Cardiff Economics Working Papers

Working Paper No. E2014/17

Why do firms switch banks? Evidence from China

Wei Yin and Kent Matthews

September 2014

Cardiff Business School
Aberconway Building
Colum Drive
Cardiff CF10 3EU
United Kingdom
t: +44 (0)29 2087 4000
f: +44 (0)29 2087 4419
business.cardiff.ac.uk

Why do firms switch banks? Evidence from China

Wei Yin and Kent Matthews

September 2014

Cardiff Business School
Cardiff University

Abstract

This paper uses a sample of matched data of firms-banks in China over the period 1999-2012 to determine the drivers of firms switching behaviour from one bank relationship to another. The findings conform to the extant literature and therefore indicate that the switching behaviour of Chinese firms is no different to firms elsewhere. The results show that the principal driver of a switching action is the credit needs of the firm and a mixture of firm and bank characteristics. The findings support the extant literature that less opaque firms are able to switch more readily than opaque firms. The results also suggest that banks that develop there fee income services are more effective in locking-in their borrowers.

JEL Codes: G21, L22

Key words: Switching behaviour, Chinese firms, Chinese banks.

Corresponding Author
Wei Yin
Cardiff Business School
Aberconway Building
Colum Drive
Cardiff CF10 3EU
Email : yinw@cardiff.ac.uk; yinwcardiff@gmail.com

This paper is prepared for the 6th International Finance and Banking Society (IFABS) conference, ISCTE Business School, Lisbon, Portugal, 18-120 June 2014. Comments welcome

1. **Introduction**

Switching costs, which arise from the asymmetry of information between firms and banks, act as the glue for the bank-firm relationship (Shy, 2002; Kim et al, 2003; Vesala, 2007). The confidentiality associated with the customer-loan relationship allows banks to exploit their informational advantage over competitors and lock-in their incumbent customers to earn higher positive expected profits on repeated lending. A number of previous studies have pointed out that a large proportion of firms have considered switching to another bank to overcome the lending constraint placed on them by their existing provider. However, a strong bank-firm relationship gives the bank an informational advantage in its relationship with the firm. Firms will face a non-favourable loan offer with higher interest rate from outside banks because of incomplete information about the firms' financial condition. For outside banks it is hard to distinguish 'good' and 'bad' firms. The informational disadvantage and lock-in strategy by the incumbent bank can limit the ability of the firm's access to external finance. Yet, firms switching their relationship banks have also been widely observed in the lending market.

Plainly a long-term and stable bank-firm relationship is not the only choice for firms. They have high a probability to switch when they face severe financial constraints which cannot be resolved by the existing bank. The longer the existence of the incumbent relationship, the higher the probability that the borrower will find another lender (Greenbaum et al., 1989). Since the switching costs arising from asymmetric information makes the switching action costly, the switching behaviours are observed heterogeneity in firms. Firms' transparency, external fund requirement and financial characteristics are the factors that drive the decision to switch lenders. However, the banks' lending decisions are not homogenous. This paper aims to model the factors that drive firm's switching behaviour. The research question this paper poses is, why do firms switch banks, and what kinds of banks do they prefer to form a new relationship with.

As with many emerging economics bank credit remains the main funding source for firms in China (Allen et al, 2005). The opacity of business in China, and information asymmetry are viewed by some as the key impact variables that define the lending relationship (Chang et al, 2009; Cao et al, 2010). But it is not simply the characteristics of the firm that matter, the lending bank's identity influences the lending decision and determines the quality of the bank-firm relationship (Hao et al, 2013).

The reform period beginning from 2001 has made remarkable improvements in the performance of the banks, especially for the large commercial banks. The average non-performing loan ratio of the major commercial banks in China decreased from 17.9% in 2003

to 0.9% in 2011. Unlike in the past where the banks were slaves to the socialist plan, Chinese commercial banks have focussed on credit quality when making lending decisions (Chang et al, 2009). Banks collect more information about firms' private financial information in order to minimise the associated lending risk.

The topic why firms switch banks is a relatively unexplored area of research. This paper attempts to make a contribution to fill this gap. This study examines more than 2000 matched firm-bank lending deals during the period 1999-2012. The principal findings are that (i) firms usually switch banks for larger amount of loans and longer lending durations; (ii) large firms, that are usually more transparent, have a higher probability to switch than small firms; (iii) strong financial conditions of the firm increases the likelihood of forming a new bank relationship; (iv) firms are more likely to switch to small market share banks, or lower profitability banks to seek more favourable lending contracts; (v) firms are less likely to switch to banks that offer a bundled service of loan and services in order to avoid lock-in problems.

The remainder of the paper is organized as follows: section 2 reviews the relevant theoretical foundation and empirical researches on asymmetric information, bank-firm relationship and the determinants of firms switching decisions; section 3 describes the methodology and summarizes the main hypotheses of this study, and introduces the models setting for empirical studies; section 4 describes the data; section 5 presents the empirical results; and section 6 concludes.

2. Literature review

2.1 *Lending relationship with asymmetric information*

Many researches claim that asymmetric information between the firms and banks create barriers for borrowers to switch lenders. Kim et al (2003) claim that switching costs mainly arise from asymmetric information between borrowers and lenders incurred when economic agents change their suppliers. The disadvantage for borrowers seeking external funding between small firms and financiers is highlighted by Keasey and Waterson, (1993) and Berger and Udell, (1998). The latter examine the effect of asymmetric information on the lending relationship between banks and small firms in the U.S. They find that informational opacity constrains small firms from obtaining large amounts of external funding. Small firms are more likely to get access to external equity from venture capitalists, and rely less on banks when compared with other types of firms.

Others argue that a strong banking relationship can decrease the information problem, but with ambiguous results about the effect of such lending relationship on firm financial

constraints. The 'inside' bank could make use of its information advantage to make more informed credit decisions. However, the 'outside' banks would charge a higher interest rate when a firm switches, (Sharpe, 1990; Rajan, 1992). The empirical evidence on this topic is also mixed. Petersen and Rajan (1994) find that small firms tend to borrow from banks which provide them informational intensive financial services. They suggest that firms that have a longer lending relationship would have easier access to credit funds. Similarly, Berger and Udell (1995) find that small firms with longer banking relationships are more able to borrow at lower rates and have a lower probability to pledge collateral than other small firms. The information gathered from a longer term relationship is used to refine the loan contract terms. In contrast, Houston and James (1996) find that an exclusive strong banking relationship would have a negative effect on high-growth firms, while, a multiple lending relationships had a positive effect.

Some studies focus on the decision of the banks to explore the relationship between information and the banks' lending decision. Berger et al (2005) argue that small banks are better able to collect and act on soft information[1] than large banks. Large banks are most likely to lend to big firms with a good credit record, since they are less willing to lend to 'informationally opaque firms'. Using survey data for Japan, Uchida et al (2008) supports the findings of Berger et al (2005). The empirical evidence shows that the large firms tend to dictate the relationship with large banks, while small banks are most likely to have a stronger relationship with small firms. The conclusion is that small banks have a comparative advantage in processing soft information and delivering relationship lending.

