

INFORMATION FROM RELATIONSHIP LENDING: EVIDENCE FROM CHINA^{*}

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ABSTRACT

We study the economic role of banks' soft information, evolved from repeated lending relationships, in the context of loan default. Using a proprietary database from one of the largest state-owned commercial banks in China, we find that the bank's internal credit rating scores substantially improve the accuracy of default prediction. While the internal credit rating incorporates firm-specific hard information such as financial ratios, it is the soft information component of these ratings that contributes to the improvement in assessing credit quality. More importantly, the relative importance of soft information over hard information depends on the depth of the lending relationship. When evaluating loan delinquency, a strong lending relationship allows soft information to substitute for, rather than complement to, the role of hard information, especially the hard information that is subject to easy manipulation by Chinese firms.

Key words: Debt default, internal credit ratings, credit risk, relationship lending

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1. INTRODUCTION

Theoretical literature on financial intermediation has long recognized the superior ability of banks in acquiring information or knowledge beyond that which is available to the ordinary financial market participants (e.g., Ramakrishnan and Thakor 1984, Boyd and Prescott 1986, Diamond 1991, and Dow and Gorton 1997). Many researchers emphasize the “soft” nature of this special knowledge in the notion that soft information is not easily and accurately conveyed, verifiable, or transferable. In contrast to the “hard” information derived from firms’ financial statements or industrial data, most researchers attribute soft information to banks’ relationships with borrowing firms (e.g., Peterson 2004). In light of the central role of the banking system in channeling capital to the real economy, however, few studies have directly examined the nature and significance of this special knowledge in predicting defaults on commercial loans.

In this paper we investigate to what extent this special knowledge can predict loan defaults, and whether it complements or substitutes for any particular type of hard information in accessing credit delinquency. We obtain a unique dataset from a major Chinese state-owned bank containing information of all loans offered to, and proprietary credit rating scores assigned to, Chinese firms during the period of 2003-2006. To extract the firm-specific soft information component from the bank’s private credit rating score, we follow Agarwal and Hauswald (2008) and orthogonalize the credit rating with the firm’s financial factors. We then compare the effectiveness between the soft and hard information in predicting loan defaults.

We first validate the comparability of our data by investigating whether the loans in our sample are commercially driven or are policy-oriented, and whether the adoption of an internal

credit system substantially improves the loan quality. Since 2002, major state-owned commercial banks in China have embarked on a series of reforms, which have generally gone through the following four stages: financial reorganization, injection of new capital by the state, introduction of foreign strategic investors, and eventual IPOs. Amid the banks' financial reorganization efforts is the introduction of an internal credit rating system. Concurrently, the average non-performing loan (NPL) ratio of the major commercial banks in China decreased from 18% in 2002 to 5% in 2007. Nevertheless, doubts remained about the effectiveness of these banking reforms and subsequently, the competence of China's state-owned banking system.

Using the data on our sample bank's internal credit ratings and default rates on its short-term loans made to 1,450 firms in 5 industries over a two-year period, we evaluate the effectiveness of the internal credit rating system in the context of loan default.¹ We find a substantial decline in loan defaults by Chinese firms after the implementation of an internal credit rating system. In addition, internal credit ratings are significantly related to the commonly used firm-specific financial ratios in predictable ways, and changes in these financial ratios lead to changes in credit ratings. These findings suggest that, at least with regard to credit ratings, loan decisions by Chinese banks are based on commercial principles instead of government policies, which may have contributed to their overall performance improvement in recent years.

Our analysis also reveals that after including internal credit ratings, the majority of the commonly used financial ratios are no longer significant in predicting loan defaults. Since this finding suggests that internal credit ratings not only incorporate, but also largely subsume, firm-specific hard information, we next investigate to what extent the improvement in loan quality is

¹ In a companion paper, we investigate other potential factors responsible for the decline of NPL ratio in Chinese banks.

due to the bank's soft information arising from extensive borrowing/lending relationships, instead of relying on firm-specific hard information.

The unique setting of China's banking system and the richness of our dataset allows us to construct three proxies to identify the degree of banking relationship for each firm. Our primary proxy is based on a firm's ownership, in which we classify a firm as either state-owned or non-state-owned. Since the evolution of the banking relationship for state-owned firms is historically mandated by the Chinese government, this proxy is relatively exogenous and thus mitigates the endogeneity of matching between a firm and its bank that typically affects such studies (Berger, Miller, Petersen, Rajan, and Stein 2005). In estimating the role of soft information generated from a repeated lending relationship, we also construct two alternative proxies, one being based on the frequency of corporate borrowing and the other on the length of the lending relationship.

We document that the bank's internal credit ratings contain useful information beyond that which is conveyed by the commonly used financial and industrial variables. This soft information, captured by the residual component of the internal credit rating that is unpredictable by these variables, is statistically and economically significant in forecasting loan defaults. Our result thus provides evidence in support of the theoretical arguments that banks possess special knowledge in assessing credit quality.

Furthermore, we find that for state-owned firms, firms that borrow more frequently from the bank, and firms that have a longer period of banking relationship, the majority of proxies for hard information are no longer significant once the soft information component of internal credit rating is included. By contrast, for firms that are not state-owned, borrow less frequently from the bank, or have a shorter period of banking relationship, most proxies for hard information remain significant even in the presence of the bank's soft information. Our findings indicate that

the extent to which soft information dominates hard information depends on the depth of the lending relationship, and that an extensive lending relationship allows soft information to substitute for, rather than complement to, the role of hard information in evaluating loan delinquency.

