Sect. 5.4, Yu (2013) argues that state ownership allows large state owners to raise the tightness of control over firms, enhancing the supervision of management for cost elimination. Beck and Brødsgaard (2022) further indicate that the participation of the Chinese Communist Party in corporate governance of the SOEs can secure enterprise compliance, a favorable condition to uphold audit quality. Alhababsah (2019) also reaches a similar conclusion for firms in Jordan that state ownership contributes to higher audit quality.

For other control variables, the coefficient on *Ln\_Size* is positive and significant, which is consistent with Abbott et al. (2016). *Growth* has a very small and insignificant coefficient, suggesting that the growth of a firm does not affect the audit quality. *ROA* and *Tenure* show positive and significant coefficients, suggesting that firms with higher profitability and a long relationship with the same auditor exert a positive influence on the audit quality (as found in Lee et al. (2022) and Fung et al. (2017), respectively). We find a significantly negative coefficient on *MA*, suggesting that M&A activities lower the audit quality of a firm. This is consistent with the finding of Beardsley et al. (2021) that M&A activities significantly increase misstatement. *Lag\_Loss* has a negative sign, indicating that if a firm has experienced loss in the previous period, the status of its operation will deteriorate, and the audit quality will decrease accordingly (as found by Lee et al. (2022)). The coefficient on *CFO* is significantly negative, suggesting that the greater the amount of cash flow from

<sup>1</sup> We also explored with variable *Long* which captures the ratio of the long-term financial assets to total assets. However, it showed a high correlation (0.782) with the core independent variable *FIN* and therefore we adopted *Short* in our analysis.

**Table 9** Allocation of financial assets and audit quality of non-financial firms

	(1)	(2)	(3)
Dependent variables	<i>AQ</i> (OLS)	<i>AQ</i> (OLS)	<i>AQ</i> (OLS)
Independent variables			
<i>FIN</i>	-0.033*** (-3.12)	-0.069*** (-5.47)	-0.064*** (-4.80)
<i>Ln_Size</i>		0.014*** (15.89)	0.014*** (16.25)
<i>LR</i>		-0.001** (-1.98)	-0.001** (-2.19)
<i>ROA</i>		0.566*** (43.99)	0.557*** (43.03)
<i>Lev</i>		-0.106*** (-18.60)	-0.114*** (-19.28)
<i>Growth</i>		0.000 (0.64)	0.000 (0.86)
<i>Tenure</i>		0.001*** (3.47)	0.001*** (3.20)
<i>MA</i>		-0.018*** (-9.30)	-0.016*** (-8.45)
<i>Lag_Loss</i>		-0.064*** (-19.24)	-0.063*** (-18.80)
<i>CFO</i>		-0.061*** (-5.04)	-0.055*** (-4.52)
<i>Non-Big4</i>		-0.008* (-1.93)	-0.009** (-2.11)
<i>C_eps</i>		-0.000 (-1.38)	-0.000** (-2.10)
<i>Short</i>		0.039* (1.70)	0.031 (1.31)
<i>SOE</i>		0.007*** (3.40)	0.008*** (3.91)
<i>Year</i>	No	No	Y
<i>Ind</i>	No	No	Y
<i>_cons</i>	-0.049*** (-48.79)	-0.316*** (-18.01)	-0.367*** (-18.39)
<i>N</i>	28,259	26,534	26,534

*Note* This table reports the estimates of the financial investment on audit quality using OLS. Among the Columns, Column (3) report estimate controlling fixed effect including industry and year. *t*-values are reported in parentheses. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

operations, the worse the audit quality (Fung et al., 2017). *LR* has a negative sign, as liquidity ratios negatively affect the acceptance of going-concern audit opinion (Averio, 2020). Finally, *Lev* has a negative impact on audit quality. As discussed in Averio (2020), this could be due to that a high level of leverage indicates more obligation to manage debt and interest payments, which may adversely affect cash flow and profit.

Therefore, our finding is consistent with the view that the flexibility managers have in choosing accounting policies in the classification and measurement of financial assets could lead to intentional inaccuracy in the accounting information they supply to conceal losses (Roychowdhury, 2006), gain tax savings (Kim et al., 2011a), hide unfavorable news on firms' operation (Peng et al., 2018) or maximize personal utilities (Xu et al., 2014). However, our study expands existing understanding by



associating the accounting manipulation of managers with the non-financial firms' financialization process which grants more room for such exploitation of managers. Building on previous literature on managers' manipulative behavior and studies on how it leads to inaccurate accounting information, we provide a first analysis on how financialization exacerbates such improper behavior and eventually lowers audit quality. Furthermore, it contributes to the previous literature on the determinants of audit quality (see Sect. 2.2 for a review of these studies) by exploring financialization as an important cause of lower audit quality. In addition, the investment-specific factor employed in our analysis, namely the short-term investment horizon of financial assets, has rarely been studied as an aspect influencing audit quality. Finally, as increasing financial assets held by a non-financial firm leads to deterioration in the audit quality, our finding also has practical implications linking to the call of ICAEW (2021) for monitoring and cooperation from all stakeholders beyond the auditors to uphold the audit quality.

## 6.2 The mediation effect of operational volatility (hypothesis 2)

According to Hypothesis 2, a higher proportion of financial assets to total assets in a non-financial firm leads to a lower audit quality via the mediator of increased operational volatility. As discussed in Sects. 4 and 5, to capture the operational volatility, we follow John's et al. (2008) earnings volatility-based method and construct two alternative measurements of *OPVOL* (Eq. (11)) and *OPVOL'* (Eq. (12)) and we employ the mediation test of Sobel's  $z$  followed by bootstrap analysis to examine Hypothesis 2. The results are summarized in Table 10. Industry and year fixed effect is controlled for in all specifications in Table 10.