Bharath et al (2007) measures the direct benefit to the bank from relationship banking. They find that the degree of information asymmetry increased the likelihood of banks winning the borrower's future loan contract. Furthermore, the firms conducting IPOs had a higher probability to maintain the current lending relationships. Sapienza (2002) finds that bank mergers decrease the supply of loans to small borrowers and it increases the probability of firms eliminating the lending relationship with the incumbent bank. In conclusion, larger firms have a higher probability to switch banks, while small firm choose to maintenance their current borrowing channel.

2.2 The impact of specific characteristics of switching behaviour

Recent papers have explored the impact of characteristics specific to the lending relationship, in terms of firms, banks and the market structure, on the firm switching behaviour. The probability of a firm switching banks is due to the heterogeneity in the firm's

[1] Soft information is the internal information about the investing project cannot be credibly communicated from firm to non-relationship banks.

characteristics, such as firm's size, age, intangibles, constraints, leverage and so on. These studies have not analysed switching costs specifically, but they provide some evidences of the determinants that affect the firm-bank relationship and switching actions. Harhoff and Körting (1998) examine the role of the lending relationships in determining the costs and collateral requirements for external funds with survey data of small and medium-sized German firms. They find that the duration of the lending relationship and financial distress have a negative impact on collateral requirements; while the number of lenders and the age of the firm have a positive effect on collateral requirements. Ongena and Smith (2001) use Norwegian data to support the view that the value of the bank-firm relationship declines through time and firms tend to end the lending relationship to avoid 'lock-in'. Moreover, they find that the switching costs are not high enough to prevent firms changing banks frequently.

Detragiache et al (2000) using matched bank-firm data examine the impacts of firm and bank characteristics on the probability of maintaining a single banking relationship. The results show that the profitability of firms has a positive impact on maintaining a single banking relationship, while firm size and leverage has a negative one. Similarly, Farinha and Santos (2002) analyse the single and multiple firm-bank relationship choice. They observe that almost all firms borrowed for the first time from a single bank, but at some point some borrow from additional banks. They find that the likelihood of a firm substituting a single to a multiple relationship increases with the duration of that relationship. The results also show that this kind of switching is more likely to occur for firms with more growth opportunities and for firms with poor performance.

Using a large loan sample from 1990-2006 in US lending market, Gopalan et al (2011) examine why firms switch to new credit providers. They find that transparent[2] firms are more likely to form a new banking relationship. Firms that form a new lending relationship will usually secure a larger loan amount after the switch. As for the switching decision, firms are more likely to switch from small banks to large banks.

In addition to the determinants of switching, Ioannidou and Ongena (2010) focus on 'the time to change' and study the loan conditions and bank behaviour when firms change lenders. They distinguish between two types of banks, 'inside' and 'outside'. The former is the bank that has a loan relationship with the firm in the past 12 month, while the latter does not. Using Bolivian data their empirical results indicate that turning to a new bank ('outside' bank) leads to a substantial drop in loan rate, then after a period of about one and a half years, the 'new' (now 'inside' bank) bank started increasing its loan rate. After three years, the loan rate will

[2] They use three variables to measure firm's information quality: firm's size, long term credit rating and the number of security analysts following the firm's stock.

be back to its level before the change. They claim that this bank strategy is consistent with the existence of hold-up costs in bank-firm relationships. They also highlights that information-sharing regime is very important for banks selecting firms.

2.3 Relevant studies about China bank-firm relationship

Although many Chinese studies have concentrated on the bank-firm relationship, only a few focus on the effect of asymmetric information on switching costs, and the determinants of why firms switch banks. Huang (2003) studies the impact of a firm's listing on the lending relationship using a logistic framework. The author denotes the existence of a lending relationship as 1, and 0 otherwise and finds that the performance of the firm increases the likelihood of developing a lending relationship prior to listing. However, the performance of firms will be less important for lending decision after firm listing. Clearly the act of listing makes more information about the firm available, which effectively lowers the banks' information collecting costs. Using survey data with 308 questionnaires from firms' senior executives, Liu and Mei (2009) analyse the determinants of the continuance or termination of a banking relationship. They claim that switching costs are the main determinant for firms' maintaining the lending relationship with the incumbent bank.

Based on the survey data of World Bank on 1186 SMEs in China, He and Wang (2009) study the impact of bank-firm relationship on the growth of firms. They find that the longer the duration and the greater the number of lending relationships, the slower the growth of firms. They report that large firms have a high probability to switch banks.

Chang et al (2009) study the impact of information from the lending relationship on loan. They distinguish information as 'hard' and 'soft', which stand for the publication information and the information arising from repeated lending respectively, and focused the research on the economic role of banks' soft information. They find that soft information and firm size have a significant negative effect on the duration of both short and long lending relationship.

3. Methodology

3.1 Model and Hypotheses

Consider a firm that has no financial resources and wants to implement a project and borrows from bank. In period 0, the project return (cash flow) is denoted as K. The investment (borrowing) cost is $(1+r)I_0$, where r is bench interest rate. As in Vesala (2007), we separate firms (loan applicants) as good credit firms (G) and bad credit firms (B). Denote Q as the quality of the firm.

$$Q = \begin{cases} G\ (good\ firm), & if\ K-(1+r)I_0 > 0 \\ B\ (bad\ firm), & if K-(1+r)I_0 < 0 \end{cases} \quad (1)$$

As with Von Thadden (2001), we make two assumptions: first, good firms consume any profit after period 0; second, outstanding debts of bad firms are forgiven. Under the relationship lending of this period, information is gathered by the lender beyond the relatively transparent data available in the financial statements. For non-relationship banks transparent information is costless to acquire and they can obtain part of the opaque information, but not as completely as the relationship bank can.

In period 1, firms face a new round of borrowing procedures. Firms that have a relationship with an incumbent bank is denoted as 'inside' bank (and otherwise they are 'outside' bank). We assume the 'inside' bank has better information of the firm, but with a 'noisy signal'. Denote P_g the probability that a good credit firm will be viewed as good, and $1 - P_g$ as the probability that it will be viewed as bad. Better performances of firms ensure that they have higher probability to be viewed as good, which is $P_g = \frac{1}{1+z^{-(K-(1+r)I_0)}}$, where $z > 1$. Let P_b be the probability that a bad credit firm will be viewed as a bad firm, and denote $1 - P_b$ as the probability that a bad firm will be viewed as good. Symmetrically, worse performances of firms ensure that they have higher probability to be viewed as bad firm, which is $P_b = \frac{1}{1+z^{(K-(1+r)I_0)}}$. Hence the 'inside' bank still has the information advantage$P_g, P_b \in (\frac{1}{2}, 1)$.