Interestingly, for firms that maintain a long-term or frequent relationship with the bank, it is the hard information that can be easily manipulated by Chinese firms, such as ROA and sales growth, that is displaced by the bank's soft information. In contrast, the hard information that is not subject to easy manipulation, such as size and degree of regional economic development, remains significant in predicting loan defaults even after the inclusion of the bank's soft information.

Our paper contributes to the finance literature analyzing the role of hard and soft information in bank lending. Most of the literature focuses on small business financing and on loan underwriting and pricing (e.g., Petersen and Rajan 1994, Berger and Udell 1995, Scott 2004, Uchida, Udell and Yamori 2007, and Cerqueiro, Degryse and Ongena 2008). Instead, we study the role of soft information in the context of loan default. Our research design and unique dataset allow us to disentangle the soft information that is ascertained through repeated lending relationships from the one being driven either by bank competition and relative size or by geographical proximity. In addition, we directly assess the importance of banks' soft information for large firms and industrial loans, which is usually absent from the literature.

Our paper is related to Grunert, Norden, and Weber (2005) who find that the combined use of financial and non-financial factors of credit rating scores predicts more accurately loan defaults by German firms than the use of either financial or non-financial factors alone, and to Agrawal and Hauswald (2008) who document that the soft information component of a credit

rating predicts loan defaults of small firms. Differing from the former, we show that soft information evolved through extensive lending relationships not only improves default prediction, but also prevails over the effect of financial factors. Differing from the latter, we establish that soft information plays an important role for large firms and large loans, despite the fact that there tends to be more hard information about large firms. In addition, we show that the effect of soft information is more profound in the presence of a stronger lending relationship.

Our paper is also related to the literature analyzing how financial and industrial factors predict corporate bankruptcy (e.g., Altman 1968). Instead, we focus on loan default. Our findings complement this literature by indicating that hard information, derived from firm's financial statements, predicts not only a firm's bankruptcy but also short-term loan delinquency.

The rest of the paper is organized as follows. Section 2 discusses institutional details about China's banking system and recent banking reforms, and the uniqueness of our research setting. Section 3 describes our sources of data. Section 4 reports the results on the determinants of loan default and internal credit rating. Section 5 discusses various tests for robustness. Section 6 concludes.

2. CHINA'S BANKING SYSTEM AND RESEARCH SETTING

2.1 The role of the big four

In an attempt to model after the Soviet in which a centralized banking system is used to support a central planning economy, China established the People's Bank of China (PBOC) in December of 1948. Prior to 1978, the PBOC served as both a central bank and a commercial bank.

In 1978, China embarked on a market-oriented economic reform. Accordingly, four state-owned banks – the Agricultural Bank of China, the Bank of China, China Construction Bank, and the Industrial and Commercial Bank of China – were established during the period of 1979-1984. The so-called “big four” serve financing needs from four respective sectors: agriculture, foreign trade, infrastructure construction, and manufacturing industries. After 1984, however, each of the “big four” was allowed to broaden the scope of their operations into other banks’ sectors amid China’s effort to introduce competitions among banks.

Throughout the time the firm-bank relationship is mandated by the government instead of driven by commercial principles. Most of the state-owned banks’ loans were originated to state-owned enterprises (SOEs) based on political and policy considerations. With the concerns for social instability accompanied with rising unemployment, loans are continuously granted by the banks to pay workers’ compensations despite that SOEs remain unprofitable and non-competitive. Consequently, non-performing loans (NPLs) piled up on banks’ financial statements.

From 1986 to 1996, approximately 11 more banks, including the Bank of Communication, China Merchants’ Bank, Pudong Development Bank, and Shenzhen Development Bank, were established in order to increase the competitiveness of the China’s banking industry. These banks are usually jointly owned by several legal entities such as local governments and enterprises. Although the legal entities are usually state-owned, these “joint-stock” banks are smaller, albeit more efficiently run, than the big four state-owned banks.

In 1995, the State Council of China announced that credit unions – previously existed in many Chinese cities – can no longer be transformed into city cooperative banks through equity contributions from local governments, enterprises, and local citizens. During the same year, China passed the “Central Bank Law” and “Commercial Bank Law”, explicitly specifying the

functions, rights and duties between the central bank (PBOC) and commercial banks. In 2003, China established the Banking Regulatory Commission to take over part of the regulatory duties previously held by the PBOC. In turn, the PBOC focuses on its macroeconomic and monetary responsibilities.

China permits foreign banks to conduct business in the mainland China starting 1979. Initially, most of the foreign banks' business is restricted to foreign currency exchange. As a precondition to join the WTO, China pledged the commitment to open its domestic currency (RMB) business to all foreign banks by 2006.

2.2 The reform of China's commercial banks

Mounting non-performing loans have long plagued the financial statements of China's commercial banks, especially the "big four". In 1997, 30% of all the loans outstanding were NPLs. By 2003, this ratio was still as high as 20%. The high percentage of NPLs was usually attributed to (1) the government's direct or indirect ownership and control of commercial banks to pursue its political and policy agendas, (2) inefficient operation and soft budget constraint associated with some SOE borrowers, and (3) ineffectiveness in enforcing the bankruptcy law.