Following Eqs. (2)-(2), the results using *OPVOL* are presented in Columns (1)-(3), respectively. In Column (1) in Table 10, the coefficients of *FIN* are positive (i.e., 0.019) and highly significant (at a 1% significance level). It clearly demonstrates that a higher ratio of financial assets to total assets significantly increases the operational volatility in non-financial firms. Column (2) in Table 10 is identical to Column (3) in Table 9, showing high financial assets to total assets ratio lowers audit quality. Finally, in Column (3) we formally test whether operational volatility is the mediator following Eq. (4). The coefficient of *FIN* is negative (-0.056) and highly significant (at a 1% significance level) after the introduction of operating volatility as a mediating variable. More crucially, the Sobel  $z$ -test is negative (-5.229) and highly significant (at a 1% significance level), strongly confirming the indirect effect of financialization on audit quality via operational volatility. This result shows that such an indirect effect accounts for around 21.8% of the total adverse effect financialization has on audit quality. All control variables also have the same signs and similar level of significance as in the main results in Column (3) in Table 9. Therefore, our results firmly support Hypothesis 2 that when a non-financial firm increases its ratio of financial assets to total assets, its audit quality deteriorates through the channel of rising operational volatility.

It has been argued that the Sobel  $z$ -test has low power compared to the bootstrap test popularized by Preacher and Hayes (2004) (Zhao et al., 2010). Therefore, we further employ the bootstrap test and the results are presented in the last two rows

**Table 10** The mediation effect of operational volatility

	Using OPVOL			Using OPVOL'		
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables	<i>OPVOL</i>	<i>AQ</i>	<i>AQ</i>	<i>OPVOL'</i>	<i>AQ</i>	<i>AQ</i>
Independent variables						
<i>FIN</i>	0.019*** (5.68)	-0.064*** (-4.80)	-0.056*** (-4.04)	0.035*** (5.69)	-0.064*** (-4.80)	-0.056*** (-4.04)
<i>OPVOL</i>			-0.681*** (-25.73)			
<i>OPVOL'</i>						-0.368*** (-25.70)
<i>Ln_Size</i>	-0.004*** (-16.66)	0.014*** (16.25)	0.012*** (13.48)	-0.007*** (-16.99)	0.014*** (16.25)	0.012*** (13.42)
<i>LR</i>	0.000*** (4.88)	-0.001** (-2.19)	-0.000 (-0.78)	0.001*** (5.01)	-0.001** (-2.19)	-0.000 (-0.76)
<i>ROA</i>	-0.231*** (-72.21)	0.557*** (43.03)	0.411*** (28.03)	-0.421*** (-71.09)	0.557*** (43.03)	0.413*** (28.27)
<i>Lev</i>	-0.001 (-0.68)	-0.114*** (-19.28)	-0.118*** (-19.04)	-0.001 (-0.44)	-0.114*** (-19.28)	-0.118*** (-19.00)
<i>Growth</i>	0.000* (1.89)	0.000 (0.86)	0.000 (1.18)	0.000** (2.11)	0.000 (0.86)	0.000 (1.22)
<i>Tenure</i>	-0.000*** (-5.30)	0.001*** (3.20)	0.000** (2.43)	-0.000*** (-5.40)	0.001*** (3.20)	0.000** (2.42)
<i>MA</i>	0.007*** (15.28)	-0.016*** (-8.45)	-0.012*** (-5.89)	0.014*** (15.26)	-0.016*** (-8.45)	-0.012*** (-5.90)
<i>Lag_Loss</i>	0.029*** (35.61)	-0.063*** (-18.80)	-0.041*** (-11.86)	0.056*** (36.90)	-0.063*** (-18.80)	-0.041*** (-11.64)
<i>CFO</i>	0.052*** (16.61)	-0.055*** (-4.52)	-0.014 (-1.07)	0.095*** (16.47)	-0.055*** (-4.52)	-0.014 (-1.09)
<i>Non-Big4</i>	0.004*** (4.09)	-0.009** (-2.11)	-0.007* (-1.77)	0.008*** (4.18)	-0.009** (-2.11)	-0.007* (-1.75)
<i>C_eps</i>	0.000*** (11.31)	-0.000** (-2.10)	-0.000 (-0.29)	0.001*** (11.33)	-0.000** (-2.10)	-0.000 (-0.29)
<i>Short</i>	0.017*** (2.89)	0.031 (1.31)	0.041 (1.62)	0.035*** (3.11)	0.031 (1.31)	0.042* (1.65)
<i>SOE</i>	-0.004*** (-7.85)	0.008*** (3.91)	0.006*** (2.63)	-0.007*** (-7.75)	0.008*** (3.91)	0.006*** (2.65)
<i>_cons</i>	0.123*** (24.47)	-0.367*** (-18.39)	-0.296*** (-14.13)	0.231*** (24.92)	-0.367*** (-18.39)	-0.295*** (-14.05)
<i>N</i>	24,691	26,534	24,343	24,691	26,534	24,343
<i>Sobel Z</i>			-5.229***			-5.221***
<i>Indirect(%)</i>			21.8			21.7
<i>Bootstrap Indirect</i>			-0.013***			-0.019***
<i>95% Conf. Interval</i>			[-0.019, -0.012]			[-0.025, -0.017]

Note See Table 5 for variable definitions. All specifications include industry and year-fixed effects. The results without industry and year fixed effects are very similar and are omitted to save space. Columns (1), (2) and (3) are estimated according to Eqs. (2), (3) and (4), respectively, and the same applies to Columns (4), (5) and (6). *t*-values are reported in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

in Column (3) in Table 10. The bootstrap test results show that the indirect effect remains negative and highly significant (at a 1% significance level) and the 95% confidence interval excludes the value 0, confirming the results of the Sobel z-test.