Given the existence of asymmetric information between firms and 'outside' bank, the 'outside' bank has a higher probability to misjudge the quality of firms. Similar to the setting in Sharpe (1990), the probability that an 'outside' bank views a good firm as good is given by $\lambda_g = \frac{1+\phi}{2} P_g$, where $0 \leq \phi < 1$. Then the probability being viewed as a bad firm is $1 - \lambda_g$. Symmetrically the probability that an 'outside' bank views a bad firm as bad is $\lambda_b = \frac{1+\phi}{2} P_b$, and the probability viewed as a good firm is $1 - \lambda_b$. It is clearly that $\lambda_g < P_g$ and $\lambda_b < P_b$. Denote L_g as the probability that a bank is willing to lend to a good credit firm, and let L_b be the probability of the bank lending to a bad credit firm. Since a firm in a good credit state has a higher probability to get a loan, then $L_g \gg L_b$.

If a firm chooses to process the lending relationship with the incumbent bank, the value of the loan it may get is denoted as Q_{inside}, which is an index of the loan quality consisting of loan amount (I_1), duration (D) and interest rate (r). While $Q_{outside}$ stands for the value of loan offer that comes from 'outside' bank. Hence, $Q_{outside/inside} = \frac{I_1}{1+r} * D^{\alpha}$, where $\alpha > 1$.The

expected value of the firm staying with the current bank-firm relationship for repeated borrowing is given by:

$$V_{inside} = \begin{cases} [P_g L_g + (1 - P_g) L_b] * Q_{inside} & if\ good\ firm \\ [P_b L_b + (1 - P_b) L_g] * Q_{inside} & if\ bad\ firm \end{cases} \quad (2)$$

The expected value of firm switching its bank is given by:

$$V_{outside} = \begin{cases} [\lambda_g L_g + (1 - \lambda_g) L_b] * Q_{outside} & if\ good\ firm \\ [\lambda_b L_b + (1 - \lambda_b) L_g] * Q_{outside} & if\ bad\ firm \end{cases} \quad (3)$$

Then,

$$V_{outside} = \begin{cases} \left[\frac{1+\phi}{2}(P_g L_g - P_g L_b) + L_b\right] * Q_{outside} & if\ good\ firm \\ \left[\frac{1+\phi}{2}(P_b L_b - P_b L_g) + L_g\right] * Q_{outside} & if\ bad\ firm \end{cases} \quad (4)$$

Transaction costs will be incurred when firm changes their credit supplier. Denote c as the transaction costs, then firms looking for better funding from banks in period 1, can be denoted as Max$\{V_{inside},\ V_{outside} - c\}$. Let 1 stand for switching, 0 for non-switching. Hence the decision equation of firms' switching is given by:

$$Switching = \begin{cases} 1, if\ V_{outside} - V_{inside} > c \\ 0, if\ V_{outside} - V_{inside} \leq c \end{cases} \quad (5)$$

i) Switching behaviour and deal terms:

Rewrite equation (7) as the probability of switching determination. Hence:

$$Prob(Switching = 1) \sim \begin{cases} Q_{outside} > \frac{[(P_g L_g - P_g L_b) + L_b] * Q_{inside} + c}{\frac{1+\phi}{2}(P_g L_g - P_g L_b) + L_b} & if\ good\ firm \\ Q_{outside} > \frac{[(P_b L_b - P_b L_g) + L_g] * Q_{inside} + c}{\frac{1+\phi}{2}(P_b L_b - P_b L_g) + L_g} & if\ bad\ firm \end{cases} \quad (6)$$

Clearly, in equation (8) there are $\frac{\partial(V_{outside} - V_{inside} - c)}{\partial I_1} > 0$ and $\frac{\partial(V_{outside} - V_{inside} - c)}{\partial D} > 0$, which suggest that more favourable the offer (large amount of loans (I_1) and longer lending duration (D) from 'outside' banks, results in a higher probability for firms switching banks. The first hypothesis is given as:

H1: *Given that the information asymmetry is a barrier for firms' switching to new banks; there is a higher probability to switch when firms get access to more favourable credit than remaining with incumbent banks.*

Firms need to choose between a relationship and a non-relationship bank for their repeat loan. As Ioannidou and Ongena (2010) argue turning to a new bank is a defining moment for both the firm and its current lenders, firms often take the strategic decision at the highest level. Switching costs arise from asymmetric information acting as a barrier for switching, which implies that favourable loans are the key motivation for firms to switch Hence, the next hypothesis is that more generous lending contracts from 'outside' bank will drive firm to switch.

ii) Loan demand and firm's characteristics:

Firms are willing to form new lending relationship when they get more attractive loans from an 'outside' bank. Published or shared information relating to transparency and reputation are important, (like firm size and financial condition). Under the condition of equation (6), the following conditions hold $\frac{\partial(V_{outside}-V_{inside}-c)}{\partial\phi} > 0, \frac{\partial(V_{outside}-V_{inside}-c)}{\partial K} > 0$; otherwise, $\frac{\partial(V_{outside}-V_{inside}-c)}{\partial\phi} \leq 0, \frac{\partial(V_{outside}-V_{inside}-c)}{\partial K} \leq 0$. These results suggest that higher cash flow and transparency increase the likelihood for firms to switch. Usually larger firms are more transparent that small firms (Elyasiani and Goldberg, 2004; Stephan et al, 2009). Hence larger firms have a higher probability to change banks. Thus the second hypothesis is:

H2: *Given the asymmetry of information between 'inside' and 'outside' banks, the more transparent a firm is and in better financial health, the greater the probability that it will form a new lending relationship.*

The average Non-performing loans ratios of Chinese commercial banks decreased continuously, from 7.1% in 2006 to 1.0% in 2011. The largest decrease has been the large commercial banks group, from 9.7% in 2006 to 1.0% in 2011. Given the existence of asymmetric information between the 'inside' and 'outside' banks, the 'outside' bank have a greater difficulty to get a firm's internal credit information. Therefore, transparent firms are more attractive to 'outside' banks. In contrast, borrowers with poor financials may be constrained to repeat borrow from their relationship lenders (Diamond, 1989). Firm size is likely to have a positive relationship with information transparency (Lin et al, 2007; Stephan et al, 2009). Furthermore, firm size usually reflects the bargaining power of the larger borrower (Harhoff and Körting, 1998). In summary, the more transparent a firm (larger firms)

is and the better the financial conditions of the firm is, the greater the likelihood that the firm will switch.

iii) Loan supply and bank's characteristics:

Lending decisions are widely observed as heterogeneous between different banks. Large banks that are usually considered as nonaggressive to poach new customer, (known as the 'fat cat' effect of Farrell and Klemperer, 2007), tend to have a lower probability to lend. While small banks or banks with low profitability have higher likelihood to lend, even to 'risky' borrowers, as part of a strategy of increasing market share and improving future profitability. Small banks are also usually more efficient than larger banks in collecting "soft" information, which makes them more willing to preserve or create bank-firm business relationships (Berger et al, 2005). Hence the lending probability ($L_{g/b}$) is affected by bank characteristics, which can be written as: $L_{g/b} = f(bank\ characteristics)$. The following hypothesis addresses the effect of bank characteristics on switching.

