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Article

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ARTICLE



Credit availability and classification shifting: based on the quasi-natural experiment of the bank lending interest rate ceiling deregulation

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ABSTRACT

Based on the exogenous shock of the bank lending interest rate ceiling deregulation in China, this paper uses a difference-in-differences model and studies how credit availability affects classification shifting from the perspective of formal debt contract formation. We find that high-risk firms' classification shifting degree is higher after the bank lending interest rate ceiling deregulation. Cross-sectional heterogeneity tests show that the impact of the deregulation on classification shifting is stronger when the level of financing constraints is higher, the diversity of financing channels is lower, the bank's need for information is higher, and the bank's monitoring is higher. Mechanism tests further show that the deregulation enables high-risk firms to increase borrowing through classification shifting. We use the unique setting of China interest rate liberalisation to scientifically identify the debt financing motivation for classification shifting. This study expands and enriches the institutional determinants of accounting information production.

KEYWORDS

Interest rate liberalisation; debt contract; core earnings; classification shifting

1. Introduction

Accounting information plays an important role in creditors' lending decisions (Holthausen & Leftwich, 1983). Creditors make decisions on lending or not, lending amount, lending terms and interest rates, based on accounting information such as profitability and solvency (Ghosh & Moon, 2010; Rao & Hu, 2005; Sun et al., 2006; Watts & Zimmerman, 1986). Rao and Hu (2005) find that banks pay very close attention to the profit indicators of firms through a questionnaire on the use of accounting information in bank credit. So, does banks' heightened interest in corporate profitability encourage firms to manipulate earnings when borrowing? Prior studies provide empirical evidence from accruals earnings management and real earnings management, finding that firms have incentives to send good profitability signals to banks by managing earnings, as this

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enables them to obtain loan and improve their bargaining power in debt contracts (Lu et al., 2008; Teoh et al., 1998; Valipour & Moradbeygi, 2011; Xu & Zhou, 2016). However, the above studies focus only on the total earnings of firms, ignoring the importance of earnings structure in the formation of debt contracts.

Core earnings, reflecting accounting information for high-quality earnings, largely determine firm value and future profitability (Fairfield et al., 1996). A higher level of core earnings indicates that the firm's earnings are more persistent and that the earnings structure is better optimised (Lipe, 1986; Qian et al., 2009). Since 2001, the China Securities Regulatory Commission (CSRC) and the Shanghai and Shenzhen Stock Exchanges have successively issued relevant rules relating to rights issue, Seasoned Equity Offering (SEO), and Initial Public Offering (IPO) of listed companies, which clearly stipulate that the financial indicators related to net income are based on the principle of 'the lower of net income after deducting special items or net income'. Classification shifting, as an earnings management tool, increases a firm's net income after deducting special items, i.e. by manipulating the classification of 'recurrent gains and losses' and 'non-recurrent gains and losses' within the income statement, thereby inflating core earnings (McVay, 2006). Compared to accruals earnings management and real earnings management, classification shifting changes the earnings structure while maintaining constant bottom-line net income. Additionally, classification shifting has the advantages of simpler operation, greater concealment, lower risk of scrutiny by regulators and auditors, and lower manipulation costs (Abernathy et al., 2014; Nelson et al., 2002). As a result, it has gradually become the preferred approach to earnings management among managers.

As a large number of studies have shown, managers' motivations for classification shifting include the following: increasing market pricing (Lipe, 1986; Kasznik & McNichols, 2002); meeting investors' and analysts' expectations (Fan et al., 2010; McVay, 2006); meeting IPO or SEO requirements (Li et al., 2015; Lu et al., 2019); meeting or beating the threshold for performance-based equity incentive and executive compensation incentives (Xie et al., 2019; Xu, 2020). While all research cited above focuses primarily on the equity market incentives and compensation contract incentives of classification shifting, creditors also pay attention to firms' core earnings because debt financing is an important way for firms to obtain external financing (Fan et al., 2019). However, there is a lack of existing literature that studies classification shifting motivated by credit market incentives. Only Fan et al. (2019) have previously studied classification shifting driven by debt contract default. Their findings suggest that firms with private loan contracts containing debt covenants based on earnings before interest, taxes, depreciation, and amortisation (EBITDA) are more likely to misclassify core expenses as special items. Due to China's lack of a well-developed stock market, bank lending remains a crucial avenue for firms to access external financing (Yu, 2011). It is therefore particularly important to explore the debt financing motives of classification shifting in this context. However, due to the potential endogeneity between debt financing and earnings manipulation, along with the lack of appropriate research setting, no literature has yet attempted to identify the core earnings manipulation motivated by debt financing. The exogenous shock of the bank lending interest rate ceiling deregulation in China in 2004 provides an ideal setting for our study. Through a quasi-natural experiment of interest rate market reform, this paper constructs the way in which the formation of debt covenants affects firms'

classification shifting from a credit financing availability perspective. This paper complements the literature on debt financing motives for classification shifting, while also providing the first evidence on the importance of the earnings structure in China's credit market.

Interest rate liberalisation is an important symbol of financial liberalisation and financial deepening (McKinnon, 1973; Shaw, 1973), as well as the core of financial market reform in China. In order to deepen and promote the liberalisation of bank lending interest rates, the People's Bank of China has successively deregulated the ceiling and floor limits of lending interest rates, which play a decisive role in regulating the supply and demand of bank credit. Following the deregulation, banks can now set market-based pricing according to the risk associated with certain firms or projects, as a result, the interest rate is fully determined by market supply and demand, which improves the efficiency of capital allocation in the credit market. This reform exerted a direct shock on the availability of debt financing for some firms, meaning that it provides an ideal setting for us to study classification shifting driven by debt financing motivation. More specifically, the deregulation allowed banks to extend loans to high-risk firms by charging higher interest rates to compensate for their risk (Chen et al., 2019; Wang et al., 2018), thereby improving the availability of debt financing for high-risk firms (Chen & Ma, 2018; Wang & Zhang, 2007). Accordingly, in order to obtain bank loans and seek more favourable borrowing conditions, high-risk firms have incentives to increase their core earnings by means of classification shifting so as to send a signal of sustainable profitability to banks.

Therefore, different from prior studies, this paper uses the 2004 bank interest rate ceiling deregulation as a quasi-natural experiment to study how increases in the availability of bank credit affect classification shifting from the perspective of formal debt contract formation. The results show that, first, following the lending interest rate ceiling deregulation, the degree of classification shifting among high-risk firms is significantly higher when compared to low-risk firms. Second, the results of mechanism tests show that the deregulation significantly increases both the borrowing amount and borrowing costs of high-risk firms. Moreover, while classification shifting significantly improves the borrowing amounts of high-risk firms after the deregulation, it does not reduce the borrowing costs for these firms. Third, the cross-sectional heterogeneity test results show that when firms' financing constraints are higher (i.e. when firms are smaller and their mortgage guarantee ability is weaker), when there are fewer financing channels available (i.e. when the level of commercial credit and the degree of regional financial development are lower), and when the banks' demand for information and monitoring are higher (i.e. when regional state-owned holding banks are more concentrated and regional banks are less competitive), the impact of the lending interest rate ceiling deregulation on classification shifting is stronger.

