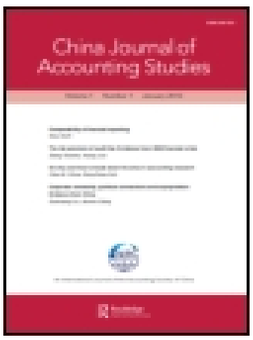

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Strategic deviance and auditor selection

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ABSTRACT

Using data of Chinese A-share non-financial listed companies spanning years 2003–2018, we examine whether a firm's business strategy that deviates from industry conventions influences corporate governance mechanisms, particularly the probability of choosing high-quality external auditors. We document a significantly positive correlation between a firm's strategic deviance and high-quality auditor engagement. The exacerbation of agency conflict is an important driver for firms with strategic deviance to hire high-quality auditors. Moreover, we find evidence that hiring Big 4 auditors can curb earnings management and capital occupation of major shareholders in firms with a deviant strategy. We conclude that strategically deviant firms hire high-quality auditors due to agency conflicts.

KEYWORDS

Strategic deviance; auditor selection; agency costs; legitimacy; high-quality auditor

1. Introduction

This study investigates the impact of corporate strategy on management's behaviour, in particular auditor selection. Specifically, we examine whether and how a firm that is strategically deviating from the conventional strategy in the industry will make different decisions regarding its auditor selection. Corporate strategy is a pattern reflected in a series of decisions (Mintzberg, 1978). It not only determines a firm's product and market areas, technology, and organisational structure but also affects the firm's operational complexity, environmental uncertainty, and information asymmetry (Lim et al., 2018).

Corporate strategy has received increasing concerns in the accounting field because of its important role in enterprise management. Recent studies have documented that the strategy will significantly affect various aspects of a firm, for example, its internal control over financial reporting (Bentley-Goode et al., 2017), accounting conservatism (Liu, 2016), probability of earnings management (Sun, Wang, Cao and Liu, 2016), readability of annual report(Lim et al., 2018), earnings persistence (Zhou et al., 2018), financial reporting irregularities and audit effort (Bentley et al., 2013), audit opinion (Y. Chen et al., 2017), audit fees (B. Q. Wang & Wu, 2017), information environment(Bentley et al., 2019), analyst prediction accuracy (He & Yin, 2018), future stock price crash risk (Habib & Hasan, 2017), and tax avoidance (Higgins et al., 2015; Yuan et al., 2019).

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Despite the great interests in strategy and the growing body of strategy-related research in the field of accounting, to our knowledge, no prior study has specifically examined whether strategy relates to a firm's auditor choice. We complement this stream of literature by investigating whether and how strategic deviance, the extent to which a firm's strategy deviates from the conventional strategy in the industry (Geletkanycz & Hambrick, 1997), plays a role in auditor selection. In particular, we expect that strategic deviance may have two opposite effects on a firm's auditor selection.

On the one hand, agency theory suggests that information asymmetry and the resulted agency conflicts are important factors driving firms to hire independent auditors (M. C. Jensen & Meckling, 1976; Healy & Palepu, 2001; Watts & Zimmerman, 1983). Consistent with this theory, there is a wealth of evidence that to alleviate the agency conflicts, specifically, firms with severe agency conflicts are more likely to hire high-quality auditors (Fan & Wong, 2005; Fang et al., 2017; Francis & Wilson, 1988). Since strategic deviance aggravates the information asymmetry between the insiders and external stakeholders of a firm (Carpenter, 2000), we expect that firms with greater strategic deviance are more likely to hire high-quality auditors.

On the other hand, strategic deviance intensifies the business risk of the firms (Wang et al., 2017), and leads to the great uncertainty of their performance (Tang et al., 2011). As a result, firms with higher strategic deviance may have the incentives to manage earnings (K.T. Ye et al., 2015). However, high-quality auditing will limit insiders' discretion to distort financial reporting (Fan & Wong, 2005; Guedhami et al., 2014). Besides, higher audit fees charged by high-quality auditors (Francis, 2004) are a tangible cost to firms (Fang et al., 2017). In short, firms with higher strategic deviance may be reluctant to select high-quality auditors due to the firm's discretions to manage earnings. Not surprisingly, while numerous studies have shown that agency conflict is positively associated with hiring high-quality auditors, some literature finds opposite evidence, such as Guedhami et al. (2009), Lin and Liu (2009), and Lin and Liu (2010). Taken together, existing research provides competing predictions regarding the impact of strategic deviance on the selection of high-quality auditors, indicating that this question needs further investigation.

Using a sample consists of 27,123 firm-year observations from 2003 to 2018, we examine the impact of strategic deviance on auditor selection in the following steps: First, we investigate whether and how strategic deviance impacts the probability of high-quality auditors being hired. Our findings reveal that firms with higher strategic deviance are more likely to hire Big 4 auditors. Second, we sharpen our analysis by investigating the mechanism through which strategic deviance affects the employment of high-quality auditors. We find that strategic deviance will aggravate agency conflict between a firm and outsiders, which, in turn, enhances the firm's demand for high-quality auditors. Third, we further examine the various impacts of high-quality audits on firms with greater strategic deviance, such as market value, cost of equity capital, capital occupation of major shareholders, and earnings management. The results indicate that although there is no significant relationship between the interaction terms of Big 4 and strategic deviance and market value, the interaction terms of Big 4 and strategic deviance are negatively related to manipulative earnings management, capital occupation, and cost of equity capital. Our findings are robust to a series of statistical tests.

Our research contributes to the literature and practice in several ways. First, our study is among those attempting to narrow the gap between corporate strategies and auditing

practice. Although the corporate strategy has received more and more attention from accounting scholars in recent years, to our knowledge, there is no evidence regarding the relationship between corporate strategy and auditor selection. By examining the effects of strategic deviance on auditor choice, this paper promotes research on the effects of corporate strategy on corporate accounting and auditing behaviour more deeply and extensively. Second, this study extends the literature about the determinants of audit selection. Previous research on auditor selection mainly focuses on the following aspects: institutional environment (Q. Wang et al., 2008), board governance (Srinidhi et al., 2014), political connections (Du & Zhou, 2010; Guedhami et al., 2014), ownership (Guedhami et al., 2009; He et al., 2014; Q. Wang et al., 2008; Wang & Liu, 2014), internationalisation (Tsao et al., 2017), board gender diversity (Lai et al., 2017), and board internationalisation (Du & Tan, 2016) and so on. From the perspective of strategic deviance, however, this study provides some new evidence on audit decisions. Besides, by using a *PSM- DID* design, our study provides relatively more reliable evidence for the impact of corporate strategy on auditor choice. Third, based on agency cost theory, this paper identifies the mechanism of strategic deviance affecting auditor choice. It further improves the theoretical framework of auditor selection research. Finally, our findings inform researchers and practitioners as well of the consequences of a strategically abnormal company hiring a high-quality auditor.

2. Literature review and hypothesis development

2.1. The impact of strategic deviance on auditor choice

2.1.1. Strategic deviance and information asymmetry

The biggest problem that capital market participants face in valuing firms is information asymmetry (Myers & Majluf, 1984), which is more serious in firms with deviant strategy, because strategic deviance may lead to uncertain performance.

First, based on legitimacy theory, strategic deviance is not conducive for firms to obtain resources. Legitimacy means that individual behaviour is consistent with accepted norms of behaviour in the big society system (Dowling & Pfeffer, 1975). The convergence of a firm's behaviour with its competitors can make the firm gain social recognition, and imitating the management practices of competitors can also improve organisational efficiency (DiMaggio & Powell, 1983). Meanwhile, legitimacy can reduce litigation risk and help firms to obtain the resources necessary for their sustainable survival (Meyer & Rowan, 1977). As for strategy, if a firm's strategy is aligned with the industry's routine, it is likely to be recognised as more legitimate than those with unique ones (DiMaggio & Powell, 1983; Suchman, 1995). Hence, firms with a deviant strategy may be stuck with a lack of customer groups, suppliers, and skilled employees, and thus are difficult to access resources (Meyer & Rowan, 1977). As a result, strategic deviance is positively related to equity capital cost (Wang et al., 2017).

Second, strategic deviance aggravates decision risk and operational risk. Since the industry routine has been proved to effectively cope with industry risks, consistent with it can avoid trial and error costs (Geletkanycz & Hambrick, 1997; Ye et al., 2014), and thus reducing the operating costs (Geletkanycz & Hambrick, 1997). On the contrary, a strategy deviating from industry routine means that the strategy is made in a novel way, leading to

a greater probability of failure (Rajagopalan, 1997). As a result, organisations have to bear the risks, costs, and inefficiencies related to the deviation and the strategies are usually suboptimal (Anderson, 1988). Recent studies have shown that strategic deviance is positively related to a firm's default risk (Wang et al., 2019), and extreme performance – either excellent or poor performance (Tang et al., 2011; Chen et al., 2014).

However, we must admit that strategic deviance may also bring some competitive advantages to firms (Deephouse, 1999; Porter, 1991; Tang et al., 2011). Firms following unique strategies may gain surprising advantages (Chen & Macmillan, 1992), establish novel customer connections (Prahalad & Hamel, 1990), and are generally very difficult to be imitated or attacked (Chen & Miller, 1994). In sum, compliance with industry norms is not always the best choice (Tang et al., 2011).

Taken together, the performance of a firm with strategic deviance is uncertain (Denrell, 2005). The greater the uncertainty, the more difficult it is for outsiders to accurately judge the present and future performance of the firm. Moreover, He and Yin (2018) show the greater strategic deviance, the fewer the number of analysts following the firm, the greater error of the analysts' earnings forecast, and the greater difference in the earnings forecast among analysts. Thus, strategic deviance may aggravate the information asymmetry between firms and outsiders.