The Chinese government has since initiated a series of reforms to curb the increasing risk associated with the high level of NPLs. In 1998, 270 billion RMB was injected by the Finance Ministry to replenish the deteriorating capital of the big four state-owned banks, followed by a transfer of 1.4 trillion RMB NPLs (at their face value) from these banks to the corresponding four newly created Assets Management Companies in 1999.

As the next step of the reform, the government "corporatizes" the state-owned banks by introducing foreign strategic investors and then listing these banks on the Hong Kong Stock

Exchange and/or Shanghai Stock Exchange. In late 2003, the government injected \$22.5 billion each into the Bank of China and China Construction Bank as equity capital, and corporatized the two as joint-stock commercial banks. In 2004, Royal Bank of Scotland, UBS, Bank of America, and TEMASEK took minority equity positions in these two banks as strategic investors. China Construction Bank went public in 2005. The state retained a controlling stake (67.49%) of the bank after its listing on the Hong Kong Stock Exchange. After the Bank of China's IPO in both Hong Kong and Shanghai in 2006, the state's equity stake was 59.12%.

In 2005, \$15 billion were used to capitalize the Industrial and Commercial Bank of China (ICBC), which was then reorganized and corporatized. Goldman Sachs, Allianz, and American Express bought a total of 8.44% of its equity. ICBC became publicly traded on the Hong Kong and Shanghai stock exchanges in 2006. After its IPO, the state controls 72.47% of the shares.

Many believe that the banking reforms since 2003, including bank restructuring, introduction of strategic investors, and public listings, have fundamentally changed the corporate governance and risk management practices of Chinese state-owned banks. A direct consequence is the lower NPL ratios.

2.3 Chinese banks as a research setting

We obtain a large dataset from one of the big-four state-owned commercial banks in China. With 2.5 million corporate customers and 150 million individual customers, our bank maintains a dominating lending position in China. As of 2006, it had assets of RMB 7,055 billion (US\$893 billion), with over 18,000 outlets including 106 overseas branches and agents globally. In July 2007 after a strong gain in its share price, the bank became the world's most valuable bank with a market capitalization of US\$254 billion.

The research setting offers several unique features. Banks play a dominating role in China's financial system. In 2004 alone, bank loans account for 83% of external capital raised by non-financial firms, in comparison with 5% of external capital raised from equity market and 12% from public debt market. Unlike many other developed countries, where bank lending is predominant among small businesses, Chinese firms rely mainly on bank financing regardless of the scopes and scales of their operations.

Within China's banking system, the big four state-owned banks dominate the loan market. By the end of 2004, the "big four" account for 55% market share in terms of asset scale. The impact of competitions from other banks is at most marginal. This mitigates the issues of bank size and competition that commonly affect such studies.

The unique setting of China's banking system also allows us to concentrate on the nature and role of firm-specific soft information obtained by the bank from its long-term and repeated lending relationships. Our primary proxy for the degree of banking relationship is based on whether or not a firm is state-owned.² With the banking relationship for state-owned firms being historically mandated by the Chinese government, this proxy is relatively exogenous and consequently, mitigates the endogeneity of matching between a firm and its bank that typically affects such studies (Berger, Miller, Petersen, Rajan, and Stein 2005). In addition, the state-ownership historically mandates the mapping of a nationwide distribution of bank branches. Since the backbone of our bank's branch network was originally set up exogenously, instead of evolving endogenously based on the regional economic development as in previous studies for

² Our paper studies how information arising from long-term or repeated lending relationships affects defaults on outstanding loans. The impact of information on loan approvals or rejections, though an interesting issue, is beyond the scope of the paper. By focusing on the prediction of loan defaults instead of loan approvals, state-ownership as a proxy for lending relationship is not affected by whether loans are granted for political or policy considerations.

developed economies, the soft information in our analysis is less likely to be driven by distance, but rather through repeated lending.

3. DATA DESCRIPTION

3.1 Data sources

We obtain a large dataset from one of the big-four state-owned commercial banks in China, which consists of year-end information on all the outstanding loans made to 15 subcategories of five manufacturing industries from 2003 to 2006. For each loan outstanding, our dataset contains information on its principal amount, maturity date, the province in which the loan was originated, interest rate, repayment status if the loan is due during the year, the borrowing firm's financial statements, ownership structure, and the industry where the firm operates.³ Starting 2004, the bank implemented an internal credit rating system.⁴ A borrowing firm is assigned with a credit rating score ranking from 1 to 12, with 1 being the lowest (poorest credit quality) and 12 the highest (highest credit quality). Our dataset thus also contains all rating information between 2004 and 2006.

For each loan outstanding, its repayment status will be noted by the bank at the end of the following year in one of the following categories: repaid, unpaid, and written off. To ensure the conservativeness of our analysis, we define a loan in the stage of default if the principal is unpaid

³ Our bank maintains an industry classification system similar to the Industrial Classification for National Economic Activities from the Bureau of Statistics.