This study contributes to the extant literature in the following respects. First, based on the important setting of bank lending interest rate ceiling deregulation in China, this paper determines how the formation of debt contracts affects classification shifting from a credit financing accessibility perspective, thereby expanding and enriching the literature on debt contracts and classification shifting. Prior studies on classification shifting focus primarily on equity market incentives such as improving market pricing (Athanasakou et al., 2011; Fan et al., 2010; Fan & Liu, 2017; McVay, 2006) and meeting

or beating incentive thresholds, such as those for IPOs, executive compensation contracts and performance-based equity incentives (Lu et al., 2019; Xie et al., 2019; Xu, 2020). Only Fan et al. (2019) have studied classification shifting incentives from a credit market perspective. Different from the work of Fan et al. (2019), who studied the use of classification shifting to avoid debt contract violations, this paper investigates how the formation of debt contracts affects classification shifting from the perspective of credit availability, using the setting of bank lending interest rate ceiling deregulation. This paper accordingly provides empirical evidence for classification shifting being motivated by debt financing, and further expands and enriches the relevant literature on the influencing factors of classification shifting from the perspective of credit market incentives.

Second, this paper extends the study of earnings management driven by financing motivation from a classification shifting perspective. A large number of existing works have provided evidence that financing motivation drives earnings management, with the goal being to obtain loan or reduce financing costs (Li et al., 2011; Roychowdhury, 2006; Teoh et al., 1998; Valipour & Moradbeygi, 2011). However, these existing studies only consider the manipulation of firms' net income, that is, accrual earnings management and real earnings management, ignoring the importance of earnings structure. Compared with non-core earnings, core earnings are more persistent, which is also valued by investors and creditors. This paper studies classification shifting earnings management by manipulating earnings structure. In so doing, it adds to the literature on earnings management driven by financing motivation, and further provides empirical evidence for the importance of earnings structure in debt financing.

Third, this paper uses the deregulation of China's lending interest rate ceiling as a quasi-natural experiment in order to scientifically identify the causal relationship between debt financing and classification shifting. Due to the endogeneity between debt financing and earnings manipulation, it is difficult to identify the causal relationship directly, while there are few natural scenarios in which exogenous debt formation occurs. As a result, the studies of these relationships tend to be largely based on correlation (Franz et al., 2014; Valipour & Moradbeygi, 2011). This paper uses the deregulation of lending interest rate ceiling as a quasi-natural experiment, which provides an ideal setting for scientifically identifying the causal relationship between credit availability and classification shifting.

2. Institutional background, literature review and research hypothesis

2.1. Institutional background

The interest rates liberalisation means that the price of borrowing and lending is determined by supply and demand in the financial market. This also means that a market interest rate system and interest rate formation mechanism are established based on the benchmark interest rate issued by the central bank, with supply and demand in the market determining the deposit and lending rates of financial institutions. Ever since the 14th Party Congress established the basic concept of interest rate liberalisation reform in 1993, China's interest rate liberalisation reform has progressed throughout more than two decades of continuous trials and advancement. By 2015, the People's Bank of China no longer set a floating ceiling on deposit rates for commercial banks and rural

cooperative financial institutions, etc., marking the completion of the reform. During this period, the bank lending interest rate ceiling deregulation in 2004, one of the landmark events of China's loan interest rate reform, played a crucial role in improving the allocation of credit resources.

In more detail, on 29 October 2004, the People's Bank of China announced the removal of the bank lending interest rate ceiling. After lending interest rates were deregulated, banks became able to adjust interest rates according to the risk posed by particular companies or projects. As a result, the interest rate is fully determined by market supply and demand. Compared to when banks passively provided loans to firms based on the interest rate set by the central bank, this improved the efficiency of capital allocation in the credit market. The deregulation allowed banks to freely adjust the lending interest rate according to the risk associated with individual loans, enabling the loan risk to be matched with the lending interest rate (Chen et al., 2019; Wang et al., 2018; Yang et al., 2017). This reform improved credit availability for high-risk firms, and accordingly provides us with an opportunity to examine classification shifting motivated by debt financing.

2.2. Literature review

Prior research has found mixed evidence with regard to how debt financing affects earnings management. On the one hand, the information-driven earnings management hypothesis argues that creditors such as banks make lending decisions – regarding whether to lend, lending amounts, interest rates and so on – based on a firm's financial situation (Holthausen & Leftwich, 1983). Therefore, firms are incentivised to strategically manage their earnings in a way that signals good profitability, as this enables them to obtain credit and improve their negotiating position when signing debt contracts. Teoh et al. (1998) find that firms with financing constraints are more inclined to manage earnings so as to increase the availability of external financing. Lu et al. (2008) determine that earnings manipulation enables firms to access more loans. Valipour and Moradbeygi (2011) show that in order to enhance bargaining power in debt negotiations, firms have incentives to send earnings information signals to banks, and that the greater the demand for financing, the greater the degree of earnings management. Liu et al. (2010) finds that firms manage earnings to reduce the debt financing costs. Li et al. (2011) show that both accruals earnings management and real earnings management are significantly lower in state-owned enterprises (SOEs) than in non-SOEs. Xu and Zhou (2016) investigate earnings management motivated by financing need, finding that firms with higher financing needs is more likely to engage in real-activity earnings management.

On the other hand, the monitoring-driven earnings management hypothesis suggests that banks can identify firms' earnings management and will implement punitive measures against firms that are found to manage earnings. Consequently, firms are unlikely to manage earnings in the context of debt financing. Zhong et al. (2007) find that creditor monitoring significantly increases the difficulty of managing earnings. Bharath et al. (2008) show that banks strictly monitor the earnings quality of firms, resulting in a higher cost of debt for those firms with a lower earnings quality. Ahn and Choi (2009) find that bank monitoring has a positive effect on earnings quality, i.e. the stronger the bank monitoring, the higher the firm's earnings quality. They also find that an effective

improvement in earnings quality grants firms better access to financing and debt maturity structure. Yao and Xia (2009) further show that banks are able to identify earnings manipulation and that firms with lower earnings quality have a significantly higher cost of debt.

Notably, these studies on debt financing-motivated earnings management focus primarily on total earnings manipulation, i.e. accruals earnings management and real earnings management, while ignoring the classification shifting earnings management that occurs through the manipulation of core earnings. Although classification shifting can optimise the earnings structure to signal the firm's persistent profitability to shareholders and creditors, and has the advantages of simple manipulation, good concealment, and low cost (Abernathy et al., 2014; Nelson et al., 2002), few existing studies have investigated classification shifting motivated by credit market incentives. In addition, due to the potential endogeneity problem between financing motivation and earnings management, it is difficult to accurately identify the causal relationship between them. The exogenous shock of the bank lending interest rate ceiling deregulation in 2004 provides a suitable setting for this investigation.