2.1.2. Strategic deviance and agency conflict

Due to strategy deviating from industry norms, there is no experience to draw on and many unforeseeable problems may be encountered during strategy implementation. Thus, managers in firms with deviant strategies have a great deal of discretion to improvise. Associated with the increase of discretion, agency conflict intensifies (M. Jensen & Murphy, 1990). Mayers and Smith (1988, p. 353) posit that 'Generally, the more discretion an agent is authorized to have, the larger is the potential for that agent to operate in his self-interest at the expense of the other parties to the contract'. Besides that, with the growth of a manager's discretion, the number of strategic factors influencing outcomes also increases, obscuring the relationship between behaviour and outcomes (Rajagopalan & Finkelstein, 1992). The vague causality and dicey results not only lead to information asymmetry but also make it difficult to uncover managers' self-interest behaviour (Rajagopalan, 1997). Based on the above analysis, we argue that strategic deviance will exacerbate agency conflict, which is consistent with the notion that corporate strategy is a source of agency problems (Rajagopalan & Finkelstein, 1992).

2.1.3. Strategic deviance and auditor selection

According to agency theory, because of the information asymmetry, insiders with opportunistic tendencies will take advantage of their information advantages to maximise their interests at the expense of the outsiders, resulting in agency cost. However, in the capital market with rational expectations, investors or creditors will charge a higher cost of capital to protect themselves, and consequently transfer agency costs to insiders (M. C. Jensen & Meckling, 1976). Consistent with this theory, some research documents that agency conflicts are positively related to the capital cost (Chen et al., 2011, 2009; Choi & Wong, 2007; Fan & Wong, 2005; Lin et al., 2011), and negatively related to the bond credit rating (Bhojraj & Sengupta, 2003). Therefore, firms with serious agency conflicts

have stronger motivation to introduce external supervision and restraint mechanisms such as independent audits, to alleviate agency conflicts (M. C. Jensen & Meckling, 1976).

By independently verifying the accuracy and credibility of financial statements, high-quality auditors can reduce information asymmetry between insiders and outsiders, and make it more difficult for insiders to engage in rent-seeking activities (M. C. Jensen & Meckling, 1976). Consequently, high-quality auditors help mitigate agency conflicts and thus lower the cost of capital (S. Zhang et al., 2019). Therefore, as agency problems increase, the demand for high-quality auditors grows (Fan & Wong, 2005; Fang et al., 2017; Francis & Wilson, 1988; Guedhami et al., 2014; Tsao et al., 2017; S. Zhang et al., 2019). Accordingly, we expect a positive correlation between strategic deviance and the hiring of high-quality auditors.

However, it is also possible that insiders of strategically deviant firms are reluctant to hire high-quality auditors. First, strategic deviance intensifies the business risk of the firms (Wang et al., 2017), and leads to the great uncertainty of their performance (Tang et al., 2011). As low or volatile earnings are likely to induce earnings management in a firm (Graham et al., 2005), the firm with higher strategic deviance has a stronger motive to manage earnings (k.T. Ye et al., 2015). Obviously, they are reluctant to hire high-quality auditors who are adverse to insiders distorting financial reporting (Fan & Wong, 2005; Guedhami et al., 2014).

Second, since the cost of capital borne by firms with larger strategic deviance is usually higher than others (Wang et al., 2017), higher fees generally charged by high-quality auditors (Francis, 2004) will increase the financial burden on those firms. Hence, the company will weigh the costs against the benefits in selecting an auditor (Fang et al., 2017). As the Chinese capital market is not well developed and investor protection is relatively weak (Lei et al., 2009), the benefits of hiring a quality auditor do not necessarily outweigh the costs, at least on some occasions that is the case.

In sum, the literature on the relationship between agency conflict and hiring high-quality auditors has revealed equivocal findings. Therefore, whether strategic deviance affects the demand for high-quality auditors remains an empirical question. Based on the discussion above, we, largely for expositional convenience, propose the following hypotheses (all hypotheses are stated in the alternative):

H_1: Strategic deviance is positively related to the firm's engagement in high-quality auditors.

2.2. the mediating role of firm's ownership structures

Ownership structure may shape the role that deviant strategy playing in auditor choice. A larger ownership-control gap indicates more serious agency conflicts. As the ratio of control over ownership increases, the ability of the controlling shareholder to exploit the minority shareholders increases, while the correlation between the shareholder's wealth and the company's wealth decreases (Fan & Wong, 2005), and consequently the controlling shareholder has the incentive and ability to exploit minority shareholders. Joh (2003) and Faccio (2006) find evidence that controlling shareholders tend to exploit minority investors as the ownership-control gap widens. Jiang et al. (2010) find that occupy is most

severe in firms with a large ownership-control gap. As a result, minority investors will 'particularly value the presence of a Big 4 auditor in this situation' (see Guedhami et al., 2014, p. 114). Prior research also finds evidence supporting this view (Fan & Wong, 2005; Guedhami et al.,2014).

Similarly, firms with a single large shareholder are subjected to worse agency conflicts with outside investors (Bennedsen & Wolfenzon, 2000; Guedhami et al., 2014; Pagano & Röell, 1998). The main agency conflict in such firms is the controlling shareholder's encroachment on the interests of minority shareholders (Shleifer & Vishny, 1997). The absence of counterbalance and cross monitor from other large shareholders cause the single dominant shareholder arbitrary in the firm's decision-making (Guedhami et al., 2014) and having sufficient discretion to accruing private benefits (Bennedsen & Wolfenzon, 2000; Pagano & Röell, 1998). Previous studies document that large shareholders tend to tunnel their company by related party transactions (Liu et al., 2008), intercorporate loans (Jiang et al., 2010), and occupying the funds of listed companies (Ye et al., 2007). Thus, external investors rely heavily on the external supervision by the Big 4 auditors when they cannot depend on the mutual supervision of multiple large shareholders to protect their interests (Guedhami et al., 2014). To convince outside investors that they abstain from siphoning corporate resources, firms with a single large shareholder may be more likely to hire high-quality auditors. In our second prediction, we test whether the importance of strategic deviance to auditor choice varies with a firm's ownership structures:

H_2: In comparison to other firms, deviant strategy firms with ownership characteristics exacerbating agency conflicts with outside investors more probably employ high-quality auditors.

2.3. The Effect of Auditor Choice in Firms with High Strategic Deviance

As suggested by M. C. Jensen and Meckling (1976), given higher agency conflicts and the resulted potential pressure from rational investors to transfer risk, insiders are motivated to hire high-quality auditors to alleviate agency conflict.

However, as the Chinese capital market is not perfect and efficient (Tang, 2011), in some cases hiring high-quality auditors is not an effective supervisory mechanism. For instance, to deceive investors and other stakeholders, firms may 'purchase' high-quality audit services and favourable audit opinions (Tang, 2011). Considering that, we further explore the motivation of firms with an unusual strategy to hire high-quality auditors, supervision, or collusion. If the motivation is supervision, we would observe that hiring quality auditors can decrease earnings management, restrain major shareholder capital occupancy, lower equity capital cost (Chen et al., 2009; Ghoul et al., 2016), or increase the market value of strategic anomaly firms (Titman & Trueman, 1986). Otherwise, we would find that hiring quality auditors has no significant effect on these aspects of strategic anomaly firms. Based on the above analyses, we propose the following hypotheses:

H_3: Hiring high-quality auditors can restrain earnings management in the firm with strategic deviance.

H_4: Hiring high-quality auditors can curb capital occupation in the firm with strategic deviance.

H_5: Hiring high-quality auditors can decrease the level of cost of equity capital in the firm with strategic deviance.

H_6: Hiring high-quality auditors can increase market value in the firm with strategic deviance.

3. Research design

3.1. Sample selection and descriptive statistics

We selected Chinese listed companies from 2003 to 2018 as the initial sample and screened the initial samples using the following procedures. We remove financial services firms and exclude industries in which all firms hire or don't hire Big 4 auditors. The firms with missing data needed in our empirical models are omitted. We are left with a sample of 27,123 firm-years spanning 2003–2018. We obtain data mainly from *CSMAR* database. The data not available in the CSMAR database comes from *CNRDS* database or Wind database. To ease the influence of outliers, we winsorise continuous variables at the 1st and 99th percentiles.

3.2. Main empirical models and variable definitions

Following M. Zhang et al. (2012), we use the following model to test the influence of strategic deviance on auditor selection. Control variables are defined in Table 1.

$$AUDITOR = \beta_0 + \beta_1 \times SD + \beta \times Control\ Variables + \varepsilon \quad (1)$$

3.3. Measurement of strategic deviance

As the corporate strategy is embodied in its resource allocation model (Mintzberg, 1978), financial ratios are generally used to capture it (Bentley et al., 2019; Bentley et al., 2013; Fang & Cu, 2019; Miles et al., 1978; Sun et al., 2016).

Following existing literature (Geletkanycz & Hambrick, 1997; Tang et al., 2011), we construct Strategic deviance based on the following six indicators: (1) advertising intensity, equal to advertising expenses over sales; (2) *R&D* intensity, equal to *R&D* expenditure over sales; (3) capital intensity, equal to fixed assets divided by the number of employees; (4) plant and equipment newness, defined as net fixed assets divided by gross fixed assets; (5) overhead efficiency, equal to overheads divided by sales; and (6) financial leverage, defined as the sum of short-term borrowing, long-term borrowing, and bonds payable divided by net assets. Since few listed companies in China separately disclose advertising expenditure and *R &D* expenditure, we adopt sales expenses divided by sales and intangible assets divided by total assets to approximate advertising intensity and *R&D* intensity respectively.