H3: *Firms are more likely to switch to small banks for credit needs than large banks. Low profitability banks are more attractive to firms since they have a higher likelihood to satisfy firms' credit requirement.*

The banking industry is heterogeneous in China and has a mix of large and small banks with intense local competition in the market. The five largest commercial banks dominate the market with a greater than 50% market share. The national joint-stock banks collectively have second highest share with city commercial banks and rural commercial banks competing at the provincial level. It is argued that small banks are more eager to extend their business and have higher propensity to lend than large banks[3]. Large banks usually rely more on observable firm characteristics in making lending decision than small banks (Cole et al, 1999), which implies they are less willing to lend than small banks under the same conditions of information asymmetry. Furthermore, small banks are more efficient at lending to small firms than large banks (Sapienza, 2002) which supports the argument that medium and small firms are more likely to switch to small banks.

3.2 Empirical models

Based on the above analysis, the determination of a firm switching is a function of deal terms, characteristics of firm and bank and can be written as:

$$Switching = f(Deal\ terms, Firm\ Characteristics, Bank\ Characteristics) \quad (7)$$

[3] Evidence of this is reported in Ferri (2009)

As with the many relevant empirical studies, firms' classification and bank-firm relationship dummy variables have been added into the model As in equation (8) :

$$Switching_i = \alpha_0 + D_i\alpha_1 + F_i\alpha_2 + B_i\alpha_3 + u_i \qquad (8)$$

, where the $Switching_i$ stands for the switching behaviour, D_i indicates the deal terms[4], F_i is a set of firms' characteristics variables, B_i stands for the banks characteristics and R_i indicates the bank-firm relationship variables. Note that $Switching = 1$ indicates the firm switches the lending relationship. In the above equations, the deal terms includes, the amount of the loan, the duration of the loan and a dummy denoting if collateral was required for the condition of the lon. The set of firms' characteristics include firm size, cash flow ratio and discriminant variables of firms' classification (private own enterprise, medium size and small firms). While market share of bank, non-interest income ratio, bank's ROA and large commercial bank dummy belongs to bank's characteristics variables, the number of firm's relationship banks and firm's previous borrowing from large bank belongs to bank-firm relationship variables. The details of variable definition are listed in Table 1:

Table 1: Variables definition

Variables	Definition	Unit
Switching	A firm borrows from a bank which did not have a loan relationship with the firm during last 12 month, denote switching=1; otherwise switching=0	-
Amount of loan (Amount)	The amount of money of each loan contract	CNY
Duration of loan (Duration)	The duration of each loan contract	Year
Collateral	Whether collateral is required when a firm borrowing from a bank. Collateral needed=1; otherwise=0	-
Total asset of firm (Tasset)	Annual total asset of firm	CNY
Total sales of firm (Firmsales)	Annual total sales of firm	CNY
Cash flow ratio (Cashflows)	Firm's annual net cash flow over total sales	%
Private enterprise (Private-Own)	Dummy variable to distinguish the private enterprise and state-own enterprise. Private enterprise=1, otherwise=0	-
Agriculture [b]	Dummy variable for industry Classification [b]. Agriculture industry=1, otherwise=0	-
Manufacture [c]	Dummy variable for industry Classification. Manufacture industry=1, otherwise=0	-
Real estate [d]	Dummy variable for industry Classification. Real estate industry=1, otherwise=0	-
Energy [e]	Dummy variable for industry Classification.	-

[4] Interest rate has not been included into the model, since Chinese banks were not free to price their loans until after Oct 2004.

Services [f]	Energy industry=1, otherwise=0 Dummy variable for industry Classification. Services industry=1, otherwise=0	-
Medium and small firm (M-S firm)	Statistical definitions of medium-sized and small enterprises from National Bureau of Statistics of China [g]. Denote that medium and small firm M-S firm=1; otherwise equal to 0	-
Market share of bank (Marksh)	Bank's loan over total loans in the market	%
Total asset of bank (Bankasset)	Annual total asset of bank	CNY
Non-interest income ratio	Bank's non-interest income over total gross income	%
Bank's return on asset (Bankroa)	Bank's net profit over total earning assets	%
Large commercial bank (Large bank)	Large commercial bank=1, otherwise=0	-
Banking market concentration ratio (HHI)	The sum of the squares of the market shares of the five largest banks	-

[a] Industry Classification here according to "Listed Company Industry Classification Guidelines (2012 Revision)", China Securities Regulatory Commission. [b] Agriculture: Farming, forestry, animal, husbandry and fishing industry. [c] Manufacture: Manufacture Industry. [d] Real estate: Real estate industry. [e] Energy: Production and Supply Electric Power, thermal Power, gas and water industry. [f] Services: Wholesale, retail, trades hotels and catering services industry. [g] Statistical definitions of medium-sized and small enterprises table is attached in Appendix A1.

The first step of the analysis is to estimate the impact of firm's characteristics and deal terms on the propensity to form a new banking relationship. This paper analyses the relationship between post-switching banks' characteristics and new banking relationship. Since Switching is only available from the borrower's 2nd deal onwards, the empirical studies drop the first deal in the regression. The specific model on switching is:

$$Switching_i = \alpha_0 + \alpha_1 lnAmount_i + \alpha_2 Duration_i + \alpha_3 Collateral_i + \alpha_4 lnTasset_i + \alpha_5 Cashflows_i + \alpha_6 Private_i + \alpha_7 Industry\ dummy_i + u_i \quad (9)$$

The specific model for the relationship between post-switching bank characteristics and firm's preference when switching is:

$$Switching_i = \beta_0 + \beta_1 lnAmount_i + \beta_2 Collateral_i + F_i\beta_3 + \beta_4 Marksh_i + \beta_5 Noninterest\ income_i + \beta_6 Bankroa_i + \varepsilon_i \quad (10)$$

The final stage is a robustness check shown as:

$$Switching_i = \alpha_0 + D_i\alpha_1 + F_i\alpha_2 + B_i\alpha_3 + R_i\alpha_4 + \alpha_5 HHI_i + u_i \quad (11)$$

, where HHI_i stands for banking market concentration ratio.

4. Data

Data on corporate characteristics is obtained from the CSMAR (China Securities Market and Accounting Research) database. Financial reports of China banks are taken from the Bankscope database. Firms are matched to banks with the corresponding lending deals. We exclude borrowers that are in the financial services sector. We take past deals to code *switching*, therefore the data only contains the deal from the 2nd borrowing. The sample includes 311 firms and 41 banks[5], from 1999-2012 with 2102 matched data. However, the sample is unbalanced because of a lack of data in some years but since these gaps appear at random, they should not affect the estimation in any other way other than reducing the sample size (Wooldridge, 2009).

The data shows that 51.5% firms switched. Firms are more likely to switch to a multiple bank-firm relationship instead of maintaining a single lending relationship; only 25% of firms maintained a single bank-firm relationship after switching. 84.1% of the lending relationship in our sample is multiple bank-firm relationship. 77.1% firm's previous borrowing is with large commercial bank in each lending period.