2.3. Theoretical analysis and research hypothesis

Information users in the capital market are able to effectively distinguish the differences in quality between above- and below-the-line items, consider core earnings to be more persistent than non-core earnings (Fairfield et al., 1996), and assign a higher valuation multiple to core earnings (Bradshaw & Sloan, 2002). Therefore, core earnings, which indicate the firm's future profitability and value, have increasingly become an important index for the information users of the capital market and the contracts they choose to engage with. For example, in order to address agency problems between executives and shareholders, company owners increasingly emphasise the importance of core earnings in compensation contracts (Liu et al., 2016; Wu & Wu, 2010). Xu (2020) delves into classification shifting driven by compensation contract, finding that monetary compensation induces executives to manipulate core earnings in order to better meet the requirements of compensation contracts. In addition, a large number of studies show that managers also manage core earnings with a view towards equity market incentives, such as meeting the expectations of investors and analysts and increasing market pricing in IPOs or SEOs (Athanasakou et al., 2011; Fan et al., 2010; Fan & Liu, 2017; Li et al., 2015; J. Lu et al., 2019; McVay, 2006). While these studies primarily examine the motivation of classification shifting in the contexts of stock market pricing and compensation covenants, it should be noted that profitability plays an equally important role in debt covenants (Watts & Zimmerman, 1986; Diana et al., 2014). Then, are firms motivated by debt financing to manipulate core earnings?

Accounting information, as a signal reflecting the quality of a firm, plays an important role in creditors' lending decisions (Holthausen & Leftwich, 1983). Creditors make decisions regarding whether to lend, lending amounts, and interest rates based on profitability and recoverability (Ghosh & Moon, 2010; Rao & Hu, 2005; Sun et al., 2006; Watts & Zimmerman, 1986). The existing literature shows that creditors' lending decisions depend heavily on their estimates of a firm's future cash flows (Lu et al., 2008). Compared to less persistent non-core earnings, core earnings are a better measure of the persistence of

firms' earnings (Lipe, 1986; Qian et al., 2009) and can better predict a firm's future profitability and cash flows (Cheng, 2005). Therefore, as an aspect of high-quality earnings information regarding firms, core earnings are also an important basis for debt contracts (Fan et al., 2019). Teoh et al. (1998) show that firms have an incentive to manage earnings when faced with financing constraints. Valipour and Moradbeygi (2011) find that in order to enhance their bargaining power in debt negotiations, firms have an incentive to send earnings information-related signals to banks, and furthermore that need for financing is significantly and positively related to earnings management. We accordingly suggest that when firms have debt financing motives, managers may opt to improve core earnings by means of classification shifting.

Since the bank lending interest rate ceiling was removed in 2004, banks are now able to obtain risk premium compensation when providing loans to high-risk firms. This increases the availability of credit to high-risk firms (Chen & Ma, 2018; Wang & Zhang, 2007). For banks, on the one hand, compared with lending to low-risk firms, they face higher risks when lending to high-risk firms. In order to ensure the recovery of principal and interest, banks have come to pay increasing attention to a firm's profitability persistence. Core earnings, which reflect firms' profitability persistence, have become a primary focus for banks. On the other hand, during the period of interest rate regulation, banks became accustomed to lending to low-risk firms, resulting in a lack of motivation to monitor firms' accounting information quality (Zhan et al., 2013). After the deregulation, banks became able to adjust interest rate according to the associated risk (Wang et al., 2018). To do so while reasonably pricing and controlling risks, however, banks must fully understand the financial position of the borrowers. Hence, the deregulation has created a demand for banks' ability to monitor firms' accounting information quality. In other words, to reduce their lending risk, banks must strengthen their ability to review the accounting information quality of high-risk firms.

For firms, on the one hand, when faced with banks' need to review of their profitability, high-risk firms are incentivised to actively signal their healthy future profitability and earnings persistence, as this will facilitate their access to credit, improve their bargaining position in debt covenants, and ultimately reduce their borrowing costs (Teoh et al., 1998; Valipour & Moradbeygi, 2011). On the other hand, the bank lending interest rate ceiling deregulation has led to increased review of firms' information quality by banks, which makes it more difficult for firms to manage their earnings through accruals earnings management (Zhong et al., 2007). Moreover, real earnings management is more costly. As a result, firms have a weak motivation to manage accruals and real activities. Instead, firms tend to resort to classification shifting. As an earnings management tool that can optimise a firm's earning structure, and different from accruals earnings management and real earnings management, classification shifting changes the reporting of items such as income, expenses, gains and losses, but does not change the firm's net income. Therefore, it has the advantages of high concealment, low risk of review by regulators and auditors, and low manipulation costs (Abernathy et al., 2014; Nelson et al., 2002), making it a perfect alternative to accruals earnings management and real earnings management. Given the above, we believe that following the deregulation, in order to access loans, seek more favourable loan terms, and avoid bank supervision, firms have been incentivised to use classification shifting to improve their core earnings by misclassifying items within the income statement.

Based on the above discussion, we propose the following hypothesis:

Hypothesis: Classification shifting among high-risk firms compared to low-risk firms can be seen to increase significantly after the bank interest rate ceiling deregulation in 2004.

3. Research design

3.1. Sample selection

In this paper, we use the bank lending interest rate ceiling deregulation in 2004 as a quasi-natural experiment and select data spanning three years before and after the event year (2001–2006) of the A-share listed firms as the initial sample. We exclude financial firms, insolvent companies, companies listed after 2004, and samples with missing accounting information. Our samples include 5,350 observations. In addition, to mitigate the systematic differences between the treatment group and control group, we apply a one-to-one and non-release nearest-neighbour matching method, and use the matched samples by Propensity Score Matching (PSM) as the research samples. We finally obtain 2,335 observations in the treatment group and 2,335 observations in the control group, such that our final samples comprise 4,670 observations. The sample data are obtained from the China Stock Market and Accounting Research (CSMAR) database. In order to avoid the influence of extreme values on the results, all continuous explanatory variables are winsorised at 1% and 99%.

3.2. Model design

We construct a difference-in-differences model to study the ways in which the bank lending interest rate deregulation affects classification shifting using the following model:

$$CLASS_D_{i,t} = \beta_0 + \beta_1 HRISK_i \times POST_t + \beta_3 CONTROLS_{i,t} + YEAR_FE + FIRM_FE + \varepsilon_{i,t} \quad (1)$$

Where, *CLASS_D* is the dependent variable, which is measured by classification shifting. *HRISK* represents default risk, a dummy variable divided into treatment and control groups according to the default risk. *POST* is a time dummy variable for the deregulation. The coefficient of *HRISK*×*POST* measures the impact of credit availability on classification shifting. *CONTROLS* are control variables. We additionally include time trend and firm fixed effects in the model.

3.3. Variable definitions

3.3.1. Classification shifting

First, we adapt McVay's (2006) core earnings prediction model to estimate unexpected core earnings (*UN_CE*). The model is expressed as follows:

$$CE_{i,t} = \alpha_0 + \alpha_1 CE_{i,t-1} + \alpha_2 ATO_{i,t} + \alpha_3 ACCRUALS_{i,t-1} + \alpha_4 ACCRUALS_{i,t} + \alpha_5 \Delta SALES_{i,t} + \alpha_6 NEG \times \Delta SALES_{i,t} + \varepsilon \quad (2)$$

Where, *CE* is core earnings, defined as sales less costs and period expense, scaled by total sales. *ATO* is asset turnover, defined as sales scaled by average net operating assets at the beginning and end of the period. *ACCRUALS* is net income less cash flows from operating activities, scaled by sales. *ΔSALES* is the change in sales, defined as sales in current year minus sales in prior year, divided by sales in prior year. *NEG* is equal to one when *ΔSALES* is negative and zero otherwise. Finally, the unexpected core earnings (*UN_CE*) is the resulting residual when regressing model (3) below by year and by industry.