Table 1. Variable definitions.

Variables	Definition
BIG4	Dummy variable, equal to 1 for firms appointing Big Four auditors, and 0 otherwise.
SD	The extent to which the company's strategy deviates from the industry's conventions, which is calculated using six measures, following Tang et al. (2011).
SDDUM	Dummy variable, equal to1 if SD greater than the annual industry median, and 0 otherwise.
SIZE	The natural log of a firm's total assets.
ROA	Return on assets, calculated as net profit scaled by total assets.
LEV	Leverage, calculated as total liabilities scaled by total assets.
INV	Defined as net inventory scaled by total assets.
REC	Defined as accounts receivable scaled by total assets.
GROW	Defined as the growth rate of sales.
ISSUE	Dummy variable set to 1 for firms issuing or allocating shares next year, and 0 otherwise.
INDR	Defined as the ratio of the number of independent directors to the total number of directors on the board.
TOP_1	Defined as the largest shareholder's equity stake.
SD_1	Another measure of SD, which is calculated by excluding the proportion of advertising and research and development using four measures, following Tang et al. (2011).
SD_2	Strategic deviance, measured using six-dimension strategic deviance measurement.
SD_3	measured by excluding R&D and ADV from equation (2). There are 22 industries in constructing SD and SD1, and 13 industries in measuring SD2 and SD3.
LOSS	Dummy variable, equal to 1 if a firm's net profit is less than 0, and 0 otherwise.
STATE	Dummy variable, equal to1 if a firm is ultimately controlled by the government or a state-owned enterprise, and 0 otherwise.
PEER	The ratio of Big 4 auditor's appointment each year within the province where a firm is located.
PC	Dummy variable, equal to1 if one or more of a firm's executives are former or current government staff, and 0 otherwise.
MSD	annual mean SD of other firms in the province where the firm was registered.
NONSDTOSD	Dummy variable, equal to1 if a firm's strategy has changed from normal to abnormal, and 0 otherwise.
SDTONONSD	Dummy variable, equal to1 if a firm's strategy has changed from normal to abnormal, and 0 otherwise.
POST	Dummy variable, equal to1 if the period is after a firm's strategy changing from normal to abnormal, and 0 otherwise.
$POST_1$	Dummy variable, equal to1 if the period is after a firm's strategy changing from abnormal to normal.
SEP	Defined as the ratio of the controlling shareholder's voting rights over their cash flow rights.
SL	Dummy variable, equal to 1 if there is only a single shareholder that holds more than 10% of the shares and zero otherwise.
CS50	Dummy variable, equal to 1 if the shares of the largest shareholder are greater than 50%, and zero otherwise.
TOBINQ	Defined as the ratio of a physical asset's market value to its replacement value.
AGE	Defined as the number of years after a firm goes public.
STATE	Dummy variable, equal to 1 if a firm is controlled by the government or a state-owned enterprise.
CAPEX	Defined as cash paid for the purchase and construction of fixed assets, intangible assets, and other long-term assets over total assets.
COC	cost of equity capital, measured as X. P Zhang et al. (2020), using analyst forecast data to calculate it.
ER	Defined as the proportion of shares held by the second largest to fifth largest shareholders.
IMS_ D	Industry specialist, dummy variable, equal to 1 if the industry market share of accounting firms is greater than or equal to 10%, and 0 otherwise.
FEE	Auditing fee, measured as the natural logarithm of audit fees of listed companies.
ACINDEX	A measure of agency cost calculated as Pantzalis and Park (2014).
MEXPENSE	Another measure of agency cost calculated as administrative fees divided by revenue.
TANGIBLE	Defined as fixed assets divided by total assets
EXSHARE	The percentage of shares held by executives.
CRCD	Dummy variable, equal to 1 if the firm is cross-listing, and zero otherwise.
TUNNEL	Defined as other payables divided by total assets.
BETAVAL	Defined as bata coefficient of a company's stock.
LIQUID	The number of individual shares traded per year divided by the number of outstanding shares
BM	Defined as the book value of a company's equity divided by its market value
LOP	Dummy variable, equal to 1 if the firm received non-standard audit opinions last year, and zero otherwise.

Among these six variables, advertising intensity, *R&D* intensity, capital intensity, and plant and equipment newness represent the actions of firms in marketing, innovation, and production capacity expansion. overhead efficiency represents the cost structure of the enterprise, while financial leverage represents the capital operation mode of the enterprise (Geletkanycz & Hambrick, 1997; Ye et al., 2014).

We take the following steps to construct the measure of strategic deviance. First, each indicator is standardised by year and industry. Second, we take the absolute value of each standardised score. Finally, we average the six indicators to get a composite measure of strategic deviance *(SD)*. The larger the *SD* is, the greater does a firm's strategy deviate from the industrial conventional strategy (see Appendix 1). Following Finkelstein and Hambrick (1990), we also constructed another measure of strategic deviance *(SD_1)* by eliminating advertising intensity and *R&D* intensity due to missing data.

3.3.1. Measurement of high-quality auditor

DeAngelo (1981) suggests that due to the huge cost of reputational damage, large audit firms have greater incentives to provide high-quality audit services. Consistent with this view, several empirical studies documents that compared to non-Big 4 auditors, Big 4 auditors are more likely to provide better assurance on the credibility of disclosed information (Becker et al., 1998; Defond & Jiambalvo, 1993; Francis, 2004). Following Khurana and Raman (2004), we use the top four accounting firms in China *(BIG4)* as proxies for high-quality auditors. We also use the top six accounting firms in China *(BIG6)* as an alternative measure of the high-quality auditor in robustness tests. Other control variables are shown in Table 1.

4. Major empirical results

4.1. Descriptive statistics and correlation analysis

Table 2 presents descriptive statistics for each variable. The mean value of *BIG4* is 0.150, suggesting that *BIG4* is an important component of the Chinese audit market. Panel B shows that the mean of *BIG4* is 15.9% and 14.1% respectively in high and low strategic deviance groups. The mean test shows that high strategic deviance firms are more likely to hire *BIG4* auditors than their low counterparts. The result provides preliminary support for the positive correlation between strategic deviance and the selection of quality auditors.

High and low strategic deviance firms also reveal disparity in other firm characteristics. High strategic deviance firms possess a smaller size *(SIZE)*, lower profitability*(ROA)*, less inventory*(INV)*, fewer accounts receivable*(REC)*, higher leverage ratio *(LEV)*, and more independent directors*(INDR)*.

The mean of *SD* is 0.560, the maximum and minimum values are 1.990 and 0.160 respectively, indicating that there are great differences in the degree of strategic deviance among firms, which also implies that the behaviour characteristics of firms vary with strategic deviance. The distribution of other variables is generally consistent with the existing literature. Besides, Pearson correlation analysis presented in Table 3 shows that *SD* and *BIG4* are significantly positively correlated at a 1% level, which also preliminarily supports the prediction that strategic deviance promotes a firm to employ high-quality auditors.

Table 2. Descriptive statistic.

	N	Mean	Median	Std	Min	Max
BIG4	27,123	0.150	0.000	0.360	0.000	1.000
SD	27,123	0.560	0.480	0.310	0.160	1.990
SIZE	27,123	21.890	21.730	1.320	12.310	28.520
ROA	27,123	0.030	0.030	0.060	−0.250	0.200
LEV	27,123	0.470	0.470	0.220	0.050	1.110
INV	27,123	0.160	0.120	0.150	0.000	0.740
REC	27,123	0.110	0.090	0.100	0.000	0.460
ISSUE	27,123	0.110	0.000	0.320	0.000	1.000
GROW	27,123	0.220	0.130	0.540	−0.630	3.740
INDR	27,123	0.370	0.330	0.050	0.250	0.570
TOP_1	27,123	0.360	0.340	0.160	0.000	0.900

Panel B subsamples: High strategic deviance group versus low strategic deviance group

	SDDUM = 0 (N = 13,545)	*SDDUM = 1* (N = 13,578)	Difference
	Mean	Mean	t-value
BIG4	0.141	0.159	−0.018***
SIZE	21.96	21.81	0.144***
ROA	0.041	0.027	0.014***
LEV	0.448	0.486	−0.038***
INV	0.167	0.151	0.016***
REC	0.121	0.106	0.015***
ISSUE	0.116	0.112	0.004
GROW	0.215	0.22	−0.005
INDR	0.366	0.368	−0.002***
TOP_1	0.362	0.359	0.003

Table 3. Correlation analysis.

Variable	BIG4	SD1	SIZE	ROA	LEV	INV	REC	ISSUE	GROW	INDR
BIG4	1									
SD	0.024***	1								
SIZE	0.247***	−0.093***	1							
ROA	0.048***	−0.215***	0.101***	1						
LEV	−0.005	0.173***	0.280***	−0.407***	1					
INV	−0.045***	−0.098***	0.103***	−0.059***	0.275***	1				
REC	−0.020***	−0.123***	−0.199***	−0.043***	0.006	−0.090***	1			
ISSUE	0.009	−0.010*	−0.007	0.023***	0.039***	0.011*	0.034***	1		
GROW	−0.001	−0.023***	0.051***	0.195***	0.037***	0.051***	0.021***	0.034***	1	
INDR	0.060***	0.024***	0.066***	0.007	−0.037***	0.007	0.000	0.029***	0.005	1
TOP_1	0.056***	−0.047***	0.215***	0.099***	0.030***	0.051***	−0.078***	−0.017***	0.032***	−0.001

This table reports the correlation analysis for all the variables concerned in our main analysis. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 4. Strategy deviance and auditor choice.