⁴ Most banks in the United States have had internal credit ratings for at least since the 1980s. Note also that internal credit rating differs from credit scoring. Small business credit scoring (SBCS) in the United States was introduced in 1995 and applies to only micro business loans. By basically adapting consumer lending practices to micro business lending, credit scoring is mostly focused on using mercantile ratings and consumer credit bureau reports on the entrepreneur. It is best viewed as a subset of internally rated loans. In the case of SBCS, the entire loan underwriting process is limited to the score. Several studies have shown that the implementation of SBCS improves small business lending (Frame, Srinivasan, and Wooseley 2001 and Berer, Frame and Miller 2005). China introduces the internal credit rating system to its banks following the economic reforms. However, there is still a lack of development of credit scoring for either small businesses or consumers.

or written off by the due date. Since this definition is essentially restricted to whether the loan is repaid on time, it is narrower in the sense that other violations of loan covenants are not considered as default.

Our dataset contains 40,740 bank loans made between 2003 and 2006. There are 13 ownership categories for the borrowing firms in our sample, including state-owned, collectively-owned, state-controlled (in which the state has a controlling stake), collectively-controlled (in which a collectively-owned entity has a controlling stake), foreign-owned and joint ventures, privately-owned, proprietorship, and joint-stock companies. We remove 2,667 loans borrowed by collectively-owned and collectively-controlled firms due to their ambiguous nature,⁵ as well as loans borrowed by firms with missing ownership information.

In what follows, we first provide a general description of loan characteristics for our overall sample. We then discuss our sample selection procedure for the regression analysis on internal credit ratings. For the descriptive analyses of the overall dataset, we include short-term loans that are originated during a given calendar year with a specific maturity date in the next calendar year. In our regression analyses, with only the end-of-year data available, short-term loans made and repaid in the same calendar year are not included in the sample unless there is a default because they do not pass through the end of year. Among loans that mature less than one year, our sample is limited to those that are originated on and after July 1st of a given calendar year with a maturity exceeding six months.

3.2 Loan sizes and interest rates for Chinese firms

⁵ The ambiguous nature of collectively-owned firms and their unique ownership arrangements are discussed and analyzed in details in Chang and Wang (1994).

Table 1 reports the summary statistics for loan sizes over our sample period. We observe that short-term loans constitute the major source of funding for Chinese firms. In fact, on average 95% of loans in our sample have a maturity of one year or less, accounting for 84.45% of the aggregate outstanding principals. By contrast, loans of medium or long-term maturity, as well as firms receiving such kind of loans, are dramatically rare. Loans with maturity exceeding one year account for only 15.54% of total outstanding principal.

Panel A of Table 1 also compares loan size characteristics between state-owned and non-state-owned firms. While the number of non-state-owned firms receiving bank financing far exceeds the number of state-owned firms, and the number of short-term loans (maturity of one year or less) originated to non-state-owned firms is higher, state-owned firms receive on average larger principal amount than non-state-owned firms. Starting 2004, the year when our bank introduced its internal credit rating system for individual firms, there is a steady increase in number of firms without state background securing short-term, medium-term, and long-term loans, and in number of loans as well as principal amount initiated for such kind of firms. On the other hand, there is a steady decrease in both number of firms being funded and number of loans and principal amount initiated for state-owned firms. Despite that state-owned firms overall borrow at a larger amount than non-state-owned firms, especially for loans of long-term maturity, the gap between the two diminishes. In 2006, both types borrow almost equal amount.

Panel B of Table 1 reveals that bank branches and borrowers may cluster in certain areas based on local economic conditions. We classify a province where our bank's branches reside as a region of high, medium, or low economic development if its average GDP per capita in 2005 exceeds 20,000 RMB Yuan, between 10,000 and 20,000 RMB Yuan, or below 10,000 RMB Yuan. Majority of our sample firms come from regions of high economic development. The

number of short-term loans made to firms from these regions significantly exceeds that for firms from less developed regions. In addition, starting 2004, there is an increase in the number of firms being funded, number of loans and total loan principal over time. By contrast, the number of firms being funded and the number of loans initiated in the regions of medium and low economic development have been mostly decreasing during our sample period.

Table 2 reports the descriptive statics of average interest rates that the bank charges on loans, based on loan maturity, firm ownership and regional economic development.⁶ Since a firm may borrow multiple loans, we calculate the weighted average interest rate for each firm. Panel A shows that state-owned firms consistently benefit from their long-term relationships with the bank, as they enjoy significantly favorable interest rate on their bank loans than firms without state ownership, regardless whether the loan is short-term or medium-term. For example, the average interest rate for one-year loan in 2003 is 24 basis points lower if the borrower is a state-owned firm (5.84% for a state-owned firm versus 6.08% for a non-state-owned firm). More importantly, this disadvantage of higher cost of bank financing for firms lack of a long-term relationship with the bank exacerbates over time and for loans of all maturities. To illustrate, the 24 basis point difference in the one-year loan interest rate in 2003 rises to 40 basis points in 2004, 48 basis points in 2005, and reaches 73 basis points in 2006. This evidence is consistent with Berger and Udell (1995) who document that small business borrowers with longer-banking relationship pay lower interest rates in the United States.

⁶ Loan interest rates tend to be noisy. To mitigate the impact of data errors, we check whether the reported interest rate of a loan falls within the permissible range surrounding the basic interest rate of the same maturity set by the central bank of China at the date of loan initiation. We remove 6,063 loan observations (16% of all loans) if a loan's interest rate falls beyond the permissible range. Our sample hence contains 32,010 loan observations. We wish to point out that this approach over-estimates the potential data error associated with loan interest rates in our sample because of the wide-spread policy-oriented (favorable) interest rates in China. That is, our 32,010 loan observations do not contain policy-based interest rates.