Next, based on the estimated unexpected core earnings (*UN_CE*), model (3) is constructed to test the unexpected core earnings resulting from the firm's manipulation of non-operating expenses:

$$UN_CE_{i,t} = \theta_0 + \theta_1 DBL_{i,t} + \varepsilon \quad (3)$$

Where, *DBL* is non-operating expenses, scaled by sales. Finally, following Li et al. (2015) and Xu (2020), we estimate the degree of classification shifting (*CLASS_D*) of the firm based on the fitted value of model (4):

$$CLASS_D_{i,t} = \hat{\theta}_0 + \hat{\theta}_1 DBL_{i,t} \quad (4)$$

In model (4), $\hat{\theta}_0$ and $\hat{\theta}_1$ are the estimates fitted for model (3), while *CLASS_D* is the classification shifting calculated according to the estimated values.

3.3.2. Default risk

Default risk is an important factor influencing banks' decisions on whether to lend and loan pricing. Thus, following prior studies, such as Bharath and Shumway (2008), Chen and Ma (2018), and Wang and Chen (2021), we use an equity-based model to measure the default risk (*DRISK*) of firms, as follows:¹

$$DRISK_{i,t} = N(-DD_{i,t}) = N\left(-\frac{\log\left(\frac{Equity_{i,t}}{Equity_{i,t}+Debt_{i,t}}\right) + \left(r_{i,t-1} - \frac{\sigma_{vi,t}^2}{2}\right) \times T_{i,t}}{\sigma_{vi,t} \times \sqrt{T_{i,t}}}\right) \quad (5)$$

$$\sigma_{vi,t} = \left(\frac{Equity_{i,t}}{Equity_{i,t} + Debt_{i,t}}\right) \times \sigma_{Ei,t} + \left(\frac{Debt_{i,t}}{Equity_{i,t} + Debt_{i,t}}\right) \times (0.05 + 0.25 \times \sigma_{Ei,t}) \quad (6)$$

Model (5) calculates the default risk. *HRISK* is equal to one if a firm's default risk is above the median level of default risk for firms in the year before the deregulation, and therefore identifies a high-risk firm, and zero otherwise, identifying a low-risk firm.

3.3.3. Control variables

Following McVay (2006) and Fan et al. (2010), we control firm size (*SIZE*), leverage (*LEV*), profitability (*ROA*), Tobin's Q (*TOBINQ*), loss indicator (*LOSS*), proportion of independent directors (*INDEP*), public offering (*SEO*), auditor firm size (*Big4*), accruals earnings management (*DA*), real earnings management (*RM*), operating cash flow (*CFO*), the shareholding

¹Here, *DRISK* is the default risk, $\sigma_{vi,t}$ represents the volatility of firms' assets, *Equity* is the market value of firms' equities, *Debt* is the value of a business's liabilities, $\sigma_{Ei,t}$ denotes firms' volatility of stock returns, *r* is firms' annual return on stocks from the previous year, and *T* is set to 1.:

Table 1. Variable definitions.

Variable	Name	Definitions
Dependent	<i>CLASS_D</i>	Classification shifting, the detailed calculation procedure of which is shown in Model (4).
Independent	<i>HRISK</i>	Dummy variable for default risk, equal to 1 if the default risk is higher than the median of this variable before the reform, and zero otherwise.
	<i>POST</i>	Dummy variable of loan interest rates ceiling deregulation, equal to 1 before 2004 (i.e. 2001–2003), and 0 from 2004 onwards (i.e. 2004–2006).
	<i>SIZE</i>	The size of the firm, which is equal to the natural logarithm of the total assets.
	<i>LEV</i>	Leverage, which is equal to the total debt divided by total assets.
	<i>ROA</i>	Profitability; that is, net profit rate of assets.
	<i>TOBINQ</i>	Tobin's Q, calculated by market value divided by book value.
	<i>LOSS</i>	Indicator variable of loss; if the firm's net income for the year is less than 0, it is equal to 1; and 0 otherwise.
	<i>INDEP</i>	Proportion of independent directors, equal to the ratio of independent directors to the number of directors.
	<i>SEO</i>	Public offering, equal to 1 if the firm issued a public offering announcement in the year under study, and 0 otherwise.
	<i>Big4</i>	The size of the auditor firm, equal to 1 if the auditor firm is 'Big Four' and zero otherwise.
	<i>DA</i>	Accruals earnings management, calculated following Dechow et al. (1995).
	<i>RM</i>	Real earnings management, calculated following Roychowdhury (2006) as the sum of abnormal cash flow from operating activities, abnormal production costs and abnormal discretionary expenses.
	<i>CFO</i>	Operating cash flow, calculated by dividing net operating cash flows by sales.
	<i>SHARE1</i>	Shareholding proportion of the largest shareholder, which is equal to the ratio of the shares owned by the largest shareholder to the total shares.
	<i>FIX</i>	The proportion of fixed assets, equal to fixed assets divided by total assets.
	<i>INTAN</i>	The proportion of intangible assets, i.e. intangible assets divided by total assets.
	<i>SOE</i>	Dummy variable for nature of property rights, equal to 1 if the firm is state-owned and 0 otherwise.

proportion of the largest shareholder (*SHARE1*), fixed assets (*FIX*), intangible assets (*INTAN*), and the nature of property rights (*SOE*). The definitions and descriptions of all the above variables are listed in [Table 1](#).

4. Empirical results

4.1. Descriptive statistics

[Table 2](#) reports the summary statistics of the main variables. The results show that the minimum value of classification shifting (*CLASS_D*) is -0.1898 , while the maximum value is 0.0052 , indicating that there are large differences in classification shifting among the firms. The mean value of *HRISK* is 0.5 , and the mean value of *POST* is 0.5126 . The values of the control variables are consistent with the existing literature.

4.2. Baseline results

In order to eliminate the inherent differences between the treatment group and the control group, we use the matched samples of PSM for regression. This is done according to the following procedure: first, logit regressions are performed on the high-risk and low-risk groups using *SIZE*, *LEV*, *ROA*, *LOSS*, *DA*, *RM*, *SHARE1*, *CFO*, and *SOE* as firm characteristic variables, with the predicted values used as scores. We then use the one-to-one and no-release nearest neighbour matching method to select a control firm for each treatment firm, while the matched samples are used for regression. The results shows that there are

Table 2. Summary statistics of the main variables.