	(1)	(2)	(3)	(4)
Variable	BIG4	BIG4	BIG4	BIG4
SD	0.161***	0.371***		
	(2.96)	(5.86)		
SDDUM			0.157***	0.215***
			(4.39)	(5.69)
SIZE		0.481***		0.477***
		(23.56)		(23.34)
ROA		1.517***		1.411***
		(3.49)		(3.22)
LEV		−0.608***		−0.572***
		(−4.76)		(−4.46)
INV		−1.400***		−1.471***
		(−7.66)		(−8.05)
REC		0.700***		0.635***
		(3.35)		(3.06)
ISSUE		−0.001		−0.003
		(−0.02)		(−0.05)
GROW		−0.056		−0.056
		(−1.52)		(−1.51)
INDR		0.929***		0.943***
		(2.70)		(2.74)
TOP_1		0.581***		0.579***
		(4.50)		(4.49)
Intercept	−2.942***	−13.113***	−2.903***	−12.867***
	(−13.22)	(−27.92)	(−13.22)	(−27.74)
INDUSTRY	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
N	27,123	27,123	27,123	27,123
Pseudo R^2	0.1040	0.1549	0.1045	0.1549

This table reports the regression results testing the impact of strategic deviance on auditor choice. The dependent variable is the top 4 accounting firms in China (*BIG4*). In Columns (1) and (2), the main independent variable is strategic deviance (*SD*). In Columns (3) and (4), the main independent variable is strategic deviance dummy (*SDDUM*), which equals 1 if the firm's strategic deviance grouped by year-industry belongs to the large group and 0 otherwise. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. T-statistics computed with robust standard errors clustered at firm*year level are reported in parentheses.

4.2. Main Tests

Table 4 presents the regression results of Model (1). The dependent variable is a high-quality auditor (*BIG4*). The main independent variable is *SD*. In Columns (1) and (2), *SD* is a continuous variable. In Columns (3) and (4), *SD* is an indicator variable that equals 1 if a firm's strategic deviance is larger than its annual industry median and 0 otherwise. Across these four specifications, all the coefficients for *SD* variables load positively at a 1% level, suggesting that firms with large strategic deviance are more likely to hire *BIG4* auditors relative to those with small strategic deviance in the same industry and year. These findings lend support to Hypothesis H_1 of a positive association between strategic deviance and high-quality auditors.

As for the control variables, the coefficients on *SIZE, ROA, REC, INDR*, and $TOP_1$are significantly positive, indicating that the possibility of a firm hiring high-quality auditors will increase with some financial indicators, such as firm size, profitability, and the proportion of accounts receivable to total assets, the proportion of independent directors and the share ratio of the largest shareholder. The coefficients on *LEV* and *INV* are

significantly negative, indicating that the asset-liability ratio and inventory ratio are negatively correlated with a firm's demand for high-quality auditors. *ISSUE* and *GROW* are insignificant, indicating that they are not significantly related to the demands for high-quality external audits.

Table 5. Alternative measurements of key variables.

	(1)	(2)	(3)	(4)	(5)	(6)
Variable	BIG6	FEE	IMS_D	BIG4	BIG4	BIG4
SD	0.143***	2.187***	0.170***			
	(3.69)	(2.67)	(3.29)			
SD_1				0.076		
				(1.28)		
SD_2					0.248***	
					(4.19)	
SD_3						0.097*
						(1.79)
SIZE	0.326***	−2.534***	0.399***	0.444***	0.453***	0.446***
	(25.83)	(−10.27)	(21.41)	(12.27)	(11.97)	(12.14)
ROA	−0.002	−5.252***	−0.076	−0.066	−0.090	−0.072
	(−0.17)	(−23.87)	(−0.23)	(−0.35)	(−0.47)	(−0.38)
LEV	−0.008	2.450***	−0.328***	−0.158	−0.218	−0.174
	(−0.20)	(4.52)	(−3.28)	(−0.35)	(−0.46)	(−0.38)
INV	−1.238***	−3.862*	−0.268	−1.660***	−1.547***	−1.634***
	(−9.66)	(−1.93)	(−1.57)	(−7.17)	(−6.69)	(−7.20)
REC	0.719***	4.525	0.730***	0.364	0.505**	0.400*
	(4.82)	(0.72)	(3.67)	(1.52)	(2.08)	(1.69)
ISSUE	−0.034	−0.355**	0.040	−0.014	−0.012	−0.014
	(−0.74)	(−2.56)	(0.70)	(−0.23)	(−0.19)	(−0.22)
GROW	−0.000	0.000	−0.000	−0.000	−0.000	−0.000
	(−1.04)	(1.57)	(−0.68)	(−0.46)	(−0.47)	(−0.46)
INDR	0.521**	−1.628	−0.018	1.002***	1.036***	1.051***
	(2.03)	(−0.27)	(−0.05)	(3.03)	(3.16)	(3.20)
TOP_1	0.601***	0.599	0.612***	0.674***	0.671***	0.668***
	(6.23)	(1.02)	(4.97)	(5.10)	(5.06)	(5.04)
Intercept	−9.282***	54.005***	−5.960***	−12.296***	−12.645***	−12.404***
	(−28.16)	(9.30)	(−13.90)	(−18.85)	(−18.63)	(−18.86)
INDUSTRY	YES	YES	YES	YES	YES	YES
YEAR	YES	YES	YES	YES	YES	YES
N	27,123	23,221	27,123	27,123	27,123	27,123
Pseudo R2/Adj. R^2	0.0630	0.982	0.3482	0.1514	0.1500	0.1492

This table reports the regression results employing alternative measures of key variables. In Columns (1)- (3), we adopt alternative measures of a quality auditor. In Columns (4)- (6), we adopt alternative measures of strategic deviance. Specifically, BIG6 refers to the top 6 domestic accounting firms.FEE is the total audit cost over a firm's total assets. IMS_D is a dummy variable equal to one, if the industrial market share of an accounting firm is 10% or greater, and zero otherwise. Similar to SD, SD3 is calculated based on six indicators including:(1) advertising intensity (sales expenses/sales); (2) R&D intensity (intangible assets/total assets); (3) capital intensity (fixed assets/number of employees); (4) plant and equipment newness (net fixed assets/gross fixed assets); (5) overhead efficiency (selling, general, and administrative expense/sales); and (6) financial leverage (total debt/equity). SD_1 and SD_3 are measured by excluding advertising intensity and R&D intensity from the above indicators. The main difference between SD, SD_1, SD_2, and SD_3 is the industrial classification standard.SD and SD_1 are grouped by 22 industries, while SD_2 and SD_3 are grouped by 13 industries. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. T-statistics computed with robust standard errors clustered at firm*year level are reported in parentheses.

4.3. Robustness Test

4.3.1. Alternative measures of key variables

To ensure the reliability of our findings, we conduct the following robustness tests: (1) we adopt *BIG6* as an alternative measure of the high-quality auditor. The results are presented in Table 5 column (1). (2) As higher audit fees indicate higher audit quality (Francis, 2004; Khan et al., 2015), we adopt the natural logarithm of audit fees of listed companies *(FEE)* as an alternative measure of the high-quality audit. The results are listed in Table 5 column (2). (3) Following Tsao et al. (2017), we use auditors with industry specialists as an alternative measure of high-quality auditors. Prior research suggests that auditors with industry specialists are more likely to provide higher quality audit services than those without industry specialists (Carcello et al., 1992). As a result, industry-specialised auditors can decrease the probability of earnings management (Balsam et al., 2003; Krishnan, 2003) and the incidence of financial fraud (Carcello & Nagy, 2004), and then increase earnings response coefficients (Balsam et al., 2003; Gul et al., 2009) of their clients. Consistent with Krishnan (2003), Wei (2014), and Tsao et al. (2017), we measure industry specialisation (*IMS*) as the industrial market share of audit firms. *IMS_ D* is a dummy variable, which equals 1 if *IMS* is greater than or equal to 10%, and 0 otherwise. The results are presented in Table 5 column (3). Results show that the coefficients on these three variables are significantly positive (coeff. = 0.143, $p < 0.01$; coeff. = 2.187, $p < 0.01$ and coeff. = 0.170, $p < 0.01$in Columns (1), (2) and (3), respectively), supporting our prior findings.

Also, following Finkelstein and Hambrick (1990), we construct three new measures of strategic deviance. We get SD_1 by excluding *R&D* and *ADV* from equation (2). Similarly, we construct two new measures of strategic deviance SD_2 and SD_3. Among them, SD_3 is measured using the previously six-dimension strategic deviance measurement, while SD_2 measured using four of the same indicators as those used in SD_1. The main difference between *SD*, SD_1, SD_2, and SD_3 is an industry classification. There are 22 industries in constructing *SD* and SD_1, and 13 industries in measuring SD_2 and SD_3. The results are shown in Table 5 Column (4) to Column (6). Results show that the coefficients on *BIG4* are significantly positive in Column (5) (coeff. = 0.248, $p < 0.01$) and Column (6) (coeff. = 0.097, $p < 0.10$), consistent with our findings in Table 5.

Finally, to address concerns that intangible assets/total assets is not a good substitute for *R&D* expenditure/sales, we examined the correlation between *RD (R&D* expenditure/sales) and RD_1 (intangible assets/total assets), SD_4 (strategic deviations calculated based on *R&D* expenditure/revenue and other indicators), and *SD* (strategic deviations calculated based on intangible assets/total assets and other indicators) respectively. The results are shown in Table 6. As shown in Table 6, RD_1 and *RD, SD* and SD_4 are significantly positively correlated at the 1% level. We also further tested the correlation between SD_4 and *BIG4*, and the regression results are shown in Table 7. As shown in Table 7, SD_4 is significantly positively correlated with *BIG4* at the 1% level.