Panel B of Table 2 indicates that on average loans initiated in regions of high economic development tend to have a higher interest rate than those initiated for firms from regions of medium or low economic development. This is consistent with the results of Panel A since the fraction of state-owned firms tends to be lower in regions of high economic development.⁷

3.3 Crediting rating and loan default rate

Table 3 reports the summary statistics for the bank's internal loan rating and default rate. Starting 2004, the bank implemented an internal credit rating system and assigns a firm with a credit rating score, ranging from one to 12, with 12 being the highest credit quality rating. Panel A reveals that internal credit rating for firms borrowing short-term loan generally increases from 2004 to 2006. Since short-term loans constitute the majority of loans outstanding, this indicates an overall improvement in loan quality during the sample period, probably due to a tougher and more skilled screening process by the bank for the borrowers.

Accordingly, we observe that 14.71% of firms with loans of less than one year maturity and 16.97% of firms with one year loans originated in 2003 are in the stage of default by 2004. After the installment of the internal credit rating system there is a sharp decline in loan defaults despite that the number of short-term loans has increased. For example, 13.03% of firms with one year loans originated in 2004 – the year after the internal credit rating system is in place – are in the default stage by 2005, a 23% drop. Furthermore, only 4.37% of firms with one year loans are in default in 2006.

⁷ During the sample period of 2003-2006, 7.4% of firms in regions of high economic development are state-owned firms, while 40% of firms in regions of medium economic development and 37.6% in regions of low economic development are state-owned firms. The fraction of state-owned firms decreases over time, regardless of the level of economic development. For example, the proportion of state-owned firms decreases from 13.2% in 2003 to 4.3% in 2006 in regions of high economic development. The fraction decreases from 47.7% in 2003 to 32% in 2006, and from 42.7% in 2003 to 30.5% in 2006, in regions of medium and low economic development, respectively.

When partitioning the sample into state-owned and non-state-owned sub-samples, Panel A suggests that it is the state-owned firms that attribute to this overall improvement in loan quality. At the time when the bank initiated the internal rating system, state-owned firms on average have significantly lower rating scores – therefore poorer credit quality – than non-state-owned firms for loans with a maturity of less than one year (7.377 for state-owned firms versus 7.921 for non-state-owned firms). Over time, however, loans initiated to state-owned firms consistently rate higher than those for non-state-owned firms, especially over longer maturities. For example, the average internal rating score for loans with medium maturity (more than one year but less than five years) in 2006 is 1.44 higher for state-owned firms (10.026 for state-owned firms versus 8.587 for non-state-owned firms). The difference is also statistically significant.

Panel A of Table 3 also indicates that consistent with the improvement in credit rating of short-term loans over our sample period, there is a decline in loan defaults for all sample firms. However, the decline is more dramatic for state-owned firms: 25.7% loans of less than one year maturities are pass-due in 2004, whereas in 2006 only 3.1% of such loans are pass-due. In addition, while state-owned firms on average have a significantly higher default rate on short-term loans than non-state-owned firms in 2003, the difference between the two groups of firms is no longer statistically significant in 2005.

Panel B of Table 3 reveals that loans initiated for firms from the regions of medium or low economic development do not necessarily rate lower than those of high economic development. In fact, loans initiated for the regions of medium economic development in 2006 on average have a higher quality than those of high economic development. Since there is a higher fraction of non-state-owned firms in the regions of high economic development, this

result is consistent with our finding that state-owned firms have better credit quality than non-state-owned firms, especially after 2004.

Panel B shows that the loan default rate is lowest in the regions of high economic development, probably driven again by the highest fraction of non-state-owned firms in such regions. Nevertheless, all three regions of economic development experience a decrease in loan default rate. This indicates that despite the potential clustering of bank branches and borrowing firms based on local economic conditions, the implementation of a nation-wide credit rating system leads to an overall decline in loan default.

4. DETERMINANTS OF LOAN DEFAULT AND INTERNAL CREDIT RATING

We now explicitly examine the economic role of the bank's information, captured by its private credit rating score, in the context of predicting loan default. By restricting our attention to a sub-sample containing short-term loans, default status, internal rating scores, and firms' financial information, we attempt to identify firm-specific factors that can potentially affect the incentive to default. We then investigate whether credit rating scores have additional predictive power after controlling for firm-specific factors known to affect default propensity.

Next, we explore the information content of the bank's internal credit rating by examining whether these ratings take into account of firm's fundamentals, and whether there is any evidence that the bank possesses additional proprietary information in evaluating credit delinquency. By parsing the rating score into a "hard" information component and a "soft" information component, based on the predicted and unpredicted components of credit rating score with respect to firm's fundamentals, we examine whether the soft information component has any predictive power. Since a bank's soft information evolves from its lending relationship

with the firm, we further investigate whether the role of soft information differs between state-owned and non-state-owned firms.

4.1 Sample selection

We begin by extracting a sub-sample of loan data based on the following filtering criteria. In 2004, our bank established and implemented its nation-wide comprehensive internal rating system. Since our loan sample ends in 2006 and some loans initiated in 2006 require payment information in 2007, we restrict our regression analysis to the sample containing short-term loans with a maturity date no later than 2006.