Following the same method of testing the mediation effect on *OPVOL*, we further employ *OPVOL'* as an alternative measurement of operational volatility and the results are presented in Columns (4)–(6) in Table 10. These results are very similar to the findings in Columns (1)–(3). In particular, in Column (6) both the Sobel z-test and the Bootstrap test results are significant (at a 1% significance level) and the 95% confidence interval of the latter excludes zero. Therefore, the results in Table 10 strongly confirm the validity of Hypothesis 2 that the financialization of non-financial firms leads to lower audit quality through the mediator of increased operational volatility.

Therefore, our study not only proposes and examines financialization as an important determining factor of audit quality, but also identifies operational volatility as a crucial channel of the adverse effect of financialization on audit quality. Although previous studies such as Bryan and Mason (2022) show earnings volatility is negatively associated with audit quality, we go a step further by analyzing financialization as the cause of rising operational volatility which subsequently reduces audit quality. Moreover, we employ the mediation tests of the modified Sobel's z plus bootstrap test to analyze this mechanism. This method has the advantage of not only testing mediation but also showing the contribution made by the mediation effect towards the total effect between two parties, yet it has rarely been applied to the accounting and finance areas of research.

### 6.3 Robustness and additional tests

#### 6.3.1 Alternative measurements of audit quality and financialization

As described in Sect. 5, based on Dechow et al.'s (1995) modified Jones model, we employ the negative value of discretionary accruals (i.e., *DA* in Eq. (9)) as an alternative measurement of audit quality. The results are presented in Columns (1) and (2), without and with the industry and year fixed effect, respectively, in Table 11.

Comparing the results between Columns (1) in Table 11 and (2) in Table 9 and between Column (2) in Table 11 and (3) in Table 9 shows that regardless of whether the industry and year effects are controlled for, the coefficients for the alternative measurement of audit quality (*DA*) remain negative (i.e.,  $-0.058$  in Column (1) and  $-0.061$  in Column (2)) at 5% significance level. The size of the coefficients is also similar to  $-0.069$  in Column (2) and  $-0.064$  in Column (3) in Table 9. Results in Columns (1) and (2) firmly support the negative impact of financialization on audit quality in non-financial firms. Most control variables continue to have the same signs in Columns (1)–(2) in Table 11 compared to (2)–(3) in Table 9. Whilst firm-level auditor expertise (i.e., *non-Big4*) becomes insignificant and office-level industry expertise (i.e., *C\_eps*) turns from negative to positive, *SOE* remains positive and significant. Therefore, overall, our results are robust against the alternative measurement of audit quality, and as such, Hypothesis 1 still holds.

We further test the robustness of the results using an alternative variable describing financialization. We adopt the dummy variable (*FINdummy*) to replace *FIN*. Spe-

**Table 11** Robustness checks

	(1)	(2)	(3)	(4)
Dependent variables	<i>DA</i>	<i>DA</i>	<i>AQ</i>	<i>AQ</i>
Independent variables				
<i>FIN</i>	-0.058** (-1.99)	-0.061** (-2.08)		
<i>FINdummy</i>			-0.008*** (-3.77)	-0.009*** (-3.87)
<i>Ln_Size</i>	0.002 (1.42)	0.002 (1.39)	0.014*** (16.20)	0.015*** (16.64)
<i>LR</i>	-0.001* (-1.67)	-0.001* (-1.72)	-0.000* (-1.96)	-0.001** (-2.11)
<i>ROA</i>	-0.015 (-0.79)	-0.024 (-1.25)	0.567*** (44.11)	0.558*** (43.19)
<i>Lev</i>	0.037*** (4.29)	0.029*** (3.19)	-0.104*** (-18.41)	-0.112*** (-18.99)
<i>Growth</i>	-0.000*** (-2.77)	-0.000*** (-2.80)	0.000 (0.61)	0.000 (0.82)
<i>Tenure</i>	0.001** (2.56)	0.001** (2.15)	0.000*** (3.11)	0.000*** (2.97)
<i>MA</i>	-0.006** (-2.11)	-0.004 (-1.38)	-0.017*** (-8.91)	-0.016*** (-8.09)
<i>Lag_Loss</i>	-0.004 (-0.79)	-0.004 (-0.70)	-0.064*** (-19.22)	-0.063*** (-18.84)
<i>CFO</i>	-0.132*** (-7.17)	-0.129*** (-6.88)	-0.057*** (-4.71)	-0.053*** (-4.35)
<i>Non-Big4</i>	-0.008 (-1.29)	-0.007 (-1.12)	-0.009** (-2.16)	-0.009** (-2.31)
<i>C_eps</i>	0.000** (1.98)	0.001** (2.12)	-0.000 (-1.20)	-0.000* (-1.76)
<i>Short</i>	0.075** (2.17)	0.089** (2.50)	-0.020 (-1.02)	-0.023 (-1.21)
<i>SOE</i>	0.011*** (3.60)	0.011*** (3.62)	0.007*** (3.34)	0.008*** (3.96)
<i>Ind</i>	N	Y	N	Y
<i>Year</i>	N	Y	N	Y
<i>_cons</i>	-0.133*** (-4.96)	-0.145*** (-4.72)	-0.326*** (-18.33)	-0.378*** (-18.77)
<i>N</i>	26,618	26,618	26,534	26,534