The average deal amount is 89835613 CNY; the highest and lowest loan amount is 259000000 and 1500000 respectively. All deals involve a single lender. The average lending duration is 1.528 year. 68.4% deal durations are between 1-2 years. The data covers only listed firms. But firms are heterogeneous in size. The largest total asset is 1.38E+11 RMB, while the smallest is only 5,220,090. The average cash flow to total sales ratio (%) is negative, with the value of -3.616. The average debt ratio is 57.437. As to bank characteristics, there is a big gap between the highest and lowest market share. The largest market share is that of ICBCI, while the lowest is the market share of Deyang City Commercial Bank. Besides the market share index, the dummy variable *large bank* is also used to distinguish large banks and others. The statistic shows that 54.4% borrowing deals are with large banks. Table 2 summarises the data.

Table 2: Summary Statistics

	Obs.	Mean	S.D.	Min	Max
	Dependent variable				
Switching	2102	0.511	0.497	0	1
	Deal Characteristics				
Ln(Amount)	2047	17.498	1.158	14.220	22.386

[5] The sample includes 5 large commercial banks, 12 joint-stock commercial banks, 19 City and Rural commercial bank, and 5 foreign banks.

Ln(1+Duration)	1802	0.811	0.401	0.077	3.060
Collateral	2102	0.738	0.439	0	1
	Firm Characteristics				
Ln(Tasset)	2102	21.557	1.035	15.468	25.651
Ln(Firmsales)	2097	20.853	1.323	15.469	25.838
Cashflows	2095	-3.616	39.186	-81.412	39.186
Private-Own	2102	0.077	0.267	0	1
Agriculture	2102	0.021	0.146	0	1
Manufacture	2102	0.471	0.499	0	1
Real estate	2102	0.164	0.371	0	1
Energy	2102	0.048	0.231	0	1
Services	2102	0.142	0.349	0	1
M-S firm	2012	0.264	0.440	0	1
	Bank's Characteristics				
Marksh (%)	1882	7.613	0.396	0.021	24.176
Ln(Bankasset)	1886	14.550	1.514	2.805	16.554
Non-interest income ratio (%)	1884	13.420	1.356	7.585	21.406
Bankroa (%)	1865	1.245	0.897	-0.282	34.063
Large bank	2102	0.544	0.498	0	1
	Market Characteristic				
HHI	2102	714.305	105.102	564.589	941.224

5. Empirical results

A switching action is defined as a firm borrowing from a bank that it did not have a loan relationship with in the previous 12 months. Hence, the dependent variable *switching* is a dummy variable either 0 or 1. As in many other studies the probit method is used to estimate the regression models. Since many of the driving variables are likely to be endogenous the probit model with continuous endogenous (ivprobit) was used for the following empirical studies[6]. All data in the regression are winsorized at the 1st and 99th percentiles.

5.1 New lending relationship, Deal terms and firms' characteristics

The estimates for the determinants of the probability of switching are shown in Table 7. The outcomes provide evidence that the probability of a firm switching its bank is determined by deal terms, firm characteristics and bank-firm relationship. In table 3, *Ln(amount)* has the significant positive effect for firms to form new borrowing deals, which says that the loan target is one of the key factors driving firms to switch. When separating the sample into switching and non-switching groups, the statistics shows that the average amount of loan in the switching group is 35.6% higher than in the non-switching group. *Duration* has a significant positive effect on the probability of switching. The average loan contract duration increase from 1.31 year to 1.73 year after switching. Since a longer contract usually implies a

[6] Lagged terms of Firm's characteristics have been selected as instrument variables except for dummy variables.

more stable relationship, it is expected that firms prefer a long and stable lending relationship. It is also the case that a longer relationship means more information filtered to the banks (Farinha and Santos, 2002). Hence the bank prefers to offer a longer contract to their new clients with good credit. The above results support *hypothesis 1*. *Collateral* has no significant effect on firms' behaviour in the regressions.

Regarding firm characteristics, *Ln(Tasset)* (firm size) shows a signification positive relationship with switching behaviour in column (2)-(6), which suggests that large firms have higher probability to form a new banking relationship. It is usually assumed that firm transparency is positively correlated with firm size (Elyasiani and Goldberg, 2004; Stephan et al, 2009), the positive relationship shows than more opaque firms are less likely to switch banks.

Asymmetric information can contribute to the lock-in power of banks. But more transparent firms can decrease the asymmetry of information and suffer less from the unobserved switching costs. This result is consistent with Stephan et al (2009) and Gopalan et al (2011) results. Another firm characteristic is *Cashflows* (cash flow ratio), which has a significant positive effect on switching banks. A high cash flow ratio is indicative of better firm performance. Firms with higher internal cash flows ratio and good performance will be less reliant on the incumbent relationship, which drive firms to a higher likelihood of switching. It is also the case that they are attractive to the 'outside' banks. These results support *hypotheses 2*.

The variable *Private-own* has an insignificant effect, which show that there is no difference in switching behaviour between state-owned or private-owned enterprise. The heterogeneity of the industries is evidenced in the regression. The regression results show that the firms in the Energy and Service industry have higher likelihood to switch banks.

Table 3: The determinants of deal terms and firms' characteristics on switching

	Pr(Switching)			
Variables	(1)	(2)	(3)	(4)
Deal terms				
Ln(amount)	0.118***	0.114***	0.112***	0.121***
	(3.951)	(3.776)	(3.724)	(4.174)
Ln(1+Duration)	0.174**	0.168**	0.172**	0.165**
	(2.095)	(2.012)	(2.073)	(1.989)
Collateral	-0.037	-0.051	-0.043	
	(-0.536)	(-0.726)	(-0.614)	
Firm characteristics				
Ln(Tasset)	0.106***	0.082**	0.084**	0.085**
	(3.058)	(2.406)	(2.500)	(2.550)
Cashflows	0.002**	0.002**	0.002**	0.002**

	(2.439)	(2.153)	(2.252)	(2.228)
Private-own	0.075	0.154	0.136	
	(0.067)	(1.342)	(1.203)	
Agriculture		0.066		
		(0.288)		
Manufacture		-0.145		
		(-1.565)		
Real estate		-0.144		
		(-1.385)		
Energy		0.316*	0.377**	0.368**
		(1.948)	(2.458)	(2.395)
Services		0.365***	0.429***	0.430***
		(3.181)	(4.223)	(4.224)
C	-4.362***	-3.373***	-3.838***	-4.010***
	(-5.594)	(-4.770)	(-4.945)	(-5.223)
Wald Chi^2	69.46	98.87	98.04	94.81
Obs	1781	1781	1781	1781
Prob: Wald test of exogeneity[7]	0.424	0.384	0.435	0.443

Note: Z statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

5.2 The propensity to form new banking relationship based on bank characteristics

This part of the analysis examines the relationship between bank characteristics and the likelihood of maintaining a lending relationship. The details of the loan deal is likely to be correlated with bank characteristics, so following the lead of Gopalan et al (2011), duration of loans[8] is not including in the following probit model with continuous endogenous (ivprobit) regressions. We control for the firms' characteristics and bank-firm relationship variables in these regressions, but do not report the results in the following table other than banks' characteristics (available on request). The results are presented in table 4.