VARIABLE	N	MEAN	P50	SD	MIN	MAX
<i>CLASS_D</i>	4670	-0.0018	0.0042	0.0259	-0.1898	0.0052
<i>HRISK</i>	4670	0.5000	0.5	0.5001	0	1
<i>POST</i>	4670	0.5126	1	0.4999	0	1
<i>SIZE</i>	4670	21.2047	21.1534	0.8880	19.1027	24.8198
<i>LEV</i>	4670	0.5190	0.5254	0.1729	0.0912	0.9986
<i>ROA</i>	4670	0.0149	0.0227	0.0657	-0.3354	0.1798
<i>TOBINQ</i>	4670	1.4098	1.0938	1.1205	0.2107	10.5881
<i>LOSS</i>	4670	0.1428	0	0.3499	0	1
<i>INDEP</i>	4670	0.2846	0.3333	0.1190	0.0000	0.5000
<i>SEO</i>	4670	0.0122	0	0.1098	0	1
<i>BIG4</i>	4670	0.0593	0	0.2362	0	1
<i>DA</i>	4670	0.0016	0.0005	0.0843	-0.2522	0.2706
<i>RM</i>	4670	0.0065	0.0117	0.1720	-0.5487	0.5287
<i>CFO</i>	4670	0.0765	0.0784	0.2616	-1.3143	1.1097
<i>SHARE1</i>	4670	0.3982	0.3711	0.1629	0.1103	0.7801
<i>FIX</i>	4670	0.2995	0.2789	0.1731	0.0063	0.7418
<i>INTAN</i>	4670	0.0388	0.0208	0.0526	0	0.2838
<i>SOE</i>	4670	0.7535	1	0.4310	0	1

no significant differences between the treatment and control groups for the matched samples, indicating that the matching results are valid. Due to limited space, these results are not shown; however, they are available upon request.

Table 3 lists the results of the regression with matched samples. Column (1) shows the results without controlling for year fixed effects; the coefficient of *HRISK*×*POST* is 0.0029 and significantly positive at the 5% level. Column (2) shows the results after adding the fixed effect of the year. The coefficient of *HRISK*×*POST* is 0.0029 and still significantly positive at the 5% level. This shows that the degree of classification shifting among high-risk firms is significantly higher than that among low-risk firms following the deregulation of the bank lending interest rate ceiling. This suggests that, after the deregulation, high-risk firms have a stronger incentive to perform classification shifting and increase their core earnings than low-risk firms. This result is consistent with our hypothesis.

4.3. Endogeneity test

4.3.1. Parallel trend test

A successful difference-in-differences analysis relies on the satisfaction of the parallel trend assumption, which requires similar trends in classification shifting during the pre-event period for both treatment firms and control firms. Based on this, we construct the intersection of annual dummy variables and *HRISK* for three years before and after the bank lending interest rate deregulation in order to conduct the parallel trend test. Table 4 presents the parallel trend test results.²

The results in Table 4 show that, before the event, the coefficients of *HRISK*×*POST*⁽⁻²⁾ and *HRISK*×*POST*⁽⁻¹⁾ are not statistically significant, while the coefficients of *HRISK*×*POST*⁽⁺¹⁾ and *HRISK*×*POST*⁽⁺²⁾ are significantly positive after the event. This indicates that classification shift among high-risk firms is significantly higher compared to that in

²Due to limited space, control variables are omitted in all of the following tables and the parallel trend figure is not shown; however, they are available upon request.

Table 3. Baseline results of credit availability and classification shifting.

	CLASS_D	
	(1)	(2)
<i>HRISK</i> × <i>POST</i>	0.0029** (2.30)	0.0029** (2.28)
<i>POST</i>	-0.0031** (-2.54)	
<i>SIZE</i>	0.0074*** (2.93)	0.0078*** (2.99)
<i>LEV</i>	-0.0212*** (-2.85)	-0.0217*** (-2.88)
<i>ROA</i>	0.2527*** (11.02)	0.2527*** (11.01)
<i>TOBINQ</i>	-0.0035*** (-4.73)	-0.0038*** (-4.80)
<i>LOSS</i>	0.0027 (1.20)	0.0027 (1.19)
<i>INDEP</i>	-0.0051 (-1.14)	0.0035 (0.47)
<i>SEO</i>	-0.0012 (-0.76)	-0.0015 (-1.00)
<i>BIG4</i>	-0.0022 (-1.27)	-0.0021 (-1.16)
<i>DA</i>	-0.0351*** (-3.87)	-0.0353*** (-3.91)
<i>RM</i>	0.0079** (2.04)	0.0080*** (2.06)
<i>CFO</i>	-0.0068 (-1.42)	-0.0069 (-1.42)
<i>SHARE1</i>	0.0090 (1.55)	0.0080 (1.21)
<i>FIX</i>	-0.0030 (-0.53)	-0.0026 (-0.46)
<i>INTAN</i>	-0.0184 (-1.07)	-0.0178 (-1.03)
<i>SOE</i>	0.0017 (0.11)	0.0015 (0.10)
<i>_Cons</i>	-0.1473*** (-2.86)	-0.1537*** (-2.91)
<i>YEAR_FE</i>	NO	YES
<i>FIRM_FE</i>	YES	YES
<i>N</i>	4670	4670
<i>R²_Adj</i>	0.418	0.418

*, ** and *** denote significance at the 10%, 5%, and 1% levels, respectively. The t-values are in parentheses. The same conventions are used for the tables below.

low-risk firms in the two years after the deregulation, while there is no significant difference in classification shifting by high-risk and low-risk firms before the deregulation. The result accordingly satisfies the parallel trend test.

4.3.2. Placebo test

To verify that the result is caused by the policy shock of interest rate market reform, rather than inherent differences between the two groups of high- and low-risk firms, we further conduct a placebo test with a false policy time. In addition, to further verify that the difference between the treatment and control groups in terms of classification shifting after the deregulation is not random, we randomly designate treatment and control

Table 4. Parallel trend test.

	CLASS_D
	(1)
$HRISK \times POST^{(-2)}$	0.0023 (1.09)
$HRISK \times POST^{(-1)}$	0.0008 (0.40)
$HRISK \times POST^{(+1)}$	0.0037* (1.74)
$HRISK \times POST^{(+2)}$	0.0054** (2.47)
$HRISK \times POST^{(+3)}$	0.0031 (1.40)
CONS	-0.1469*** (-4.60)
CONTROLS	YES
YEAR_FE	YES
FIRM_FE	YES
N	4670
R^2_{Adj}	0.416

Table 5. Placebo test.

	(1)	(2)
	Advancing the time of the policy by one year	Randomly setting up treatment and control groups
$HRISK \times POST_PSEUDO$	0.0018 (1.30)	
$HRISK_PSEUDO \times POST$		0.0006 (0.48)
CONS	-0.1549*** (-2.91)	-0.1532*** (-2.90)
CONTROLS	YES	YES
YEAR_FE	YES	YES
FIRM_FE	YES	YES
N	4670	4670
R^2_{Adj}	0.417	0.417

groups for a placebo test. The results are shown in Table 5, which show that the coefficients of $HRISK \times POST_PSEUDO$ and $HRISK_PSEUDO \times POST$ are not significant, indicating that the placebo test is satisfied. Moreover, a kernel density function plot was generated based on coefficients estimated from the 1,000 random samples. As can be seen from Figure 1, the coefficients of $HRISK_PSEUDO \times POST$ obey a normal distribution with a mean of 0, which is significantly smaller than the coefficient values of $HRISK \times POST$. Therefore, the placebo test indicates that the regression results are not caused by random factors.