*Note* This table reports the estimates of the robustness test on the financialization-audit quality relationship using OLS. In Columns (1) and (2), the dependent variable is discretionary accruals (*DA*), while all other variables remain unchanged. In Columns (3) and (4), the main independent variable *FIN* is replaced by *FINdummy*, while all other variables remain unchanged. Amongst all Columns, Columns (2) and (4) report estimates controlling for industry and year fixed effect. *t*-values are reported in parentheses. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

cifically, if a non-financial firm has assets llocated to financial assets, *FINdummy*=1; if not, *FINdummy*=0. The results are reported in Columns (3) and (4) in Table 11. Irrespective of whether the industry and year fixed effects are controlled for, the coefficients of *FINdummy* are negative (-0.008 and -0.009 in Columns (3) and (4), respectively) and highly significant (at 1% significance level), confirming the adverse impact of financialization on audit quality. These coefficients are less negative compared with the main results in Columns (2) (i.e., -0.069) and (3) (i.e., -0.064) in Table 9, indicating that such adverse effect is stronger when the process of financialization is captured using the ratio of financial assets to total assets ratio (*FIN*).

All control variables have the same signs as in the main results in Table 9 only with some minor changes in the level of significance (e.g., *Short* turns insignificant). As such, our results are robust when an alternative measurement of financialization is employed, supporting firmly the validity of Hypothesis 1.

### 6.3.2 Instrumental variables

To examine whether our results are affected by endogeneity, we employ the Two-Stage Least Squares (2SLS) method. Non-financial firms often build ties with a bank in order to facilitate their transactions with the bank and their investment in financial assets. Güner et al. (2008) demonstrate that bankers serving as directors of companies can help companies obtain more bank loans and increase the external financing rate. Sisli-Ciamarra (2012) shows that in addition to being able to gain more bank loans, financing costs are lower if the directors of a company have a banking background. Therefore, we obtain two alternative instrumental variables: (1) bank connection (*BC*) which takes a value of 1 if either the firm holds shares of a bank or a bank holds shares of the firm and 0 otherwise; (2) bank connection of the managers (*BCM*) which takes a value of 1 if the senior executive features a banking background and 0 otherwise. The data are collected from the CMSAR. The definitions of these two instrumental variables are also reported in Table 2.

To identify the plausibility and feasibility of these instrumental variables, we test the correlation of these instrument variables with independent variables. The correlation coefficients are significant at a 1% significance level, suggesting that these variables can be used for instrument variables. We use these two alternative instrumental variables, namely *BC* and *BCM* discussed above, one by one. In both cases, the coefficients of *FIN* in the second stage are significant at 5% and the sign of both remains negative. Therefore, the instrumental variable estimates confirm Hypothesis 1 that the financialization of non-financial firms leads to deterioration in audit quality. The results table is not presented here to save space and is available upon request.

## 7 Conclusions and practical implications

Against the background of the ongoing global phenomenon of increasing financial investment by non-financial firms, this study investigates how this process affects the audit quality of these firms in the context of Chinese-listed non-financial firms during the period 2011–2020. We first examine whether the increasing proportion of financial assets in the total assets has an adverse impact on the audit quality of these non-financial firms (Hypothesis 1). We then analyze the mediation effect of operational volatility to assess whether it is the channel via which such impact takes place (Hypothesis 2). We employ the mediation tests of the modified Sobel's *z* and the bootstrap test for this assessment. We incorporate auditor expertise (firm-level and office-level industry expertise), length of financial investment horizons (i.e., short-term) and the nature of ownership (i.e., state-owned) in our analysis.

Our findings can be summarized as follows. First, we find that when a non-financial firm increases the proportion of financial assets to total assets, it deteriorates its audit

quality. Second, the mediation tests confirm that operational volatility (measured by two alternative series) serves as an important channel of negative influence from financialization to audit quality. Third, the state ownership nature of non-financial firms raises audit quality whilst the auditor expertise and investment horizon (e.g., short-term) of the financial assets do not affect audit quality.

Our findings have several important practical implications. The first finding highlights the importance of auditors acting with integrity, skepticism, and objectivity and performing the work with diligence (KPMG, 2015), especially when they observe the occurrence of the financialization of a non-financial firm. More importantly, to guard audit quality, auditors, company boards, audit committees, investors, audit regulators, and auditing standard-setters need to act together. For instance, ICAEW (2021) recommends a robust level of challenge to management from the company boards, tools and techniques developed for flagging and managing manipulative and deceptive behavior by auditors, and joint development of a framework and methodology for the calculation and reporting of Audit Quality Indicators by audit regulators, audit committees, investors and auditors. These actions could also limit the operational volatility induced by the process of financialization of a non-financial firm, further mitigating the deterioration of audit quality.

Furthermore, our results also provide indicators of specific areas that could contribute to the maintenance of high audit quality. Given that short-term assets do not seem to have a negative effect on audit quality, non-financial firms need to carry out regular reviews on the ratios of long- and short-term assets to the total assets for a more balanced financial portfolio in terms of the length of the investment horizon. The state-ownership nature of non-financial firms does not necessarily lead to lower audit quality as one may perceive. It may in fact promote higher audit quality as found in our study, possibly via stronger corporate governance imposed by the state (Yu, 2013; Beck & Brødsgaard, 2022). Therefore, a more comprehensive view is required when evaluating the relationship between state-ownership and audit quality, considering the inefficiency of the state-owned firms which is widely observed whilst also recognizing strong governance induced by the tight control of the state.