4.3.2. Alternative Specifications of regression models

Although the above results support the positive correlation between strategic deviance and high-quality auditors, due to the synthetic nature of *SD*, it is unknown how the six factors constructing *SD* affect each other, and which factors influence auditor selection. To alleviate this concern, we add all the indicators in Equation (1). To be more specific, we

Table 6. Regression of appropriateness of R&D expenditure to replace intangible assets.

	(1)	(2)
Variables	RD	SD_4
RD_1	0.274***	
	(10.19)	
SD		0.640***
		(53.09)
Constant	−0.015***	0.227***
	(−2.79)	(7.69)
Industry	yes	yes
year	yes	yes
N	13,592	13,359
Adj. R^2	0.077	0.456

where, SD_4 is the strategic deviation calculated based on R&D expenditure/revenue and other indicators, and SD is the strategic deviation calculated based on intangible assets/total assets and other indicators. RD is R&D expenditure/revenue, and RD_1 is intangible assets/total assets. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. T-statistics computed with robust standard errors clustered at firm*year level are reported in parentheses.

control for a firm's research and development intensity (*R&D*), advertising intensity *(ADV*), capital intensity (*CAP*), the newness of fixed assets (*PLANT*), interest-bearing liability ratio (*LEVERAGE*), and indirect cost efficiency (*SG&A*). The results are shown in Table 8 Column (1). Results show that the coefficient on *SD* is significantly positive (coeff. = 0.172, $p < 0.05$).

To further isolate the impact of strategic deviance on auditor choice from its confounding factors, we split *SD* into its components: *SD* in advertising *(SD_ADV)*, in research intensity *(SD_R&D)*, in updating degree of fixed assets *(SD_PLANT)*, in indirect cost efficiency *(SD_SG&A)*, in capital intensity*(SD_CAP)* and interest-bearing liability ratio *(SD_LEVERAGE)*. If strategic deviance does encourage companies to hire high-quality auditors, we would observe that at least one component of *SD* is positively associated with *BIG4*. The results are shown in Table 8 Column (2). The coefficients on *SD_ADV* and *SD_PLANT* are significantly positive (coeff. = 0.184, $p < 0.01$ and coeff. = 0.126, $p < 0.01$, respectively).

Moreover, we extend equation (1) by adding control variables to it. Following S. Zhang et al. (2019), we also control *SEP, LOSS, EXSHARE, and STATE* in the model (1). *SEP* is defined as the ratio of the ultimate controller's control right to ownership. *LOSS* is an indicator variable equal to 1 if a firm's net profit is less than 0, and 0 otherwise. *EXSHARE* is the percentage of shares held by executives. *STATE* is a dummy variable that equals 1 if a firm is ultimately controlled by the government or a state-owned enterprise, and 0 otherwise. Besides, prior research shows that political connections (*PC*), and the peer's auditor selection preference *(PEER)* impact the auditor selection of a firm (Du and Tan, 2016; Guedhami et al., 2014; Li, Sun and Ettredge, 2017). Following this line of research, we add the above control variables in the model (1). *PEER* represents the ratio of Big 4 auditor's appointment each year within the province where a firm is located. *PC* represents political connection. If one or more of a firm's executives are former or current government staff,

Table 7. Strategic deviations and auditor selection based on R&D expenditures.

	(1)	(2)
Variables	Big4	Big4
SD_4	0.372***	0.463***
	(4.59)	(5.17)
SIZE		0.374***
		(14.92)
ROA		−0.041
		(−0.64)
LEV		0.015
		(0.45)
INV		−1.591***
		(−5.95)
REC		0.719**
		(2.52)
ISSUE		−0.012
		(−0.16)
GROW		0.000
		(0.22)
INDR		0.452
		(0.91)
TOP_1		0.764***
		(4.05)
Constant	−1.114***	−9.850***
	(−3.07)	(−14.03)
Industry	yes	yes
year	yes	yes
N	13,359	13,359
Pseudo R^2	0.1588	0.1948

SD_4 is a strategic deviation calculated based on R&D expenditure/revenue and other metrics. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. T-statistics computed with robust standard errors clustered at firm*year level are reported in parentheses.

PC is 1, otherwise, it is 0. The results are shown in Table 8 Column (3). Results show that the coefficient on *SD* is still significantly positive (coeff. = 0.162, $p < 0.05$).

4.4. Endogenous

To alleviate the potential endogeneity resulting from reverse causality, functional form misspecification, or missing variables, the following tests are conducted:

First, we use an instrumental variable estimation to address the concern of missing variables. Prior research suggests that decision-makers tend to imitate the decisions of others in the same community (Brown et al., 2008; Pool et al., 2015). Campbell et al. (2019) use the distance between a firm and the biggest strategic deviance firm as the instrumental variable of SD. Limited by data availability, we took the annual mean *SD (MSD)* of other firms in the province where the firm was registered as the instrumental variable.

Therefore, we expect that a firm's *SD* is positively related to *MSD*. Importantly, the correlation between *MSD* and *BIG4* untabulated is small in our sample ($\rho = 0.074$), helping to justify the validity of *MSD* as an instrumental variable. In the first stage, we regress *SD* on *MSD* and all the control variables in Equation (1). In the second stage, we regress BIG4 on the

Table 8. Addressing the mechanical relationship between strategic deviance and auditor choice.

	(1)		(2)		(3)
Variable	BIG4		BIG4		BIG4
SD	0.172**			SD	0.162**
	(2.36)				(2.57)
ADV	0.178*	SD_ADV	0.184***	EXSHARE	0.098
	(1.73)		(7.45)		(0.69)
R&D	−0.075	SD_R&D	−0.003	PEER	6.412***
	(−0.24)		(−0.13)		(27.45)
CAP	−0.005	SD_CAP	−0.025	PC	−0.143**
	(−1.09)		(−1.19)		(−2.09)
PLANT	−0.885***	SD_PLANT	0.126***	STATE	−0.006
	(−6.33)		(4.00)		(−0.10)
LEVERAGE	0.003	SD_ LEVERAGE	−0.011	LOSS	−0.052
	(1.64)		(−0.31)		(−0.64)
SG&A	−0.001*	SD_ SG&A	0.013	SEP	−0.002
	(−1.77)		(0.45)		(−0.60)
SIZE	0.463***	SIZE	0.460***	SIZE	0.403***
	(12.49)		(13.43)		(17.90)
ROA	−0.091	ROA	−0.047	ROA	0.005
	(−0.48)		(−0.27)		(0.45)
LEV	−0.219	LEV	−0.113	LEV	0.013
	(−0.47)		(−0.26)		(0.50)
INV	−1.691***	INV	−1.656***	INV	−1.494***
	(−7.21)		(−7.49)		(−6.93)
REC	0.476*	REC	0.406*	REC	0.168
	(1.94)		(1.74)		(0.73)
ISSUE	0.017	ISSUE	−0.013	ISSUE	−0.001
	(0.27)		(−0.21)		(−0.01)
GROW	−0.000	GROW	−0.000	GROW	−0.000
	(−0.39)		(−0.42)		(−0.92)
INDR	1.028***	INDR	0.923***	INDR	0.099
	(3.11)		(2.80)		(0.25)
TOP_1	0.619***	TOP_1	0.692***	TOP_1	0.506***
	(4.65)		(5.25)		(3.18)
Intercept	−12.118***	Intercept	−12.813***	Intercept	−11.887***
	(−18.00)		(−20.29)		(−21.21)
INDUSTRY	YES	INDUSTRY	YES	INDUSTRY	YES
YEAR	YES	YEAR	YES	YEAR	YES
N	27,123	*N*	27,123	*N*	20,385
Pseudo R^2	0.1547	*Pseudo* R^2	0.1545	*Pseudo* R^2	0.2013

This table reports the regression results addressing the mechanical relationship between strategic deviance and auditor choice. In Column (1), we additionally control all the variables used to construct strategic deviance, e.g., advertising intensity (*ADVERTISE*), research and development intensity (*RESEARCH*), plant and equipment newness (*PLANT*), non-production overhead (*OVERHEAD*), capital intensity (CAP), and financial leverage (LEVERAGE). In Column (2), we replace SD with its components: strategic deviance in advertising (*SD_ADVERTISE*), in research intensity (*SD_RESEARCH*), in plant newness (*SD_PLANT*), in overhead expense (*SD_OVERHEAD*), in capital intensity (*SD_CAP*), and financial leverage (*SD_LEVERAGE*). In Column (3), we include *EXSHARE (*the percentage of shares held by executives), *PROVMEANBIG4 (*The average employment rate of BIG4 in a firm's province), *PC (politically connected), STATE (a* firm's ownership property), *LOSS, SEP(*the separation of cash flow rights and control rights) as additional control variables. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. T-statistics computed with robust standard errors clustered at firm*year level are reported in parentheses.

predicted values of *SD* derived from the first-stage estimation. Two-stage regression results are shown in Columns (1) and (2) of Table 9. In the first stage, we find that the coefficient on *MSD* is significantly positive (coeff. = 0.484, $p < 0.01$), consistent with our prediction that the level of a firm's strategic deviance is influenced by others in its province. In the second stage, the coefficient on (predicted)*SD* is significantly positive (coeff. = 1.510, $p < 0.01$).

Second, to alleviate potential reverse causality, we lag *SD* by five periods and use the lagged variable as the main independent variables and rerun model (1). As shown in

Table 9. Alternative regression specifications: alleviating endogeneity.