4.4. Robustness tests

To confirm the reliability of our main findings, we also conduct robustness tests as follows.

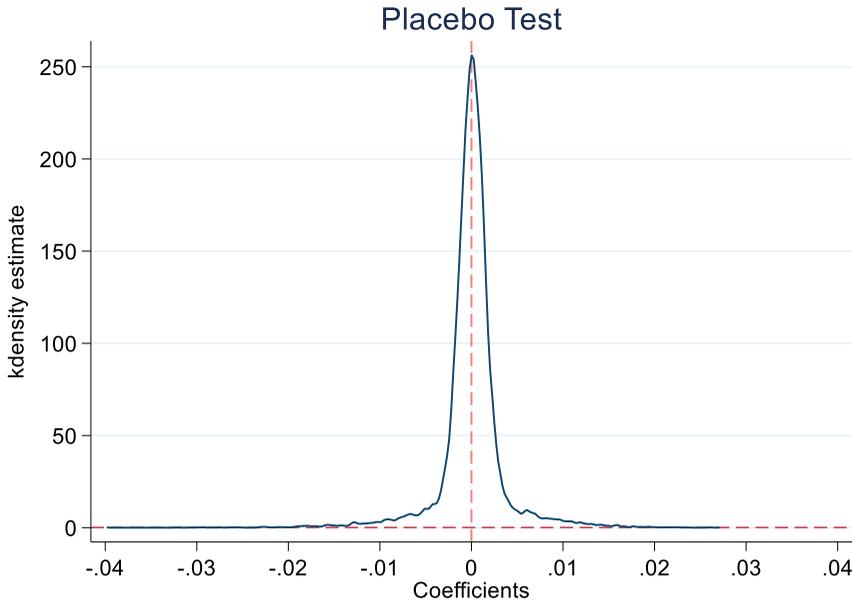


Figure 1. Kernel density function plot of placebo test.

4.4.1. Alternative measure of classification shifting

First, following Xu (2020), we use the manipulation of non-operating income as an alternative variable for the classification shifting. Second, following Li et al. (2015), we use net income minus non-recurring gains and losses to measure core earnings for robustness. Third, following the method outlined by McVay (2006), we use the ΔCE model to estimate the unexpected core earnings (UN_ACE),³ and calculate classification shifting using UN_ACE for the robustness test. The results remain robust. Due to limited space, these results are not shown; however, they are available upon request.

4.4.2. Alternative measure of treatment group and control group

Following Chen et al.'s (2019) division of treatment and control groups, we divide the sample into low-quality and high-quality firms, respectively, based on their profitability. Our results remain robust after changing the risk measurement. Due to limited space, these results are not shown; however, they are available upon request.

4.4.3. Changing the sample interval

We use two years before and after the deregulation (i.e. 2002–2005), and four years before and after the deregulation (i.e. 2000–2007) as the sample for robust test. The results are found to be consistent with the baseline result. Due to limited space, these results are not shown; however, they are available upon request.

³Here, the specific estimation model of UN_ACE is as follows:

$$\Delta CE_{i,t} = \alpha_0 + \alpha_1 CE_{i,t-1} + \alpha_2 \Delta CE_{i,t-1} + \alpha_3 \Delta TO_{i,t} + \alpha_4 ACCRUALS_{i,t-1} + \alpha_5 ACCRUALS_{i,t} + \alpha_6 \Delta SALES_{i,t} + \alpha_7 NEG \times \Delta SALES_{i,t} + \varepsilon.$$

5. Additional tests

5.1. Mechanism test

5.1.1. Credit availability mechanism

Due to the deregulation of the bank lending interest rate ceiling, banks became able to lend to high-risk firms by charging a higher interest rate, which could potentially improve the credit availability of high-risk firms. Accordingly, we test the mechanism that high-risk firms can change their earnings structure and thus access borrowing through classification shifting after the reform. In order to verify that the deregulation improves the financing availability for high-risk firms, as well as to test whether classification shifting can increase the borrowing amounts of high-risk firms, we construct a mediating model and a moderating model. Following Chen and Ma (2018), we construct the following test model:

$$LOAN_{i,t} = \beta_0 + \beta_1 HRISK_i \times POST_t + \beta_2 CONTROLS_{i,t} + YEAR_FE + FIRM_FE + \varepsilon_{i,t} \quad (7)$$

$$LOAN_{i,t} = \beta_0 + \beta_1 HRISK_i \times POST_t + \beta_2 CONTROLS_{i,t} + YEAR_FE + FIRM_FE + \varepsilon_{i,t} \quad (8)$$

$$LOAN_{i,t} = \beta_0 + \beta_1 HRISK_i \times POST_t + \beta_2 CLASS_D_{i,t} + \beta_3 HRISK_i \times POST_{1t} \times CLASS_D_{i,t} + \beta_4 CONTROLS_{i,t} + YEAR_FE + FIRM_FE + \varepsilon_{i,t} \quad (9)$$

Models (7) and (8) are the mediating models, and model (9) is the moderating model. In more detail, *LOAN* indicates the credit availability, calculated as '(long-term borrowing + short-term borrowing)/total assets'. The definitions of other variables are consistent with the above models.

The results are shown in Table 6. Column (1) show that the coefficients of *HRISK*×*POST* is significantly positive. Column (2) presents the results of adding the classification shifting of firms as a mediating effect test. The results show that the coefficients of *HRISK*×*POST* and *CLASS_D* are significantly positive. This confirms that treatment group firms experience improved credit availability due to classification shifting following the deregulation. Column (3) shows the result of adding the moderating effect of classification shifting, and the coefficient of *HRISK*×*POST*×*CLASS_D* is significantly positive, indicating that classification shifting enhances the credit availability of high-risk firms following the deregulation.

Table 6. Credit availability mechanism tests.

	Bank credit		
	(1)	(2)	(3)
<i>HRISK</i> × <i>POST</i>	0.0083** (2.16)	0.0079** (2.07)	0.0081** (2.14)
<i>CLASS_D</i>		0.1225** (2.39)	0.0812 (1.50)
<i>HRISK</i> × <i>POST</i> × <i>CLASS_D</i>			0.2492** (2.31)
<i>_Cons</i>	-0.7185*** (-7.22)	-0.6996*** (-7.02)	-0.6801*** (-6.80)
<i>CONTROLS</i>	YES	YES	YES
<i>YEAR_FE</i>	YES	YES	YES
<i>FIRM_FE</i>	YES	YES	YES
<i>N</i>	4670	4670	4670
<i>R</i> ² <i>Adj</i>	0.812	0.813	0.813