Our study employs data from China to examine our hypotheses. Therefore, one of the future research directions is to examine cross-country evidence on the effect of financialization on audit quality. This, however, requires consistent standards in identifying the financial assets of non-financial firms across economies. Furthermore, our data covers the period 2011–2020. When more data become available for a reasonable number of years after 2020, future studies may consider examining the effect of Covid pandemic on the relationship between financialization and audit quality, as this global disruptive event has introduced higher volatility into the financial asset prices both in China and worldwide (Zhang et al., 2022; Papadamou et al., 2023).

## Declarations

**Conflict of interest** The authors of this manuscript certify that they have no affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this manuscript. The research does not involve any Human Participants and/or Animals.

**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

## References

- Abbott, L. J., Daugherty, B., Parker, S., & Peters, G. F. (2016). Internal audit quality and financial reporting quality: The joint importance of independence and competence. *Journal of Accounting Research*, *54*(1), 3–40.
- Acuitas (2017). Survey of fair value audit deficiencies. <https://us.aicpa.org/content/dam/aicpa/interstar-eas/forensicandvaluation/newsandpublications/downloadabledocuments/2017-pcaob-fair-value-audit-deficiencies-survey.pdf> [Accessed on 12 Nov 2023].
- Ahn, J., Hoitash, R., & Hoitash, U. (2020). Auditor task-specific expertise: The case of fair value accounting. *The Accounting Review*, *95*(3), 1–32.
- Alhababsah, S. (2019). Ownership structure and audit quality: An empirical analysis considering ownership types in Jordan. *Journal of International Accounting Auditing and Taxation*, *35*, 71–84.
- Almeida, H., Campello, M., & Weisbach, M. S. (2004). Cash Flow Sensitivity of Cash. *Journal of Finance*, *59*(4), 1777–1804.
- Averio, T. (2020). The analysis of influencing factors on the going concern audit opinion—a study in manufacturing firms in Indonesia. *Asian Journal of Accounting Research*, *6*(2), 152–164.
- Balsam, S., Krishnan, J., & Yang, J. S. (2003). Auditor industry specialization and earnings quality. *Auditing: A Journal of Practice and Theory*, *22*(2), 71–97.
- Bank of International Settlements (1996). Financial market volatility: measurement, causes and consequences, BIS Conference Papers, No 1, 15 March 1996, <https://www.bis.org/publ/confp01.pdf> [Accessed on 25 Oct 2022].
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182.
- Barth, M. E., & Clinch, G. (1996). International differences in accounting standards: Evidence from UK, Australian, and Canadian firms. *Contemporary Accounting Research*, *13*(1), 135–170.
- Barth, M. E., Beaver, W. H., & Landsman, W. R. (2001). The relevance of the value relevance literature for financial accounting standard setting: Another view. *Journal of Accounting and Economics*, *31*(1–3), 77–104.
- Beardsley, E. L., Imdieke, A. J., & Omer, T. C. (2021). The distraction effect of non-audit services on audit quality. *Journal of Accounting and Economics*, *71*(2–3), 101380.
- Beck, K. I., & Brødsgaard, K. E. (2022). Corporate governance with Chinese characteristics: Party organization in state-owned enterprises. *The China Quarterly*, *250*, 486–508.
- Bryan, D. B., & Mason, T. W. (2020a). Earnings volatility and audit report lag. *Advances in Accounting*, *51*, 100496.
- Bryan, D. B., & Mason, T. W. (2020b). Earnings volatility and auditor risk assessments: Evidence from auditor resignations. *Accounting Horizons*, *34*(4), 33–56.
- Bryan, D. B., & Mason, T. W. (2022). Earnings autocorrelation and accounting restatements. *Review of Accounting and Finance*, *21*(3), 154–173.
- Bryan, D. B., Mason, T. W., & Reynolds, J. K. (2018). Earnings autocorrelation, earnings volatility, and audit fees. *Auditing: A Journal of Practice & Theory*, *37*(3), 47–69.
- Cahan, S., Godfrey, J. M., Hamilton, J., & Jeter, D. C. (2008). Auditor specialization, auditor dominance, and audit fees: The role of investment opportunities. *The Accounting Review*, *83*(6), 1393–1423.
- Cahan, S., Zhang, W., & Veenman, D. (2011). Did the waste management audit failures signal lower firm-wide audit quality at Arthur Andersen? *Contemporary Accounting Research*, *28*(3), 859–891.