	2SLS		Lag Model	PSM	ROA-PSM	PSM-DID	
Variable	SD	BIG4	BIG4	BIG4	BIG4	BIG4	BIG4
SD		1.510***					
		(8.98)					
SDDUM				0.362***	0.256***		
				(5.29)	(3.60)		
MSD	0.484***						
	(16.97)						
L5.SD			0.181***				
			(2.93)				
NONSDTOSD* POST						0.223**	
						(1.96)	
SDTONONSD* $POST_1$							−0.014
							(−0.13)
SIZE	−0.037***	0.268***	0.370***	0.504***	0.486***	0.527***	0.513***
	(−15.79)	(28.32)	(15.65)	(13.29)	(13.21)	(9.58)	(9.31)
ROA	0.026***	−0.043**	−0.197	1.067**	3.009***	1.250	0.948
	(3.67)	(−1.97)	(−0.96)	(2.16)	(3.47)	(1.26)	(1.46)
LEV	0.065***	−0.106**	−0.104	−0.683***	−0.275	−0.899***	−0.419
	(3.72)	(−1.96)	(−0.68)	(−2.92)	(−1.20)	(−2.61)	(−1.23)
INV	−0.278***	−0.346***	−2.073***	−1.198***	−1.623***	−1.001**	−1.398***
	(−11.50)	(−2.90)	(−9.22)	(−3.60)	(−4.65)	(−2.03)	(−2.92)
REC	−0.441***	0.808***	0.747***	0.420	0.491	0.976**	0.259
	(−15.56)	(6.49)	(2.93)	(1.16)	(1.34)	(2.00)	(0.51)
ISSUE	−0.009	0.008	−0.077	−0.119	0.009	−0.033	0.001
	(−1.31)	(0.27)	(−0.98)	(−1.09)	(0.08)	(−0.22)	(0.00)
GROW	0.000	−0.000	−0.000	0.004	0.001*	−0.050	−0.002
	(0.91)	(−0.97)	(−0.48)	(0.60)	(1.87)	(−1.60)	(−0.52)
INDR	0.080*	0.345**	0.551	1.212**	0.606	0.705	0.880
	(1.96)	(2.03)	(1.34)	(2.01)	(0.96)	(0.82)	(1.09)
TOP_1	−0.050***	0.395***	0.884***	0.429*	0.508**	0.314	0.712**
	(−3.26)	(6.23)	(5.54)	(1.82)	(2.11)	(0.90)	(2.10)
Intercept	1.237***	−7.876***	−24.958***	−13.489***	−13.766***	−13.825***	−14.567***
	(19.96)	(−31.90)	(−32.86)	(−15.90)	(−15.36)	(−10.30)	(−10.74)
INDUSTRY	YES	YES	YES	YES	YES	YES	YES
YEAR	YES	YES	YES	YES	YES	YES	YES
N	27,108	27,107	15,061	7918	7776	4220	4108
Pseudo R^2	0.096	0.1529	0.1314	0.1483	0.1610	0.1587	0.1607

This table presents the regression results adopting various regression specifications. Columns (1)- (2) estimate two-stage least square analysis with the average *SD* of other firms in the province of the firm as the instrument variable. Columns (3) use *SD* with a five-year lag as the main independent variable to address reverse causality. Column (4) matches all the control variables by propensity score matching method (PSM) to address model misspecification. Columns (5) only match *ROA* by PSM method to isolate the impact of good companies on auditor choice from strategic deviance. Columns (6)- (7) use the difference-in-difference model to further alleviate the omitted variable bias. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. T-statistics computed with robust standard errors clustered at firm*year level are reported in parentheses.

Column (3) of Table 9, the coefficient on lagged *SD(L5.SD)* remains significantly positive (coeff. = 0.181, $p < 0.01$), not supporting reverse causality.

Third, to alleviate the concern of functional form misspecification, we use the propensity matching score method *(PSM)* to match samples and rerun the model (1).

The propensity score matching procedure includes the following steps. First, following Lai et al. (2017), we sort *SD* by industry and year, and we define firms with *SD* greater than the annual industry median as the treated group *(SDDUM = 1)*, and others as the untreated group*(SDDUM = 0)*. Second, we match the firms in the treated group one-to-one from the untreated group to construct matched samples, ensuring that there is no significant difference in company characteristics in each pair of samples except *SD*.

Specifically, using a logit model, we regress the indicator variable *SDDUM* on the control variables in Equation (1) at first. During this process, we adopt the nearest neighbour matching within a caliper of 0.01 and require common support (Shipman et al., 2017). Using the matched samples, we reestimate model 1. The results are presented in Table 9 Column (4). As shown in Table 9 Column (4), the results consistently indicate that firms with greater strategic deviance are more likely to choose high-quality auditors than those with lower strategic deviance.

Another concern is that companies with strategic deviance may also be good companies, which tend to hire high-quality auditors. To isolate the impact of strategic deviance on the selection of auditors from a firm's performance, we match samples according to *ROA* using *PSM* and retest the relation between *SD* and *BIG4*. As shown in Table 9 Column (5), the coefficients on *SDDUM* remain significantly positive (coeff. = 0.256, $p < 0.01$).

To further mitigate the omitted variable bias, we use the approach of *PSM-DID*. Columns (6) and Columns (7) of Table 9 report the results. *NONSDTOSD* refers to a firm's strategy that has changed from normal to abnormal, while *SDTONONSD* refers to a firm's strategy having gone from abnormal to normal. *POST* refers to the period after a firm's strategy changes from normal to abnormal, while $POST_1$ refers to the period after a firm's strategy changes from abnormal to normal. The coefficient on the *NONSDTOSD* POST* is significantly positive (coeff. = 0.223, $p < 0.05$), indicating that after a firm changing the strategy from normal to abnormal, the firm has a higher demand for high-quality auditors.

5. Additional analyses

5.1. Testing the channel of agency cost

The above results show that strategic deviance promotes firms to hire high-quality auditors. However, the channel is still unclear. In this section, we further test the mediating role of agency costs. If an agency motive is a real channel, we would observe that the level of agency cost will vary with the change of strategic deviance.

In this section, we test the channel of agency costs by the *PSM-DID* model.

Specifically, the dependent variable is the agency cost, and the independent variable is the strategic deviance. Following Dai et al. (2016), we controlled year, industry, and some of the company characteristics including the company's size*(SIZE)*, profitability*(ROA)*, financial leverage*(LEV)*, growth*(GROW)*, the proportion of independent directors*(INDR)*, the shareholding proportion of the largest shareholder*(TOP_1)*, the proportion of tangible assets *(TANGIBLE)*, the scale of the board of directors*(BOARD)*, nature of ownership*(STATE)* and the shareholding proportion of senior executives*(EXSHARE)*. Except for *TANGIBLE* and *EXSHARE*, the other control variables are defined earlier.

We adopt two measures of agency costs: agency costs index*(ACINDEX)* and management expense ratio *(MEXPENSE)*. Concretely, *ACINDEX* is a comprehensive index, which comprises four indicators measuring agency conflict including free cash flow,[1] management expense ratio *(MEXPENSE)*, asset turnover(sales/total assets), and institutional

[1]The formula for calculating free cash flow is as follows:
[(Net profit + interest expense + non-cash expenditure)- Net increase in working capital – capital expenditure]/Total assets × growth dummy variable. When Tobin Q of the listed company is less than 1, the growth dummy variable is 1; otherwise, it is 0

investors holding(number of shares held by institutional investors/total number of shares). By ranking all sample firms positively(negatively) by year in terms of free cash flow and management expense ratios (the asset turnover and institutional investor shareholding), we get a ranking of each company by each indicator. After dividing the ranking for each metric by the largest number of rankings for that year, and taking the average of each company's annual rankings on these four metrics, we get *ACINDEX.MEXPENSE* is administrative fees divided by sales (Singh & Davidson, 2003). Obviously, the greater the agency cost, the larger these two indicators are.

Table 10 reports the test about the channel of agency costs. The interaction terms *NONSDTOSD* POST* and *SDTONONSD* POST*$_1$ are of our concern. Column (2) shows that the coefficient on *SDTONONSD* POST*$_1$ is significantly negative, while Column (3) shows the coefficient on *NONSDTOSD*POST* is significantly positive. These results suggest that when a firm's strategic deviance increases, its agency cost rises. Taken together, the above findings support that agency conflict is the channel through which strategic deviance affects auditor selection.

Table 10. Testing the channel of agency costs.

	(1)	(2)	(3)	(4)
Variable	ACINDEX	MEXPENSE	ACINDEX	MEXPENSE
SDTONONSD* POST$_1$	−0.002	−0.015***		
	(−0.33)	(−3.87)		
NONSDTOSD* POST*			0.011**	0.001
			(2.03)	(0.18)
SIZE	−0.026***	−0.023***	−0.020***	−0.020***
	(−8.50)	(−3.87)	(−8.34)	(−7.37)
ROA	−0.381***	−0.242***	−0.511***	−0.465***
	(−2.94)	(−2.67)	(−12.01)	(−9.67)
LEV	−0.129***	−0.027*	−0.156***	−0.055**
	(−5.75)	(−1.65)	(−10.73)	(−2.44)
GROW	−0.000	−0.000**	−0.004*	−0.000
	(−1.56)	(−2.34)	(−1.79)	(−1.09)
INDR	0.029	−0.040	0.051	0.075**
	(0.61)	(−0.51)	(1.10)	(2.07)
TOP$_1$	−0.242***	−0.039***	−0.234***	−0.033***
	(−14.95)	(−4.48)	(−14.58)	(−3.61)
TANGIBLE	−0.056***	−0.033***	0.003	−0.029
	(−3.31)	(−3.08)	(0.21)	(−1.57)
BOARD	−0.007	−0.005	−0.035***	0.005
	(−0.55)	(−0.49)	(−2.62)	(0.57)
STATE	0.005	0.007	−0.002	−0.010***
	(0.87)	(1.21)	(−0.37)	(−2.61)
EXSHARE	0.161***	−0.003	0.159***	−0.007
	(10.85)	(−0.35)	(10.33)	(−0.68)
Intercept	1.250***	0.651***	1.104***	0.533***
	(18.85)	(4.28)	(18.36)	(10.21)
INDUSTRY	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
N	3794	3970	3952	4104
Adj. R^2	0.298	0.178	0.294	0.222

This table reports the test of the channel of agency costs. We adopt two measures of agency costs: agency costs index (*ACINDEX*) and management expense ratio *(MEXPENSE*). *NONSDTOSD* refers to a firm's strategy that has changed from normal to abnormal, and *POST* refers to the period after the change. *SDTONONSD* refers to a firm's strategy that has gone from abnormal to normal, and *POST*$_1$ refers to the period after the change. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. T-statistics computed with robust standard errors clustered at firm*year level are reported in parentheses.