5.1.2. Borrowing cost mechanism

The bank lending interest rate ceiling deregulation provides opportunities for high-risk firms to obtain bank credit, but firms also pay higher prices to compensate for the associated risk premium. This adds to the overburden of firms' borrowing costs, so firms respond and are incentivised to reduce their borrowing costs. Considering the above, we attempt to test the mechanism of how high-risk firms manage their earnings structure through classification shifting for the purposes of reducing borrowing costs after the deregulation. To verify that the deregulation raises the cost of borrowing for high-risk firms, and further verify that classification shifting can help reduce the borrowing cost, we construct the following test models:

$$COST_{i,t} = \beta_0 + \beta_1 HRISK_i \times POST_t + \beta_2 CONTROLS_{i,t} + YEAR_FE + FIRM_FE + \varepsilon_{i,t} \quad (10)$$

$$COST_{i,t} = \beta_0 + \beta_1 HRISK_i \times POST_t + \beta_2 CLASS_D_{i,t} + \beta_3 CONTROLS_{i,t} + YEAR_FE + FIRM_FE + \varepsilon_{i,t} \quad (11)$$

$$COST_{i,t} = \beta_0 + \beta_1 HRISK_i \times POST_t + \beta_2 CLASS_D_{i,t} + \beta_3 HRISK_i \times POST_t \times CLASS_D_{i,t} + \beta_4 CONTROLS_{i,t} + YEAR_FE + FIRM_FE + \varepsilon_{i,t} \quad (12)$$

Models (10) and (11) are the mediating models, and model (12) is the moderating model. More specifically, *COST* indicates the borrowing costs, which is calculated by 'financial expenses divided by the sum of long-term borrowing and short-term borrowing'. The definitions of other variables are consistent with the above models.

Table 7 presents the empirical results. The results in Column (1) show that the coefficients of *HRISK*×*POST* is significantly positive. Column (2) presents the results after adding classification shifting by firms as a mediating effect test. As the column shows, the coefficient of *HRISK*×*POST* is significantly positive, while the coefficient of *CLASS_D* is insignificant, indicating that the deregulation does not reduce high-risk firms' borrowing costs through classification shifting. Moreover, Column (3) lists the moderating effect results of the classification shifting. As shown, the coefficient of *HRISK*×*POST*×*CLASS_D* is negative but insignificant. The above results suggest that while the lending rate ceiling deregulation does indeed raise the borrowing costs for high-risk firms, the mechanism of

Table 7. Borrowing cost mechanism results.

	Borrowing cost		
	(1)	(2)	(3)
<i>HRISK</i> × <i>POST</i>	0.0048* (1.69)	0.0048* (1.69)	0.0048* (1.67)
<i>CLASS_D</i>		0.0045 (0.12)	0.0114 (0.28)
<i>HRISK</i> × <i>POST</i> × <i>CLASS_D</i>			-0.0420 (-0.52)
_Cons	0.4492*** (6.04)	0.4499*** (6.03)	0.4466*** (5.97)
<i>CONTROLS</i>	YES	YES	YES
<i>YEAR_FE</i>	YES	YES	YES
<i>FIRM_FE</i>	YES	YES	YES
<i>N</i>	4670	4670	4670
<i>R</i> ² _Adj	0.350	0.350	0.350

classification shifting by high-risk firms to reduce the borrowing costs is not confirmed, that is, the 'cost reduction motive' for classification shifting is not verified. One possible explanation is that high-risk firms are still in a weak negotiating position compared to banks.

5.2. Cross-sectional heterogeneity

To further test the boundary conditions of firms' classification shifting being motivated by credit financing, we also conduct the following cross-sectional heterogeneity tests. While it is certainly important for every firm to obtain the bank credit required for operations, the intensity of the firms' motivation to manage core earnings for borrowing changes following the removal of bank lending interest rate ceilings. The differences in the degree of financing constraints, banks' information demand and monitoring intensity, and available alternative financing channels lead to different motivations for earnings manipulation. We therefore examine the cross-sectional heterogeneity in the impact of the deregulation on classification shifting from three perspectives: financing constraints, financing channel diversity, and bank motivations.

5.2.1. The heterogeneity test of financing constraints

In general, firms facing greater financing constraints are more significantly affected by interest rate liberalisation (Laeven, 2003). The bank lending interest rate ceiling deregulation provides high-risk firms with more borrowing opportunities. We accordingly predict that, to obtain credit, firms with high financing constraints have a stronger incentive to carry out classification shifting. In this paper, firm size and mortgage are used as two measures for financing constraints, as it is usually the case that the smaller and less mortgaged the firms, the greater their financing constraints (Krishnan et al., 2015; Myers, 1977). Based on how each company compares to the median value of firm size, the sample is divided into big firms and small firms. The mortgage is measured by net fixed assets, and the sample is divided into a high-mortgage and low-mortgage group according to how each company compares to the industry-year median value.

Table 8 presents the results of the heterogeneity test based on the financing constraints, with the first two columns showing the results of the heterogeneity test according to the firm size. As the table shows, the coefficient of $HRISK \times POST$ is not significant in the big firm group, while it is significantly positive in the small firm group. The latter two columns show the results of the heterogeneity test based on mortgage. As shown, the coefficient of $HRISK \times POST$ is significantly positive in the low-mortgage group, while it is insignificant in the high-mortgage group. These results show that credit availability has a more significant impact on firms with greater financing constraints.

5.2.2. Heterogeneity test of financing channel diversity

In addition to borrowing from banks, firms can also finance through commercial credit or other channels. Hence, the difficulty of financing through other channels also affects firms' motivation to borrow from banks. We therefore use commercial credit and regional financial development to represent the diversity of borrowing channels. When a firm's commercial credit is high, the firm can obtain more commercial credit. Similarly, when the financial development level of a firm's region is high, the firm has access to more channels

Table 8. Heterogeneity test of financing constraints.

	(1)	(2)	(3)	(4)
	Big firms	Small firms	High-mortgage	Low-mortgage
<i>HRISK</i> × <i>POST</i>	0.0006 (0.48)	0.0048** (1.97)	0.0015 (1.10)	0.0052** (2.35)
<i>B-diff</i>	0.004*		0.004*	
	<i>P_Value</i> = 0.081		<i>P_Value</i> = 0.097	
<i>_Cons</i>	-0.0234 (-0.42)	-0.1979* (-1.88)	-0.0510 (-0.95)	-0.1712** (-2.10)
<i>CONTROLS</i>	YES	YES	YES	YES
<i>YEAR_FE</i>	YES	YES	YES	YES
<i>FIRM_FE</i>	YES	YES	YES	YES
<i>N</i>	2335	2335	2333	2337
<i>R²_Adj</i>	0.371	0.433	0.429	0.426

through which it can obtain credit. We predict that the greater the number of financing channels available to a firm, the weaker the impact of the deregulation on its credit availability, and hence the lower its incentive to engage in classification shifting. We measure commercial credit by the difference of accounts payable and prepayments over total assets. Fan Gang Financial Marketization Index is used to measure the level of regional financial development.

Table 9 presents the heterogeneity test results according to the diversity of financing channels. The results show that if commercial credit and financial development levels are lower, the coefficient of *HRISK*×*POST* is significantly positive; otherwise, the coefficient of *HRISK*×*POST* is not significant. These results suggest that when it is difficult for firms to finance through other channels, the motivation of firms to obtain bank credit is stronger.