- Caporale, G. M., You, K., & Chen, L., (2019). Global and regional stock market integration in Asia: A panel convergence approach. *International Review of Financial Analysis*, 65, 101381.
- Chang, X., Dasgupta, S., & Hilary, G. (2009). The effect of auditor quality on financing decisions. *The Accounting Review*, 84(4), 1085–1117.
- Chen, H., Chen, J. Z., Lobo, G. J., & Wang, Y. (2011). Effects of audit quality on earnings management and cost of equity capital: Evidence from China. *Contemporary Accounting Research*, 28(3), 892–925.
- Chin, C. L., & Chi, H. Y. (2009). Reducing restatements with increased industry expertise. *Contemporary Accounting Research*, 26(3), 729–765.
- Choi, J. H., & Wong, T. J. (2007). Auditors' governance functions and legal environments: An international investigation. *Contemporary Accounting Research*, 24(1), 13–46.
- Choi, J. H., Kim, J. B., Qiu, A. A., & Zang, Y. (2012). Geographic proximity between auditor and client: How does it impact audit quality? *Auditing: A Journal of Practice and Theory*, 31(2), 43–72.
- Cohen, J. R., Hoitash, U., Krishnamoorthy, G., & Wright, A. M. (2014). The effect of audit committee industry expertise on monitoring the financial reporting process. *The Accounting Review*, 89(1), 243–273.
- DeAngelo, H., DeAngelo, L., & Wruck, K. H. 2002. Asset liquidity, debt covenants, and managerial discretion in financial distress: the collapse of LA Gear. *Journal of financial economics*, 64(1), 3–34.
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *Accounting Review*, 70(2), 193–225.
- DeFond, M. L., & Zhang, J. (2014). A review of archival auditing research. *Journal of Accounting and Economics*, 58(2–3), 275–326.
- DeFond, M. L., Wong, T. J., & Li, S. (1999). The impact of improved auditor independence on audit market concentration in China. *Journal of Accounting and Economics*, 28(3), 269–305.
- Demir, F. (2009a). Financial liberalization, private investment and portfolio choice: Financialization of real sectors in emerging markets. *Journal of Development Economics*, 88(2), 314–324.
- Demir, F. (2009b). Financialization and manufacturing firm profitability under uncertainty and macroeconomic volatility: Evidence from an emerging market. *Review of Development Economics*, 13(4), 592–609.
- Dutta, S. J. (2018). Financialization: a primer. Transnational Institute, Amsterdam. <https://www.tni.org/files/publication-downloads/financialization-primer-sept2018-web.pdf> Accessed on [Accessed on 25 Oct 2022].
- Ehrmann, M., Fratzscher, M., & Rigobon, R. (2011). Stocks, bonds, money markets and exchange rates: Measuring international financial transmission. *Journal of Applied Econometrics*, 26(6), 948–974.
- Epstein, G. A., & Jayadev, A. (2005). The rise of rentier incomes in OECD countries: Financialization, central bank policy and labor solidarity. In G. A. Epstein (Ed.), *Financialization and the World Economy* (pp. 46–74). Edward Elgar Publishing Ltd.
- Ferguson, A., Francis, J. R., & Stokes, D. J. (2003). The effects of firm-wide and office-level industry expertise on audit pricing. *The Accounting Review*, 78(2), 429–448.
- Feyen, E., Frost, J., Gambacorta, L., Natarajan, H., & Saal, M. (2021). *Fintech and the digital transformation of financial services: Implications for market structure and public policy* (p. 117). BIS Papers.
- Financial Stability Board. (2012). Enhancing the contribution of external audit to financial stability. Press release on 15 March 2012, [https://www.fsb.org/wp-content/uploads/pr\\_120315.pdf](https://www.fsb.org/wp-content/uploads/pr_120315.pdf) [Accessed on 25 Oct 2022].
- Francis, J. R. (2011). A framework for understanding and researching audit quality. *Auditing: A Journal of Practice & Theory*, 30(2), 125–152.
- Francis, J. R., Michas, P. N., & Yu, M. D. (2013). Office size of big 4 auditors and client restatements. *Contemporary Accounting Research*, 30(4), 1626–1661.
- Fung, S. Y. K., Raman, K. K., & Zhu, X. K. (2017). Does the PCAOB international inspection program improve audit quality for non-US-listed foreign clients? *Journal of Accounting and Economics*, 64(1), 15–36.
- Garcia-Blandon, J., Argilés-Bosch, J. M., & Ravenda, D. (2019). Is there a gender effect on the quality of audit services? *Journal of Business Research*, 96, 238–249.
- Glover, S. M., Taylor, M. H., & Wu, Y. J. (2017). Current practices and challenges in auditing fair value measurements and complex estimates: Implications for auditing standards and the academy. *Auditing: A Journal of Practice & Theory*, 36(1), 63–84.
- Godfrey, J. M., & Hamilton, J. (2005). The impact of R&D intensity on demand for specialist auditor services. *Contemporary Accounting Research*, 22(1), 55–93.