5.2. The Mediating Role Of Major Shareholder On The Relationship Between Strategic Deviance And Auditor Selection

To test whether the probability of hiring *BIG4* varies with the level of agency cost, following Guedhami et al. (2014) we examine the impact of major shareholders on the relation between *SD* and *BIG4*. We introduce the interaction terms between *SD* and several proxies for ownership structure: *SEP, SL*, and *CS50. SEP* is the ratio of the controlling shareholder's voting rights over their cash flow rights. The higher *SEP*, the more separated the ownership structure, and more potential agency conflicts. SL is a dummy variable that equals 1 if there is only a single shareholder that holds more than 10% of the shares and zeros otherwise. *CS50* is a dummy variable that equals 1 if the voting rights of the largest shareholder are greater than 50%, and 0 otherwise. SL and *CS50* imply agency conflicts are severe (Guedhami et al., 2014).

Table 11 presents the results. The coefficient on *SD* SEP* is 0.077 ($p < 1\%$), suggesting that the separation of cash flow rights from voting rights in firms leads to more severe agency conflicts and thus increases the demand for high-quality auditors for firms with deviant strategy. The coefficient on SD* SL is 0.397 ($p < 1\%$), suggesting that a single large shareholder would increase agency conflicts with outside investors, and thus the demand for high-quality audit increases for firms with deviant strategy. The coefficient on SD*CS50 is 0.268 ($p < 5\%$), indicating that the agency costs and thus the demand for high-quality audits for firms with the deviant strategy would increase with the presence of a large shareholder with a majority of voting rights. Taken together, the demand for a high-quality adult is higher for firms with more severe agency conflicts and deviant strategies.

5.3. The effects of big 4 auditors on firms with strategic deviance

To further investigate the impact of the deviant strategy and auditor choice on firms' activities and performance, we test the impact of the quality auditor in firms with deviant strategies on capital occupation *(TUNNEL)*, market value*(TOBINQ)*, and equity capital cost*(COC)*.

5.3.1. The impact of big 4 auditors on earnings management in high strategic deviance firms

Following prior research (Sun et al., 2016; Ye & Liu, 2011; Yu et al., 2011), we construct a model to test the association between strategic deviance and earnings management *(EM)*. We use *AC95* to measure *EM*. *AC95* derives from models proposed by Dechow, Sloan, and Sweeney (1995). We include several control variables in this model: Profitability (*ROA*), financial leverage(*LEV*), growth(*GROW*), company size(*SIZE*), nature of ownership(*STATE*), and board size(*BOARD*). We also control year fixed effects and industry fixed effects.

Column (1) of Table 12 presents the regression results. The coefficient on *BIG4*SD* is negative and significant (−0.023, $p < 0.01$). It indicates that when firms with deviant strategies hire high-quality auditors, earnings management activities are significantly reduced. As for control variables, the coefficients on *LEV, GROW,* TOP_1 are significantly positive, indicating that the asset-liability ratio, growth of the firm, the proportion of shares held by the largest shareholder, are positively correlated with earnings management. The coefficients on *ROA, SIZE, STATE*, and *BOARD* are significantly negative,

Table 11. The mediating role of the ownership structure.

	(1)	(2)	(3)
Variable	BIG4	BIG4	BIG4
SD	0.047	−0.035	0.162**
	(0.65)	(−0.41)	(2.24)
SEP	−0.049**		
	(−2.39)		
SD*SEP	0.077***		
	(3.56)		
SL		−0.381***	
		(−5.66)	
SL*SD		0.397***	
		(4.14)	
CS50			0.144
			(1.49)
CS50*SD			0.268**
			(2.26)
SIZE	0.402***	0.441***	0.444***
	(19.41)	(12.11)	(12.09)
ROA	0.001	−0.070	−0.076
	(0.05)	(−0.39)	(−0.41)
LEV	0.005	−0.170	−0.185
	(0.07)	(−0.38)	(−0.41)
INV	−1.599***	−1.561***	−1.566***
	(−7.80)	(−6.78)	(−6.70)
REC	0.326	0.436*	0.435*
	(1.49)	(1.80)	(1.79)
ISSUE	−0.004	−0.013	−0.009
	(−0.05)	(−0.22)	(−0.14)
GROW	−0.000	−0.000	−0.000
	(−0.95)	(−0.56)	(−0.48)
INDR	0.580	0.925***	0.976***
	(1.54)	(2.79)	(2.95)
TOP_1	0.637***	0.820***	0.080
	(4.23)	(5.80)	(0.42)
Intercept	−11.485***	−12.149***	−12.232***
	(−22.33)	(−18.19)	(−18.08)
INDUSTRY	YES	YES	YES
YEAR	YES	YES	YES
N	21,062	27,123	27,123
Pseudo R^2	0.1525	0.1533	0.1519

This table reports regressing results on the role of ownership characteristics. The ownership variables interacted with *SD* are the ratio of the controlling shareholder's voting rights to cash flow rights (*SEP*) in Column (1), a dummy variable for whether the proportion of blockholder exceeds 50% (*CS50*) in Column (2), and the presence of a single shareholder holding more than 10% of the shares(*SL*) in Column (3). *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. T-statistics computed with robust standard errors clustered at firm*year level are reported in parentheses.

indicating that the profitability, firm size, controlled by the government or a state-owned enterprise, and the size of the board are negatively correlated with earnings management. The results support that high-quality auditors play a supervisory role rather than a conspiratorial role in firms with a deviant strategy.

5.3.2. The impact of big 4 auditors on shareholder's tunnelling behaviour in high strategic deviance firms

Following Liu and Ma (2106) and Ye et al. (2007), we construct a regression model to test the impact of auditor choice and deviant strategy on shareholder tunnelling behaviour. In this regression, we control sever variables including the firm size *(SIZE)*, the return on total

Table 12. The impact of auditor choice.

	(1)	(2)	(3)	(4)
Variable	EM	TUNNEL	TOBINQ	COC
SD	0.038***	0.024***	0.213***	0.001
	(14.58)	(11.36)	(21.35)	(0.79)
BIG4*SD	−0.023***	−0.016***	−0.033	−0.005*
	(−3.89)	(−4.41)	(−1.16)	(−1.76)
BIG4	0.012***	0.008***	0.091***	0.000
	(3.31)	(3.90)	(5.65)	(0.11)
ROA	−0.031**		1.483***	
	(−2.06)		(22.76)	
L.ROA		−0.007		
		(−1.20)		
LEV	0.015***		0.094***	0.024***
	(3.61)		(5.16)	(11.98)
GROW	0.036***		−0.009**	0.004***
	(18.37)		(−1.96)	(4.45)
SIZE	−0.008***	−0.005***	−0.214***	
	(−12.88)	(−11.82)	(−58.18)	
STATE	−0.014***	−0.001	0.024***	
	(−10.33)	(−0.97)	(4.70)	
MIT		−0.002***		
		(−7.22)		
CRCD			−0.000***	
			(−3.69)	
TOP_1	0.015***	−0.022***	−0.143***	
	(3.66)	(−8.92)	(−9.23)	
CAPEX			−0.159***	
			(−3.70)	
AGE			0.058***	
			(8.80)	
BOARD	−0.008**			
	(−2.46)			
LIQUID				−0.001***
				(−7.81)
BM				0.029***
				(16.68)
BETAVAL				0.006***
				(4.59)
SEP		0.000		
		(0.46)		
Intercept	0.260***	0.127***	4.540***	0.050***
	(17.41)	(12.46)	(61.50)	(6.88)
INDUSTRY	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
N	23,749	12,847	26,266	14,548
Adj. R^2	0.101	0.196	0.533	0.250

This table reports the regression results testing the impact of a quality auditor in firms with a deviant strategy on market value(*TOBINQ*), equity capital cost(*COC*), earnings management(*EM*), and capital occupation(*TUNNEL*). *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. T-statistics computed with robust standard errors clustered at firm*year level are reported in parentheses.

assets in the prior fiscal year*(L.ROA)*, the ratio of the controlling shareholder's voting rights over their cash flow rights*(SEP)*, the nature of a firm's ownership*(STATE)*, the share ratio of the largest shareholder *(TOP_1)*, a comprehensive index measuring market development in the region where the firm is registered*(MIT)* (Fan et al., 2016). We also control year fixed effects, and industry fixed effects.

Column (2) of Table 12 reports the impact of auditor choice and deviant strategy on shareholder's tunnelling behaviour. The coefficient of *BIG4*SD* is negative and significant (−0.016, $p < 0.01$). It indicates that when firms with deviant strategies hire high-quality

auditors, shareholder's tunnelling behaviour is significantly restrained. As for control variables, the coefficients on *SIZE, TOP$_1$, and MIT* are significantly negative, indicating that the firm size, the proportion of shares held by the largest shareholder, and the market development where the company is registered are negatively correlated to shareholder's tunnelling behaviour.