Table 4: Post-switching bank characteristics and new banking relationship

	Pr(switching)				
Variables	(1)	(2)	(3)	(4)	(5)
MARKSH	-0.020***	-0.016***	-0.021***		
	(-3.989)	(-3.119)	(-3.965)		
MARKSH*M-S firm		-0.029***			
		(-2.681)			
BANKROA	-0.241***	-0.211***	-0.206***	-0.206***	-0.171**
	(-3.252)	(-2.838)	(-2.711)	(-2.783)	(-2.295)
Bankroa*M-S firm			-0.193***		-0.186***
			(-2.770)		(-2.692)
Large Bank				-0.268***	-0.269***
				(-4.279)	(-4.272)
NON-INTEREST INCOME RATIO	-0.093***	-0.094***	-0.092***	-0.095***	-0.094***
	(-3.601)	(-3.627)	(-3.528)	(-3.714)	(-3.650)

[7] Wald test of exogeneity do not reject the null that there is exogeneity in the regression.

[8] When bank facing liquidity crisis, they are tending to make a loan in a short term other than long term.

C	-2.887*** (-2.942)	-3.670*** (-3.491)	-4.039*** (-3.601)	-2.932*** (-3.004)	-4.043*** (-3.617)
Wald Chi[2]	105.63	111.66	110.76	106.40	112.33
Obs	1812	1812	1812	1812	1812
Prob: Wald test of exogeneity[9]	0.454	0.488	0.482	0.455	0.477

Note: Z statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

In column (1), (2) and (3), *market share* of banks shows a significant negative relationship with switching. This implies that larger the market share of the bank, the lower the probability of switching. The variable *large bank* shows a similar result in column (4) and (5). The results show that the average amount of borrowing from large commercial banks is 41.4% less than firms borrowing from smaller commercial banks. The argument is that smaller banks are more aggressive in expanding, they usually have higher propensity to lend than larger banks. The significant negative result of joint variables (market share*medium-small firms) in column (2) suggests that medium-small sized firms are more likely to form new relationships with small market share banks than large firms[10].

In table 4, the variable *Bankroa* shows a significant negative relationship with switching. This says that banks with low profitability have high propensity to lend, since interest income is the main revenue resource for Chinese banks. The significant negative results of joint variables (market share*medium-small firms) in column (3) and (5) suggest that medium-small size firms are more likely to form new relationship with this kind of bank, since they are more opaque than large firms. The results above show strong evidence of support for *hypothesis 3*. Interestingly, the results show that the higher the non-interest income ratios of bank, the lower the probability of firms switching. The argument goes that a bank that has a higher proportion of its revenue generated from non-interest services will be more able to lock-in firms with offering a bundle of services alongside loan.

5.3 Robustness check

A common finding in the literature is that small and medium sized firms in China have difficulty in obtaining financial support from banks (Lin, 2007), especially for private enterprises who do not have government connection. This could result in small and medium sized private firms have a higher likelihood of remaining with their incumbent banks. Table 5 presents some robustness checks on the previous results.

[9] Wald test of exogeneity do not reject the null that there is exogeneity in the regression.

[10] Consistent with findings of Berger et al. (2005) and Gopalan et al. (2011)

In column (1) and (2), other *Private-own* and *Private-own *M-S FIRM* variables are insignificant, which suggests the medium size and small private firms in the sample (all listed firms) have not shown significant switching preference difference with others.

Table 5: The determinants of firms switching banks

	Pr(switching)						
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Deal Terms							
Ln(Amount)	0.145***	0.157***	0.161***	0.162***	0.143***	0.144***	0.126***
	(4.518)	(5.527)	(5.679)	(5.763)	(4.699)	(4.983)	(4.407)
Ln(1+Duration)	0.122**						0.105**
	(2.247)						(2.013)
Collateral	-0.003	0.043	0.058	0.046	0.025		
	(-0.044)	(0.572)	(0.761)	(0.612)	(0.311)		
Firm Characteristics							
Ln(TASSET)	0.128***				0.094**	0.085**	0.077**
	(3.264)				(2.169)	(1.985)	(2.268)
Ln(Firmsales)		0.082**	0.075**	0.078**			
		(2.544)	(2.344)	(2.467)			
CASHFLOWS	0.002**	0.001*	0.001*	0.001*	0.002**	0.002**	0.002**
	(1.975)	(1.886)	(1.707)	(1.832)	(1.974)	(1.981)	(2.282)
Private-own	0.284	0.189	0.082		0.057		
	(1.364)	(0.941)	(0.738)		(0.507)		
Private-own*M-S FIRM	-0.252		-0.151				
	(-1.004)		(-0.635)				
Energy						0.285*	0.411**
						(1.885)	(2.768)
Services						0.294***	0.469***
						(3.460)	(4.980)
Bank characteristics							
MARKSH		-0.019***			-0.020**	-0.019***	
		(-3.775)			(-3.919)	(-3.665)	
Ln(Bankasset)			-0.121***	-0.262***			
			(-5.316)	(-4.152)			
BANKROA		-0.251***	-0.168*	-0.216***	-0.247**	-0.231***	
		(-3.334)	(-1.860)	(-2.868)	(-2.666)	(-3.190)	
NON-INTEREST INCOME RATIO		-0.089***	-0.093***	-0.091***	-0.091***	-0.095***	
		(-3.422)	(-3.622)	(-3.504)	(-3.229)	(-3.710)	
Market							
HHI					-0.0001		
					(-0.405)		
C	-5.383***	-2.853***	-1.446	-2.879***	-2.562	-2.497**	-3.979***
	(-6.176)	(-3.042)	(-1.485)	(-3.131)	(-0.812)	(-2.559)	(-5.147)
Wald Chi^2	72.74	104.55	116.51	101.06	105.87	116.09	92.89
Obs	1781	1812	1812	1812	1812	1812	1781
Prob: Wald test of exogeneity[11]	0.372	0.416	0.457	0.444	0.451	0.488	0.337

Note: Z statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

[11] Wald test of exogeneity do not reject the null that there is exogeneity in the regression.

As a robustness check, we use total sales as a proxy for firm size and total bank assets as a measure of market penetration (instead of market share). In column (3) and (4), *Firm total sales* gives the same effect as *Firm total asset* to switching behaviours, which again confirms the finding that big firms are more likely to form a new banking relationship. In column (3), the impact of *Bank asset* is significantly negative, this again is consistent with previous result that firms tend to switch to small banks.