- Goldman, N. C., Harris, M. K., & Omer, T. C. (2022). Does task-specific knowledge improve audit quality: Evidence from audits of income tax accounts. *Accounting Organizations and Society*, 99, 101320.
- Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of Accounting and Economics*, 40(1–3), 3–73.
- Gul, F. A., Wu, D., & Yang, Z. (2013). Do individual auditors affect audit quality? Evidence from archival data. *The Accounting Review*, 88(6), 1993–2023.
- Güner, A. B., Malmendier, U., & Tate, G. (2008). Financial expertise of directors. *Journal of Financial Economics*, 88(2), 323–354.
- Habib, A., Jiang, H., Bhuiyan, M. B. U., & Islam, A. (2014). Litigation risk, financial reporting and auditing: A survey of the literature. *Research in Accounting Regulation*, 26(2), 145–163.
- He, J. J., & Tian, X. (2013). The dark side of analyst coverage: The case of innovation. *Journal of Financial Economics*, 109(3), 856–878.
- He, X., Pittman, J. A., Rui, O. M., & Wu, D. (2017). Do social ties between external auditors and audit committee members affect audit quality? *The Accounting Review*, 92(5), 61–87.
- He, X., Kothari, S. P., Xiao, T., & Zuo, L. (2022). Industry-specific knowledge transfer in audit firms: Evidence from audit firm mergers in China. *The Accounting Review*, 97(3), 249–277.
- Hsieh, S. F., & Brennan, G. (2022). Issues, risks, and challenges for auditing crypto asset transactions. *International Journal of Accounting Information Systems*, 46, 100569.
- Hu, N., Xu, J., & Xue, S. (2022). Regulatory risk and auditors' reporting conservatism: Evidence from Chinese comment letters. *Journal of Accounting and Public Policy*, 106997.
- Hutton, A. P., Marcus, A. J., & Tehranian, H. (2009). Opaque financial reports, R2, and crash risk. *Journal of Financial Economics*, 94(1), 67–86.
- ICAEW (2021). *Audit quality: how to raise the bar*. ICAEW. <https://www.icaew.com/-/media/corporate/files/technical/audit-and-assurance/the-future-of-audit/audit-how-to-raise-the-bar.ashx> [Accessed on 25 Oct 2022].
- International Monetary Fund. (2020). *Global Financial Stability Report: Markets in the Time of COVID-19*, April 2020, International Monetary Fund, Washington.
- International Monetary Fund. (2022). *Global Financial Stability Report: Shockwaves from the War in Ukraine Test the Financial System's Resilience*, April 2022, International Monetary Fund, Washington.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- Jin, L., & Myers, S. C. (2006). R2 around the world: New theory and new tests. *Journal of Financial Economics*, 79(2), 257–292.
- John, K., Litov, L., & Yeung, B. (2008). Corporate governance and risk-taking. *The Journal of Finance*, 63(4), 1679–1728.
- Johnson, S., & Mitton, T. (2003). Cronyism and capital controls: Evidence from Malaysia. *Journal of Financial Economics*, 67(2), 351–382.
- Jones, J. J. (1991). Earnings management during import relief investigations. *Journal of Accounting Research*, 29(2), 193–228.
- Kim, J. B., Chung, R., & Firth, M. (2003). Auditor conservatism, asymmetric monitoring, and earnings management. *Contemporary Accounting Research*, 20(2), 323–359.
- Kim, J. B., Li, Y., & Zhang, L. (2011a). Corporate tax avoidance and stock price crash risk: Firm-level analysis. *Journal of Financial Economics*, 100(3), 639–662.
- Kim, J. B., Li, Y., & Zhang, L. (2011b). CFOs versus CEOs: Equity incentives and crashes. *Journal of Financial Economics*, 101(3), 713–730.
- Kim, J.B. & Zhang, L., 2014. Financial reporting opacity and expected crash risk: Evidence from implied volatility smirks. *Contemporary Accounting Research*, 31(3), 851–875.
- Knechel, W. R., Naiker, V., & Pacheco, G. (2007). Does auditor industry specialization matter? Evidence from market reaction to auditor switches. *Auditing: A Journal of Practice and Theory*, 26(1), 19–45.
- Knechel, W. R., Thomas, E., & Driskill, M. (2020). Understanding financial auditing from a service perspective. *Accounting Organizations and Society*, 81, 101080.
- KPMG (2017). *Fair value measurement: Questions and answers*, Dec 2017.
- KPMG (2015). *Audit quality: Our hands-on process of maintaining integrity, independence, ethics, objectivity, skepticism and quality performance*. KPMG. <https://assets.kpmg/content/dam/kpmg/pdf/2016/03/audit-quality-report-2015.pdf> [Accessed on 25 Oct 2022].
- Krippner, G. R. (2005). The financialization of the American economy. *Socio-Economic Review*, 3(2), 173–208.

- Landsman, W. R. (2006). Fair value accounting for financial instruments: some implications for bank regulation. BIS Working Papers No 209, Bank of International Settlement, Basel.
- Lee, G., Naiker, V., & Stewart, C. R. (2022). Audit office labor market proximity and audit quality. *The Accounting Review*, 97(2), 317–347.
- Lennox, C., & Li, B. (2012). The consequences of protecting audit partners' personal assets from the threat of liability. *Journal of Accounting and Economics*, 54(2–3), 154–173.
- Lennox, C., & Park, C. W. (2007). Audit firm appointments, audit firm alumni, and audit committee independence. *Contemporary Accounting Research*, 24(1), 235–258.
- Lennox, C., & Pittman, J. (2010). Big five audits and accounting fraud. *Contemporary Accounting Research*, 27(1), 209–247.
- Li, C. Y., Zhang, Y., Li, X. B., & Liang, S. K. (2018). Earnings management under fair value: Crisis under smooth profit—A listed company as an example. *Accounting and Economic Research*, 32, 46–61.
- Lim, C. Y., & Tan, H. T. (2008). Non-audit service fees and audit quality: The impact of auditor specialization. *Journal of Accounting Research*, 46(1), 199–246.
- Lim, M., How, J., & Verhoeven, P. (2014). Corporate ownership, corporate governance reform and timeliness of earnings: Malaysian evidence. *Journal of Contemporary Accounting & Economics*, 10(1), 32–45.
- Liu, X., Shu, H., & Wei, K. (2017). The impacts of political uncertainty on asset prices: Evidence from the Bo scandal in China. *Journal of Financial Economics*, 125(2), 286–310.
- Luo, C. (2021). Will the change from four to three classifications of Financial assets lead to a substitution of Accrual earnings management for real earnings management? *Open Journal of Accounting*, 11(1), 1–20.
- Mao, Z. H., & Xu, C. (2018). Can fair value hierarchy measurement of financial assets identify earnings management? An empirical study based on non-financial listed companies in China. *Economic Science*, 4, 117–128.
- Minutti-Meza, M. (2013). Does auditor industry specialization improve audit quality? *Journal of Accounting Research*, 51(4), 779–817.
- Orhangazi, Ö. (2008). Financialization and capital accumulation in the non-financial corporate sector: A theoretical and empirical investigation on the US economy: 1973–2003. *Cambridge Journal of Economics*, 32(6), 863–886.
- Papadamou, S., Fassas, A. P., Kenourgios, D., & Dimitriou, D. (2023). Effects of the first wave of COVID-19 pandemic on implied stock market volatility: International evidence using a Google trend measure. *The Journal of Economic Asymmetries*, 28, e00317.
- Payne, J. L. (2008). The influence of audit firm specialization on analysts' forecast error. *Auditing: A Journal of Practice and Theory*, 27(2), 109–136.
- Peng, Y. C., Ni, X. R., & Shen, J. (2018). The effect of transforming the economy from substantial to fictitious on financial market stability: An analysis on stock price crash risk. *Economic Research Journal*, 53(10), 50–66.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods Instruments & Computers*, 36(4), 717–731.
- Ramanna, K., & Watts, R. L. (2012). Evidence on the use of unverifiable estimates in required goodwill impairment. *Review of Accounting Studies*, 17(4), 749–780.
- Reichelt, K. J., & Wang, D. (2010). National and office specific measures of auditor industry expertise and effects on audit quality. *Journal of Accounting Research*, 48(3), 647–686.
- Rodrigues, J., Santos, A., & Teles, N. (2018). Semi-peripheral financialisation: The case of Portugal. *Review of International Political Economy*, 23(3), 480–510.
- Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of Accounting and Economics*, 42(3), 335–370.
- Roychowdhury, S., Shroff, N., & Verdi, R. S. (2019). The effects of financial reporting and disclosure on corporate investment: A review. *Journal of Accounting and Economics*, 68(2–3), 101246.
- Schauble, J. (2018). The impact of external and internal corporate governance mechanisms on agency costs. *Corporate Governance: The International Journal of Business in Society*, 19(1), 1–22.
- Sisli-Ciamarra, E. (2012). Monitoring by affiliated bankers on board of directors: Evidence from corporate financing outcomes. *Financial Management*, 41(3), 665–702.
- Škoda, M., & Sláviková, G. (2015). Fair value measurement after financial crunch. *Procedia-Social and Behavioral Sciences*, 213, 241–247.
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology*, 13, 290–312.