5.3.3. The impact of big 4 auditors on the market value in high strategic deviance firms

Following Zhang and Zhu (2019), we construct a regression model to examine the impact of Big 4 auditors on the market value in high strategic deviance firms. We use *TOBINQ*, which is from the *CSMAR* database, to measure the market value. *TOBINQ* is the ratio of a firm's market value to the replacement cost of its assets. We control several variables in our regression including profitability(*ROA*), financial leverage(*LEV*), growth(*GROW*), company size(*SIZE*), the nature of a firm's ownership (*STATE*), whether the firm is cross-listing (*CRCD)*, the share ratio of the largest shareholder(*TOP$_1$*), the number of years after a firm goes public(*AGE*), year fixed effects, and industry fixed effects.

Column (3) of Table 12 presents the impact of auditor choice and deviant strategy on *TOBINQ*. The coefficient of *BIG4*SD* is negative and insignificant. This suggests that the market value is not sensitive to the auditor's choice of the firm with a deviant strategy.

As for the control variables, the coefficients on *ROA, LEV, AGE*, and *STATE* are significantly positive. It indicates that the firm's market value increases with the firm's profitability, leverage, the years after a firm goes public, and is controlled by the government or a state-owned enterprise. The coefficients on *SIZE, GROW, CAPEX, TOP$_1$*, and *CRCD* are significantly negative. It indicates that the size, growth of the firm, capital expenditure, the proportion of shares held by the largest shareholder, and the firm's cross-listing, are negatively correlated with a firm's market value.

5.3.4. The impact of big 4 auditors on the cost of equity capital in high strategic deviance firms

To test the impact of high-quality auditors on the cost of equity capital (*COC*)in firms with *SD*, following X. P Zhang et al. (2020), we construct a regression model controlling financial leverage(*LEV*), growth(*GROW*), book-to-market*(BM)*, share liquidity (*LIQUID*), bata coefficient(*BETAVAL*), year fixed effects, and industry fixed effects. The measure of *COC* is derived from X. P Zhang et al. (2020), calculated by analyst forecast data.

Column (4) of Table 12 presents the results. The coefficient of *BIG4*SD* is −0.005, which is negative and significant at 10% levels. It indicates that in firms with deviant strategy, hiring high-quality auditors reduce the firms' equity cost. As for control variables, the coefficients on *LEV, GROW, BM, BETAVAL* are significantly positive, which indicates that the asset-liability ratio, the growth of the firm, book-market ratio, beta coefficient of the stock are positively correlated with firms' equity capital cost. The coefficient of *LIQUID* is significantly negative, which indicates that the stock liquidity is negatively correlated with the equity capital cost.

6. Research conclusion

Auditor selection has received much attention from academia and practitioners. To further extend this streamline of literature, we investigate the association between

strategic deviance and auditor selection. We argue that when a firm follows a strategy different from its peers, it chooses high-quality auditors due to an agency cost motivation. We find a positive association between the firm's strategic deviance and the selection of Big 4 auditors. We also demonstrate that agency cost plays a mediating role in the relationship between strategic deviance and Big 4 auditors. Finally, we find that hiring high-quality auditors can restrain earnings management and capital occupation of major shareholders, and lower the cost of equity capital in firms with *SD*.

This study has important theoretical and practical significance. In theory, this study enriches the literature on the influencing factors of auditor selection and the economic consequences of strategic deviance. Although there is a voluminous literature on audit choice, few studies examine the influence of strategy on auditor selection. We complement the extant literature by providing a strategy-based explanation for auditor selection. Studying how corporate strategies affect auditor selection is important, as corporate decisions are all made under certain corporate strategies (Camillus, 1981). To the best of our knowledge, the present study is one of the first to investigate the association between business strategy and auditors in the emerging market and reveals the mechanism by which strategic deviance affects auditor selection.

In practice, the conclusion of this paper has some enlightenment on how to improve accounting information quality. This study reveals that strategic deviance is an important factor affecting auditor selection, and hiring high-quality auditors in firms with strategic deviance can significantly reduce earnings management, indicating that hiring high-quality auditors is an effective way to improve the accounting information quality of strategic abnormal firms. Furthermore, this study is conducive to encourage more strategic deviance firms to hire quality auditors by providing evidence that hiring quality auditors reduces the cost of capital.

Our research is subject to some limitations. Firstly, although our core results persist after standard tests including *PSM, PSM-DID*, and *2SLS*, we cannot fully dismiss that possibility of endogeneity. Secondly, while numerous studies use financial indicators to measure corporate strategy, the other approach may be taken to extract strategy information from the public disclosures of public companies. It would be the research venue for the future. Specifically, we may use the text analysis method to explore strategy-related questions.

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Appendix I: The Measurement of Strategy Deviance

To demonstrate the measurement of SD in more details, we provide some practical and specific examples by referring to the annual reports issued in 2018.

First, we are taking Beijing Xinwei Technology Group Co., Ltd. as an example and believe that the measurement of SD can accurately capture a corporate's strategic deviation. SD of Beijing Xinwei Technology Group Co., Ltd. in 2018 was 2.215, which was much higher than the average of annual SD (0.522). Its 2018 annual report suggested that: 'the change of company's internal and external environment leads to the adjustment of the company's overall strategic planning of satellite industry. Following the established technical routes of continuous evolution from discontinuous service to continuous service, continuous evolution from narrowband service to broadband service, and smooth evolution from satellite Internet to broadband Internet, the company pushed forward the development of loads and related products in the constellation phase of IT.'

Second, we provide examples for each component of *SD* measurement, including *SD* in advertising *(SD_ADV)*, in research intensity *(SD_R&D)*, in updating degree of fixed assets *(SD_PLANT)*, in indirect cost efficiency *(SD_SG&A)*, in capital intensity *(SD_CAP)* and interest-bearing liability ratio *(SD_LEVERAGE)*.

(1)*SD_R&D*perspective. The 2018 annual report of Dalian Sunlight Machinery Co., Ltd. indicated that: 'during the reporting period, the company acquired Tianjin Meijiem Education and Technology Co., Ltd .... The value of the "MYGYM"brand franchise and related trademark rights held by Tianjin Meijiam has been evaluated and confirmed to be RMB 122,7108,700, and the amount of intangible assets affected by this increased by 1,732.46% compared with the previous period ... Since 2017, the company has persisted in promoting a new development strategy and started a new development stage of transformation into the education industry through the merger and integration of high-quality education assets'.

(2) *SD_CAP* perspective. Since it has been publicly traded, the main business of Sichuan New Energy Power Co., Ltd. was the production and sale of chemical fertilisers, basic chemical raw materials, and organic chemical products. In 2018, the company adjusted its business scope by eliminating chemical fertiliser and chemical fertiliser product manufacturing and adding wind power generation, solar power generation, mining, beneficiation of non-ferrous metals, and inorganic salt manufacturing. In 2018, the fixed assets increased significantly, in particular, the ratio of fixed assets/total assets increased by 4.2% compared with the previous year, mainly due to the transformation of the wind power project into fixed assets.

(3) *SD_ADV* perspective. Zhejiang Guangsha Co., Ltd. is one of the established real estate development enterprises in Zhejiang Province. Based on the needs of the transformation and development, the company formally put forward the strategy of withdrawing from the real estate industry in the second half of 2015. By the end of this reporting period, the company had officially completed the withdrawal of its real estate business. Accordingly, the annual selling expenses decreased by 45% in 2019.

(4) *SD_LEVERAGE* perspective. Shenzhen Machine Tool Co., LTD's annual report indicated that: 'short-term liabilities increased by 5.13%, and long-term liabilities increased by 3.32% in 2018 compared with the same period last year. In terms of business development, the company accelerated the transformation from traditional manufacturers to 'industrial service providers with intelligent manufacturing as the core'.

(5) *SD_SG&A* perspective. In 2018, Inner Mongolia Tianshou Technology &Development, Co., Ltd acquired Tianchi Molybdenum Industry, and gradually transformed its main business to the mining industry. SG&A expenses increased 73.46% year by year, mainly due to the inclusion of the income statement of Tianchi Molybdenum Industry in the consolidated statement.

(6) *SD_PLANT* perspective. Western Sichuan Resources Holding Co., Ltd. continued to dispose of some assets due to its strategic adjustment. In 2018, the scope of consolidation in the reporting period reduced compared to the same period last year, and various financial indicators changed accordingly, furthermore, fixed-asset investment fell 93.05% year by year.

Finally, yet importantly, by referring to three companies with large *SD* values, we find that strategic deviation is preceded by strategic variation.

(1) The *SD* of Sichuan Western Resources Holding Co., Ltd in 2018 was 3.771, larger than the annual average (0.522). Its annual report indicated: 'in recent years, to adapt to market changes, the business has been transformed through multiple mergers and acquisitions . . . during the reporting period, the company further deepened its strategic transformation.'

(2) The *SD* of Great Wall International ACG Co., Ltd. in 2018 was 2.432. Its 2018 annual report demonstrated: 'In 2015, the company implemented major asset purchases and related transactions. The company had gradually transformed from a traditional industry that mainly produces and sells coke series products to a large-scale cultural enterprise covering animation design, production, animation games, creative tourism, and toy sales . . . In 2016, the company disposed major assets, stripping the original coke business, and now, the company's main business is animation games and related businesses.'

(3) The *SD* of Guangdong East Sunshine Technology Holding Co., Ltd. in 2018 was 0.564. Its 2018 annual report presented: 'To ensure green and sustainable development, the company enlarged and strengthened its core competitive products, and relied on its strong *R&D* strength and technical cooperation, continuously extending to the downstream emerging industries with high added value. According to the company's long-term development strategic plan, the company has gradually extended to the new energy and new material industry . . . '