As with other studies we add a banking market concentration variable as a control for the market structure (Herrera and Minetti, 2007; Uchida et al., 2008), to check the robustness of the results in table 7 and 8. In column (5), market concentration (HHI) shows no significant relations to switching, but other variables results are consistent with the previous regressions.

6. Conclusion

This paper finds that firm-bank switching behaviour in China conforms to the findings of other studies. Using firm-bank matched data over 1999-2012, we examine why firms switch to new banks for their repeat loans instead of staying with their relationship banks. We define a switching action as a firm borrowing from a bank which it did not have a loan relationship with in the last 12 month. Unsurprisingly, the results provide evidence that the chief determinant of switching action stems from firm credit needs, as well as firm and bank characteristics.

We find that firms usually switch banks for larger amount of loans and longer lending durations. However, collateral requirement of lending has no significant effect on firms' switching behaviour.

As large firms are usually considered less opaque than small firms (Elyasiani and Goldberg, 2004; Stephan et al, 2009), the study finds a positive relationship between firm size and the probability of bank switching. Firms that have a better ability to generate cash from its sales are more likely to form a new bank relationship, since they are attractive to banks and can easily acquire new loans.

We also find that firms are more likely to switch to small market share banks, or lower profitability banks, since these banks are more aggressive to extend their business and take risk to earn profit, which will results in more loans for firms. Banks that offer a bundled service of loan and bank services will have are more able to lock-in firms to maintain a current lending relationship.

Reference

Allen, F., J., Qian and M.J., Qian. 2006. China's Financial System: Past, Present, and Future. Working paper, No. 05-17, Philadelphia: Wharton Financial Institutions Centre.

Berger, A. N. and G.F. Udell. 1995. Relationship Lending and Lines of Credit in Small Business Finance. *Journal of Business,* 68, 351-381.

Berger, A. N. and G.F. Udell. 1998. The Economics of Small Business Finance: The Roles of Private Equity and Debt Markets in the Financial Growth Cycle. *Journal of Banking and Finance*, 22(6-8), 613-673.

Berger, A.N., N.M. Miller, M.A. Petersen, R.G. Rajan, and J.C. Stein. 2005. Does Function Follow Organizational Form? Evidence from the Lending Practices of Large and Small Banks. *Journal of Financial Economics,* 76, 237-269.

Bharath, S., S. Dahiya, A, A. Saunders, and A. Srinivasan. 2007. So what Do I Get? The Bank's View of Lending Relationships. *Journal of Financial Economics*, 58, 368-419.

Cao, W.M., J.G., Chen and J., Chi. 2010. Bank Firm Relationship and Firm Performance under a State-owned Bank System: Evidence from China. *Banks and Bank Systems,* Vol.5, 3, 68-79.

Chang, C., G.M., Liao, X.Y., Yu and Z., Ni. 2009. Information from Relationship Lending: Evidence from Loan Defaults in China. *European Banking Center Discussion Paper*, No. 2009-10S.

Cole, R.A., L.G., Goldberg and L.J., White. 1999. Cookie-cutter versus Character: The Micro Structure of Small Business Lending by Large and Small Banks. In: Blanton, J.L., A., Williams and S.L.W., Rhine (Eds.), Business Access to Capital and Credit, A Federal Reserve System Research Conference, 362-389.

Detragiache, D., P., Garella and L. Guiso. 2000. Multiple versus Single Banking Relationships: Theory and Evidence. *Journal of Finance*, Vol. LV, 1133-1161.

Diamond, D. 1989. Reputation Acquistion in Debt Markets. *Journal of Political Economy,* 97(4), 826-862.

Elyasiani, E., and L.G., Goldberg. 2004. Relationship Lending: A Survey of the Literature. Journal of Economics and Business, 56, 315-330.

Farinha, L.A., and J.A.C. Santos. 2002. Switching from Single to Multiple Bank Lending Relationships: Determinants and Implications. *Journal of Financial Intermediation*, 11, 124-151.

Farrell, J. and Klemperer, P. 2007. Coordination and Lock-in: Competition with Switching Costs and Network Effect. In: Armstrong, M., Porter, R.H. (Eds.), *Handbook of Industrial Organization,* Volume 3, North Holland.

Ferri G 2009. Are new Tigers supplanting old mammoths in China's banking system? Evidence from a sample of City Commercial Banks, *Journal of Banking and Finance*, 33, 1, 133-140

Gopalan, R., G.F., Udell and V., Yerramilli. 2011. Why do Firms Form New Banking Relationships? *Journal of Financial and Quantitative Analysis*, Vol. 46, No. 5, 1-35.

Greenbaum, S.,I, G., Kanatas and I., Venezia. 1989. Equilibrium Loan Price under the Bank-Client Relationship. *Journal of Banking and Finance* 13, 221-235.

Hao, X.C., J., Shi and J. Yang. 2013. The Differential Impact of the Bank-Firm Relationship on IPO Underpricing: Evidence from China. Asian Finance Association Annual Conference, Jiangxi, China.

Harhoff, D. and T. Körting. 1998. Lending Relationships in Germany-Empirical Evidence from Survey Data. *Journal of Banking and Finance*, 22, 1317-1353.

He, R. and W.C., Wang. 2009. Bank-firm Relationship and the Growth of SMEs: Evidence from the Value of Relationship Lending. *Journal of Finance and Economics*, Vol 35, 10, 81-91. (In Chinese)

Herrera, A.M. and R., Minetti. 2007. Informed Finance and Technological Change: Evidence from Credit Relationships. Journal of Financial Economics, 83, 223-269.

Houston, J. and C. James. 1996. Bank Information Monopolies and the Mix of Private and Public Debt Claims. *Journal of Finance*, 51, 1863-1889.

Huang C.C. 2003.The Re-creation of the Relationship between Company Listing, Lending by Relations and China's Banking. *Journal of Management World*, 12, 8-15. (In Chinese)

Ioannidou, V. and S. Ongena. 2010. 'Time for a Change': Loan Conditions and Bank Behavior when Firms Switching Banks. *Journal of Finance*, Vol. LXV, 1847-1877.

Keasey, K. and R. Watson. 1993. Small Firm Management: Ownership, Finance and Performance. *Oxford: Blackwell*.

Kim, M., D. Kliger and B. Vale. 2003. Estimating switching costs: the case of banking. *Journal of Financial Intermediation*, 12, 25-56.

Lin, Y.C., Huang, S.Y., Chang, Y.F. and Tseng, C.H. 2007. The Relationship between Information Transparency and the Informativeness of Accounting Earnings. *The Journal of Applied Business Research*, Vol. 23, 3, 23-32.

Lin, Justin. 2007. Developing small and medium bank to improve financial structure. *China Center for Economic Research*, Peking University, *working paper*. (In Chinese)

Liu, F.J. and N., Mei. 2009. Customer Retention Research of Commercial Banks based on Bank-enterprise Relations. *Journal of China Soft Science*, 3, 126-137. (In Chinese)

Ongena, S. and D.C., Smith. 2000. What Determines the Number of Bank relationships? Cross Country Evidence. *Journal of Financial Intermediation*, Vol 9, NO.1, 26-56.