We concentrate on loans with short-term loans (maturity of one year or less). This is because to identify default status for medium and long-term loans requires information extended beyond one year. To avoid over-estimating default rate, for loans with a maturity less than one year, we only include those initiated on and after July 1st of year 2004 and 2005 with a maturity exceeding six months, which allow us to identify their default status during the period of 2005-2006. This yields a sub-sample of 2,878 firm-year observations.

We remove 428 observations with missing internal rating scores, 167 observations with missing financial statement information, 220 observations due to missing sales growth rate. Our final sample contains 2,063 observations. The detailed variable descriptions are in provided in Appendix I.

Table 4 summarizes firm characteristics between firms that defaulted on their loans and those that did not. The average internal credit rating is 8.089 out of 12. However, there is preliminary evidence that bank's internal credit rating predicts loan default as the rating differs depending on whether or not the loans are in subsequent default stage. For example, among loans

initiated in 2004, those that were in default in 2005 have an average internal credit score of 5.38 associated with the borrowers, compared to the average score of 8.30 for those that were not in default. Firms defaulting on their loans also have a significantly higher degree of leverage, poorer profitability (measured by return on assets, or ROA), lower asset turnover, and smaller cash reserves. In addition, default characteristics are similar between state-owned firms and non-state-owned firms.

4.2 Does hard information predict loan default?

We start with a correlation analysis to identify the relationship between firms' hard information – fundamental factors derived from their financial statements – and the subsequent loan defaults. Table 5 suggests that a higher loan default rate is correlated with smaller asset base, greater leverage, and poorer operating performance in terms of ROA, asset turnover, cash reserve, and sales growth. Loan default rate is also related to internal credit rating, regardless of whether or not the loan is originated to a state-owned firm, and the degree of economic development.

Next, we explicitly explore this relationship with the following probit regression model:

$$\Pr(\text{Default} = 1) = \beta_0 + \beta_1 \text{Size} + \beta_2 \text{Leverage} + \beta_3 \text{ROA} + \beta_4 \text{AssetTurnover} + \beta_5 \text{Cash} + \beta_6 \text{SalesGrowth} + \beta_7 \text{State} + \beta_8 \text{State} \times \text{Size} + \beta_9 \log(\text{GDP}) + \gamma_{\text{industry}} + \lambda_{\text{year}} + \varepsilon \quad (1)$$

Our dependent variable is a dummy variable equal to one if a firm is in the stage of defaulting its loan, and zero otherwise. Our independent variables include lagged firm-specific factors that could affect the default propensity: size, leverage, return on assets, asset turnover, cash reserve, sales growth, and a dummy variable equal to one if the firm is state-owned.⁸ We

⁸ In 2005, among the 1,066 firms in our sample we observe 12 firms changed their ownership from state-owned to non-state-owned. Excluding these 12 firms does not alter our findings.

include $\log(\text{GDP})$ to control for potential clustering of bank branches and borrowing firms based on local economic conditions. We also include industry and year fixed-effects, $\gamma_{industry}$ and λ_{year} .

Table 6 reports the probit regression results. For each variable we report both the coefficient estimate and the marginal effect. z-statistics based on robust standard errors are in parentheses. Model 1 indicates that hard information, captured by a firm's fundamentals, can significantly predict loan default. Specifically, firms with larger asset base, lower leverage, higher profitability, faster asset turnover, larger cash reserves, and operating in the regions of more advanced economic development tend to have a lower propensity of default.

We observe similar findings from Models 2 through 4 after controlling the dummy for state-owned firms, the interaction between state-owned firms and size, and year and industry fixed-effect, respectively. In addition, Model 3 shows that the coefficient of the dummy variable for state-owned firms is positive and significant, suggesting that *ceteris paribus*, state-owned firms have a higher default propensity. Model 4 reveals that the coefficient for the interaction term between the dummy and size is negatively significant. While state-owned firms tend to have a higher probability of default, this probability declines if such firms have a large asset base.

4.3 Does internal credit rating have any additional predictive power for loan default?

Results from the previous section indicate that factors affecting the probability of default have the expected signs. Default is less likely if a firm is large, more profitable, having faster turnovers and lower leverage, and is from a region of higher economic development. In this section, we examine whether the bank's internal credit rating, implemented nation-wide for all the branches, has any additional predictive power for loan default. Specifically, we include the bank's internal credit rating score in (1):

$$\Pr(\text{Default} = 1) = \beta_0 + \beta_1 \text{Rating} + \beta_2 \text{Size} + \beta_3 \text{Leverage} + \beta_4 \text{ROA} + \beta_5 \text{AssetTurnover} + \beta_6 \text{Cash} + \beta_7 \text{SalesGrowth} + \beta_8 \text{State} + \beta_9 \text{State} \times \text{Size} + \beta_{10} \log(\text{GDP}) + \gamma_{\text{industry}} + \lambda_{\text{year}} + \varepsilon \quad (2)$$

Table 7 reports the probit regression results. Models 1 and 2 suggest that controlling for local economic development as well as year and industry fixed-effects, internal credit rating is significantly negatively related to the probability of default. Specifically, one level increase in the internal credit rating (higher score) leads to a 2.2% lower probability of default.