- Tache, M. (2021). The incidence of earnings management on audit quality. In *Proceedings of the International Conference on Business Excellence*, 15, (1), 783–792. Available via <https://sciendo.com/article/10.2478/picbe-2021-0073> [Accessed on 12 Nov 2023].
- Theurillat, T., Corpataux, J., & Crevoisier, O. (2010). Property sector financialization: The case of Swiss pension funds (1992–2005). *European Planning Studies*, 18(2), 189–212.
- Tobin, J. (1965). Money and economic growth. *Econometrica*, 33(4), 671–684.
- Van Treeck, T. (2008). Reconsidering the investment–profit nexus in finance-led economies: An ARDL-based approach. *Metroeconomica*, 59(3), 371–404.
- Vargo, S. L., Lusch, R. F., & Akaka, M. A. (2010). Advancing service science with service-dominant logic: Clarifications and conceptual development. In P. P. Maglio, C. A. Kieliszewski, & C. James (Eds.), *Handbook of Service Science* (pp. 133–156). Springer.
- Wang, J., & Mao, N. (2022). Does financialization of non-financial corporations promote or prohibit corporate Risk-Taking? *Emerging Markets Finance and Trade*, 58(7), 1913–1924.
- Wang, L., & You, K. (2022). The impact of political connections on corporate tax burden: Evidence from the Chinese market. *Finance Research Letters*, 47, 102944.
- Wang, Q., Wong, T. J., & Xia, L. (2008). State ownership, the institutional environment, and auditor choice: Evidence from China. *Journal of Accounting and Economics*, 46(1), 112–134.
- Weber, J., Willenborg, M., & Zhang, J. (2008). Does auditor reputation matter? The case of KPMG Germany and ComROADAG. *Journal of Accounting Research*, 46(4), 941–972.
- Xie, F., Kuang, X., & Li, Z. (2022). Financialization of developing and emerging economies and China's experience: How China resists financialization. *Cambridge Journal of Economics*. beac037.
- Xu, S., & Guo, L. (2021). Financialization and corporate performance in China: Promotion or inhibition? *Abacus*, 59(3), 776–817.
- Xu, N., Li, X., Yuan, Q., & Chan, K. C. (2014). Excess perks and stock price crash risk: Evidence from China. *Journal of Corporate Finance*, 25, 419–434.
- Ye, J. F., Zhou, L., Li, D. M., & Guo, L. (2009). Management Motivation, Accounting Policy choice and earnings management: An empirical study based on the Classification of Financial Assets of Listed Companies under the New Accounting standards. *Accounting Research*, 3, 25–30.
- Yu, M. (2013). State ownership and firm performance: Empirical evidence from Chinese listed companies. *China Journal of Accounting Research*, 6(2), 75–87.
- Zhang, C., & Zheng, N. (2020). The financial investment decision of non-financial firms in China. *The North American Journal of Economics and Finance*, 53, 101215.
- Zhang, N., Wang, A., Ul-Haq, N., & Nosheen, S. (2022). The impact of COVID-19 shocks on the volatility of stock markets in technologically advanced countries. *Economic Research-Ekonomska Istraživanja*, 35(1), 2191–2216.
- Zhao, X., Lynch Jr, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, 37(2), 197–206.
- Zhu, W. (2016). Accruals and price crashes. *Review of Accounting Studies*, 21(2), 349–399.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.