Petersen, M. A. and R.G. Rajan. 1994. The Benefits of Lending Relationships: Evidence from Small Business Dara. *Journal of Finance*, 49, 3-37.

Rajan, R.G.1992. Insider and Outsiders: The Choice between Informed and Arm's Length Debt. *Journal of Finance*, 47, 1367-1400.

Sapienza, P. 2002. The Effects of Banking Mergers on Loan. *Journal of Financial*, Vol LVII, 357-384.

Sharpe, S.A. 1990. Asymmetric Information, Bank Lending, and Implicit Contracts: A Stylized Model of Customer Relationships. *Journal of Finance*, 45, 1069-1087.

Shy, O. 2002. A quick-and easy Method for Estimating Switching Costs. International Journal of Industrial Organization, 20, pp.71-87.

Stephan, A., A., Tsapin and O., Talavera. 2009. Why do Firms Switch Their Main Bank? Theory and evidence from Ukraine. *Discussion Papers of DIW Berlin 894*, DIW Berlin, German Institute for Economic Research.

Uchida, H., G.F. Udell, and W. Watanabe. 2008. Bank Size and Lending Relationships in Japan. *J. Japanese Int. Economies*, 22, 242-267.

Vesala, T. 2007. Switching Costs and Relationship Profits in Bank Lending. *Journal of Banking & Finance*, 31, 477-493.

Von Thadden, E-L. 2004. Asymmetric information, bank lending and implicit contracts: the winner's curse. *Finance Research Letters*, Elsevier, vol. 1(1), 11-23.

Wooldridge, J.M. 2009. Introductory Econometrics: A Modern Approach. South Western College, U.S.

Appendix

Table A.1: Statistical Definitions of Large, Medium-sized and Small Enterprises (newest)

Industry Branch	Index	Unit	Large	Medium-sized	Small
Farming, forestry, animal husbandry and fishing	Operating income (Y)	10,000	$Y \geq 20000$	$500 \leq Y < 20000$	$50 \leq Y < 500$
Industry	Employees (X)	People	$X \geq 1000$	$300 \leq X < 1000$	$20 \leq X < 300$
	Operating income (Y)	10,000	$Y \geq 40000$	$2000 \leq Y < 40000$	$300 \leq Y < 2000$
Construction	Operating income (Y)	10,000	$Y \geq 80000$	$6000 \leq Y < 80000$	$300 \leq X < 6000$
	Total assets (Z)	10,000	$Z \geq 80000$	$5000 \leq Z < 80000$	$300 \leq X < 5000$
Wholesale	Employees (X)	People	$X \geq 200$	$20 \leq X < 200$	$5 \leq X < 20$
	Operating income (Y)	10,000	$Y \geq 40000$	$5000 \leq Y < 40000$	$1000 \leq Y < 5000$
Retail trades	Employees (X)	People	$X \geq 300$	$50 \leq X < 300$	$10 \leq X < 50$
	Operating income (Y)	10,000	$Y \geq 20000$	$500 \leq Y < 20000$	$100 \leq Y < 500$
Transport	Employees (X)	People	$X \geq 1000$	$300 \leq X < 1000$	$20 \leq X < 300$
	Operating income (Y)	10,000	$Y \geq 30000$	$3000 \leq Y < 30000$	$200 \leq Y < 3000$
Storage	Employees (X)	People	$X \geq 200$	$100 \leq X < 200$	$20 \leq X < 100$
	Operating income (Y)	10,000	$Y \geq 30000$	$1000 \leq Y < 30000$	$100 \leq Y < 1000$
Post	Employees (X)	People	$X \geq 1000$	$300 \leq X < 1000$	$20 \leq X < 300$
	Operating income (Y)	10,000	$Y \geq 30000$	$2000 \leq Y < 30000$	$100 \leq Y < 2000$
Hotels	Employees (X)	People	$X \geq 300$	$100 \leq X < 300$	$10 \leq X < 100$
	Operating income (Y)	10,000	$Y \geq 10000$	$2000 \leq Y < 10000$	$100 \leq Y < 2000$
Catering services	Employees (X)	People	$X \geq 300$	$100 \leq X < 300$	$10 \leq X < 100$
	Operating income (Y)	10,000	$Y \geq 10000$	$2000 \leq Y < 10000$	$100 \leq Y < 2000$
Soft and scientific research, technical services	Employees (X)	People	$X \geq 300$	$100 \leq X < 300$	$10 \leq X < 100$
	Operating income (Y)	10,000	$Y \geq 10000$	$1000 \leq Y < 10000$	$50 \leq Y < 1000$
Real estate	Operating income (Y)	10,000	$Y \geq 200000$	$1000 \leq Y < 200000$	$100 \leq X < 1000$
	Total assets (Z)	10,000	$Z \geq 10000$	$5000 \leq Z < 10000$	$2000 \leq X < 5000$
Property Management	Employees (X)	People	$X \geq 1000$	$300 \leq X < 1000$	$100 \leq X < 300$
	Operating income (Y)	10,000	$Y \geq 5000$	$1000 \leq Y < 5000$	$500 \leq Y < 1000$
Leasing and Business Services	Employees (X)	People	$X \geq 300$	$100 \leq X < 300$	$10 \leq X < 100$
	Total assets (Z)	10,000	$Z \geq 120000$	$8000 \leq Z < 120000$	$100 \leq X < 8000$
No specified industry	Employees (X)	People	$X \geq 300$	$100 \leq X < 300$	$10 \leq X < 100$

Source: National bureau of statistics of China.

Table A2: List of banks in sample

Type of Bank	Name of Bank
Large commercial bank	Industrial and commercial bank of China
	Agricultural bank of China
	Bank of China
	China Construction Bank
	Bank of Communications
Joint-stock commercial bank	China Citic bank
	China Everbright Bank
	Huaxia Bank
	Guangdong Development Bank (China Guangfa Bank)
	Shenzhen Development Bank (Pingan Bank)
	China Merchants Bank
	Shanghai Pudong Development Bank
	Industrial Bank
	China Minsheng Banking Corporation
	Evergrowing Bank
	China Zheshang Bank
	Bohai Bank
City and Rural commercial bank	Bank of Beijing
	Weihai Commercial Bank
	Bank of Shanghai
	Bank of Jiangsu
	Harbin Bank
	Chongqing Rural Commercial Bank
	Bank of Ningbo
	Bank of Dalian
	Shanghai Rural Commercial Bank
	Bank of Nanjing
	Bank of Hangzhou
	Jiaxing Commercial Bank
	Wenzhou Bank
	Huishang Bank
	Bank of Jiujiang
	Baoshan Bank
	Bank of Guangzhou
	Bank of Chengdu
	Harbin Bank
Foreign bank	HSBC Bank (China)
	Bank of East Asia (China)
	Citibank (China)
	DBS BANK (China)
	Nanyang Commercial Bank (China)