Models 3 and 4 reveal that including the internal credit rating variable leads to a sharp increase in the overall fit of the probit model, as the McFadden's R^2 jumps 31%, from 0.197 (Model 4, Table 6) to 0.287 (Model 4, Table 7). This suggests that internal credit rating can substantially improve the prediction for loan default. In addition, including the firm-specific hard information such as fundamental factors as well as year and industry fixed-effects does not alter our findings. Internal credit rating scores continue to be both statistically and economically significantly associated with the default propensity.

Interestingly, Models 3 and 4 show that once the internal credit rating is included, most of firm-specific hard information – fundamental factors identified in the previous section to help predict the probability of loan default, such as firm size, leverage, profitability, and asset turnovers – is no longer statistically significant. This suggests that internal credit rating scores subsume the effect of these factors.

We also observe from Model 4 that the coefficient associated with the dummy for state-owned firms is no longer significant after including the internal credit rating variable and the coefficient for the interaction term between the dummy and size becomes marginally significant. This is in contrast with the results of Model 4, Table 6, where both coefficients are significant at 5%. This comparison provides limited evidence that internal credit rating is more informative about state-owned firms, with whom the bank tends to have a long-term relationship.

4.4 The information content of internal credit rating

4.4.1 Does internal credit rating take into account firm-specific hard information?

The results from Table 7 show that the bank's internal credit rating scores are significantly related to the probability of default. Including these rating scores also leads to most fundamental factors no longer significant, suggesting that internal credit rating scores incorporate the majority, if not all, of firm-specific hard information.

To explore the information content embedded in the internal credit rating scores, we first examine our sample firms' characteristics based on the terciles of internal credit rating for year 2004 and 2005, respectively. Panel A, Table 8 presents evidence that internal credit rating is associated with firm fundamentals: Firms falling into the top tercile level of credit ratings tend to have significantly larger asset base, lower leverage, better performance (such as higher ROA and higher sales growth), and greater cash reserves than firms of inferior credit quality.

We now formally examine how the bank's internal credit rating score takes into account of firm fundamental factors in a regression framework as follows:

$$\begin{aligned} Rating = & \beta_0 + \beta_1 Size + \beta_2 Leverage + \beta_3 ROA + \beta_4 AssetTurnover + \beta_5 Cash \\ & + \beta_6 SalesGrowth + \beta_7 State + \beta_8 State \times Size + \beta_9 \log(GDP) + \gamma_{industry} + \lambda_{year} + \varepsilon \end{aligned} \quad (3)$$

The OLS results from Panel B of Table 8 confirm our findings in Panel A that internal credit ratings do take into account firm-specific fundamental factors expected to affect loan default. Models 1 through 3 suggest that these proxies for hard information together explain approximately 40% of a firm's internal credit rating. Intuitively, larger asset base, lower leverage, greater profitability, faster asset turnover, higher level of cash reserve and sales growth lead to better credit quality and more favorable credit score. While state-owned firms on average are

associated with low credit rating scores, this effect is more pronounced for firms of smaller size, as the coefficient associated with the interaction term is positive and significant.

Models 4 and 5 of Panel B, Table 8 show that for the state-owned firms, firm-specific fundamentals are able to explain over 60% of the internal credit ratings, whereas they can explain only 36% for firms without state background. This suggests that financial information is more credible for firms that maintain a long-term banking relationship, and therefore is taken into account to a greater extent by the bank. In contrast, financial information from firms that do not maintain a long-term banking relationship is less influential when the bank sets its internal credit rating scores.

In Table 9 we adopt a difference-in-difference analysis and examine whether a change in firm-specific hard information such as a firm's fundamental characteristics causes a change in the internal credit rating. Panel A reveals that firms with an improved internal credit rating have previously experienced a significant increase in their asset base and operating performance such as ROA and asset turnover. They are also associated with a significant decrease in leverage. In contrast, firms with a subsequent decrease in internal credit rating have experienced a significant increase in leverage and a decline in ROA and asset turnover.

Next, we employ the difference-in-difference analysis in a regression framework. In the OLS regression, the dependent variable is the change in the internal credit rating. In the ordered probit regression, the dependent variable takes a value of 1 if a firm's internal credit rating improves from 2004 to 2005, or from 2005 to 2006, -1 if deteriorates, and 0 otherwise.

Panel B of Table 9 reports the regression results. We observe that a change in asset base, leverage, and operating performance is significantly related to a subsequent change in internal credit rating. The ordered probit result suggests that an increase in asset base and operating

performance measured by ROA leads to a higher internal credit rating, while an increase in leverage leads to a lower rating.

To summarize, our multivariate regression analysis and difference-in-difference analysis indicate that the bank's internal credit rating takes into account of firm-specific hard information such as firm's fundamental factors previously identified to predict loan default. In addition, these factors matter more if the firm has a long-term relationship with the bank.

4.4.2 The role of bank's soft information

Our findings in Tables 7 through 9 suggest that being able to explain less than 42% of the internal credit rating, firm-specific hard information – captured by firms' fundamentals – is not sole determinant of the bank's internal credit rating. In addition, results from Table 6 indicate that including internal rating score leads to a sharp improvement in predicting subsequent loan default, even in the presence of known fundamental factors. This suggests that the bank possesses superior informational advantage when evaluating loan defaults.

We follow an approach similar to Agarwal and Hauswald (2008) and parse the internal credit rating into a hard information component and a soft information component, which we define statistically based on the fundamental information available from a firm's financial statements during the period the rating score is assigned. Specifically, we obtain the fitted values and residuals of the internal credit rating score from Model 3, Table 8. In this case, Bank Specialty, measured by the residual component of the internal credit rating, captures the soft information arising from the bank's own assessment, monitoring, knowledge and experiences.