5.2.3. Heterogeneity test of banks' motivations

Due to variations in banks' demand for firms' earnings information and their differing levels of monitoring, differences arise in motivations for classification shifting. Zhang et al. (2019) find that large banks have no advantages over small banks when it comes to screening 'soft' information (e.g. entrepreneurial business ability), and moreover that large banks pay more attention to 'hard' information indicators (such as financial indicators, mortgages, and so on). We expect that state-controlled banks, as large banks with

Table 9. Heterogeneity test of financing channel diversity.

	(1)	(2)	(3)	(4)
	High commercial credit	Low commercial credit	High financing development	Low financing development
<i>HRISK</i> × <i>POST</i>	0.0009 (0.58)	0.0053** (2.37)	0.0006 (0.36)	0.0065*** (2.90)
<i>B-diff</i>	0.004*		0.006**	
	<i>P_Value</i> = 0.085		<i>P_Value</i> = 0.023	
<i>_Cons</i>	0.0249 (0.37)	-0.3724*** (-4.13)	-0.1045* (-1.94)	-0.1887** (-1.98)
<i>CONTROLS</i>	YES	YES	YES	YES
<i>YEAR_FE</i>	YES	YES	YES	YES
<i>FIRM_FE</i>	YES	YES	YES	YES
<i>N</i>	2358	2312	2583	2087
<i>R²_Adj</i>	0.413	0.486	0.445	0.410

Table 10. Heterogeneity test of banks' motivations.

	(1) High concentration of state- owned holding banks	(2) Low concentration of state- owned holding banks	(3) High bank competition	(1) Low bank competition
<i>HRISK</i> × <i>POST</i>	0.0058*** (3.03)	-0.0006 (-0.36)	0.0001 (0.06)	0.0065*** (2.90)
<i>B-diff</i>		-0.006** <i>P_Value</i> = 0.013		0.006** <i>P_Value</i> = 0.025
<i>_Cons</i>	-0.1580* (-1.87)	-0.1659*** (-2.71)	-0.1462** (-2.38)	-0.146 (-1.49)
<i>CONTROLS</i>	YES	YES	YES	YES
<i>YEAR_FE</i>	YES	YES	YES	YES
<i>FIRM_FE</i>	YES	YES	YES	YES
<i>N</i>	2655	2015	2583	2087
<i>R</i> ² <i>_Adj</i>	0.433	0.351	0.442	0.395

limited access to 'soft' information about firms, will pay more attention to firms' earnings persistence when they lend to high-risk firms, and therefore that, in regions with a high concentration of state-controlled banks, firms will have stronger incentives to engage in classification shifting to signal their earnings persistence. In addition, price competition among commercial banks can be seen to increase following interest rate marketisation (Yi & Zhao, 2001), which may prompt banks to relax their scrutiny of borrowing firms' accounting information in pursuit of profits. Following this logic, firms are more likely to engage in classification shifting in regions where the degree of bank competition is lower while the intensity of bank scrutiny is higher.

Table 10 presents the results of heterogeneity testing based on banks' motivations. The results show that the coefficient of *HRISK*×*POST* is significantly positive in regions with a high concentration of state-controlled banks and high bank competition. These results suggest that firms are more motivated to engage in classification shifting following bank lending rate ceiling liberalisation when the lending banks have a higher demand for corporate earnings information and when supervisory scrutiny is more stringent.

5.3. Core/non-core earnings and bank credit

To further demonstrate the importance of core earnings for firms' access to bank credit, and to provide more direct evidence on the role of core earnings in bank debt decisions, we follow Lu et al. (2008) in constructing a model to test the impact of core and non-core earnings on bank credit. Table 11 presents the regression results. As the table reveals, the results in Column (1) show that core earnings increase the bank credit significantly, while the results in Column (2) indicate that the effect of non-core earnings on bank credit is insignificant. Column (3) further shows the regression results of the model with both core earnings and non-core earnings. These results suggest that core earnings are more important for banks' credit decisions.

Table 11. Core or non-core earnings and bank credit.

	(1)	(2)	(3)
	Core earnings	Non-core earnings	Core/Non-core earnings
<i>CE</i>	0.0236*** (2.84)		0.0233*** (2.76)
<i>NCE</i>		0.0019 (0.06)	0.0059 (0.19)
<i>_Cons</i>	-0.8527*** (-6.55)	-0.8385*** (-6.32)	-0.8205*** (-6.19)
<i>CONTROLS</i>	YES	YES	YES
<i>YEAR_FE</i>	YES	YES	YES
<i>FIRM_FE</i>	YES	YES	YES
<i>N</i>	4670	4601	4601
<i>R²_Adj</i>	0.101	0.0972	0.0988

6. Conclusions

As one of the most central reforms to China's financial market, interest rate liberalisation has long been the focus of practical and academic circles in China. Interest rate liberalisation is of great significance because it promotes the free flow of capital, eliminates credit discrimination, and improves the efficiency of capital allocation. Accounting information is the most critical basis for market resource allocation. In particular, core earnings, which reflect the persistence of corporate earnings, play an important role in credit allocation. However, due to the potential endogeneity between debt financing and earnings manipulation, along with the lack of suitable research setting, few existing studies have examined core earnings manipulation motivated by debt contracts. Interest rate market reform provides an ideal setting to study how the formation of debt covenants might affect classification shifting from the perspective of credit financing availability.

This paper accordingly constructs a difference-in-differences model to empirically test the impact of interest rate liberalisation on classification shifting, using China's bank lending interest rate ceiling deregulation as a quasi-natural experiment. We find that classification shifting among high-risk firms increases significantly following the deregulation. The mechanism test finds that the deregulation significantly increases credit availability among high-risk firms, while classification shifting significantly enhances the positive relationship between them. In this way, the influence mechanism of 'increasing credit availability' is verified. At the same time, the deregulation significantly increases high-risk firms' borrowing cost; however, classification shifting does not weaken the relationship between the two, and the mechanism of 'lowering the cost of borrowing' is not verified. Finally, this paper finds that the impact of bank lending interest rate ceiling deregulation on classification shifting among high-risk firms is more significant when the firms are smaller in size and have weaker mortgages, lower commercial credit, lower regional financial development, a higher proportion of state-controlled banks in their region, and lower bank competition.

Based on the study of how interest rate liberalisation affects firm classification shifting, this paper provides empirical evidence regarding the impact of the reform on micro-firm behaviours and enriches the literature on the economic consequences of interest rate

liberalisation. It also adds to the literature on debt financing motives for classification shifting, and confirms the importance of earnings structure in financing. Moreover, this paper uses a difference-in-differences model to mitigate the endogeneity problem, providing more robust and reliable evidence on how financing availability affects firms' motivation to engage in classification shifting. Finally, the present research provides a realistic reference for how to improve the quality of accounting information as market-oriented reform progresses in China's transition economies. We show that the users of accounting information, as well as regulatory authorities, should strengthen not only their supervision and review of firms' total earnings, but also their monitoring of earnings structure manipulation through classification shifting. Doing so will help to improve the quality of accounting information, as well as support the allocation of credit according to market signals.

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