To examine whether the bank's soft information matters in predicting loan defaults, we re-run regression (2) by replacing internal credit score variable with Bank Specialty. Table 10

reports the probit regression results for state-owned and non-state-owned firms, frequent and infrequent corporate borrowers, and for new and old borrowers, respectively.

The first two columns of Table 10 show that the bank's soft information is significantly related to default propensity. The negative coefficient for Bank Specialty suggests that more favorable proprietary information leads to a lower probability of default. In terms of the overall fitness of the model, we observe that the bank's soft information component is less noisy, or has at least equal, if not greater, power in predicting loan default as the internal credit rating. This is because the R^2 for both sub-sample firms exceeds 0.29, slightly higher than the R^2 from Models 3 and 4 of Table 7, where internal credit rating instead of Bank Specialty is used in the probit analyses.

Interestingly, we observe that for state-owned firms, almost all the proxies for hard information are no longer significant after including Bank Specialty. This suggests that the bank's soft information, arising from long-term lending relationships, substitutes almost all the hard information, and is almost capable of predicting loan defaults alone. In contrast, for the non-state-firms where such a profound lending relationship rarely exists, Bank Specialty is unable to prevail over hard information such as financial ratios derived from financial statements. The majority of firm-specific fundamental factors remain statistically significant even in the presence of Bank Specialty. This suggests that the lack of a long-term lending relationship leads to the soft information possessed by the bank less capable of evaluating loan defaults.

We observe similar results from the rest of Table 10 when alternative proxies are used to capture the depth of the existing lending relationship. The bank's soft information prevails over hard information for firms that borrow frequently from the bank, and for firms that begin their borrowing relationship early.

Interestingly, the proxies for hard information that consistently remain insignificant across all three classifications of long-term lending relationships are ROA and Sales Growth.⁹ Relatively to other proxies for hard information, these two are more difficult to verify and can be easily manipulated by Chinese firms. This result thus highlights the importance of bank's soft information in replacing the type of hard information that is subject to easy manipulation.

5. ROBUSTNESS

Our analysis suggests that a long-term lending relationship fosters firm-specific soft information, which significantly predicts loan default. We classify a firm with a long-term banking relationship based on its state ownership, borrowing frequency and when it obtained its first loan.

To check the robustness of our findings, we use an alternative definition of banking-relationship based on a firm's previous borrowing frequency. Namely, a firm is classified as a frequent borrower if for its loans originated in 2004 it has borrowed more than 4 times from the bank (the sample median) in 2003, or if for its loans originated in 2005 it has borrowed more than 5 times (the sample median) during the period of 2003-2004. Our results do not change.

As another robust check, we estimate our regressions for firms whose borrowing frequency falls to the bottom quartile and top quartile of sample frequency during the period of 2003-2006. Our results are robust.

In another robustness analysis, we estimate our main regressions based on loans instead of firms. We find similar results.

⁹ From an accounting perspective, sales growth manipulations are relatively limited compared to the options to manipulate ROAs. Nevertheless, sales manipulations are widespread among Chinese firms, especially among those of median or small sizes.

6. CONCLUSION

In this paper we study the economic role of banks' soft information, evolved from repeated lending relationships, in the context of loan default. Using a proprietary database from one of the largest state-owned commercial banks in China, we find that the bank's internal credit rating scores substantially improve the accuracy of default prediction. While the internal credit rating does incorporate hard information such as financial ratios derived from financial statements, it is the soft information component of these ratings that contributes to the improvement in assessing credit quality. In addition, we find that to what extent soft information prevails over hard information depends on the depth of the lending relationship. When evaluating loan delinquency, a strong repeated lending relationship allows soft information to substitute, rather than complement, the role of hard information, especially the hard information that is subject to easy manipulations by Chinese firms.

REFERENCES

- Agrawal, Sumit, and Robert Hauswald, 2008. Distance and private information in lending. Working Paper, Federal Reserve Bank of Chicago and American University.
- Altman, Edward, I., 1968. Financial ratios, discriminant analysis and the prediction of corporate bankruptcy, *Journal of Finance* 23, 589-609.
- Berger, Allen, N., W. Scott Frame, and Nathan H. Miller, 2005. Credit scoring and the availability, price, and risk of small business credit, *Journal of Money, Banking, and Credit* 37, 191-222.
- Berger, Allen N., Nathan H. Miller, Mitchell A. Petersen, Raghuram G. Rajan, Jeremy 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.
- Berger, Allen N., and Gregory F. Udell, 1995. Relationship lending and lines of credit in small firm finance, *Journal of Business* 68, 351-381.
- Boyd, John H., and Edward C. Prescott, 1986. Financial intermediary-coalitions, *Journal of Economic Theory* 38, 211-232.
- Cerqueiro, Geraldo, Hans Degryse, and Steven Ongena, 2008. Rules versus discretion in loan rate setting, Working Paper, Tilburg University.
- Chang, Chun, and Yijiang Wang, 1994. The nature of township-village enterprises, *Journal of Comparative Economics* 19, 434-452.
- Czarnitzki, Dirk, and Kornelius Kraft, 2001. Are credit ratings valuable information? ZEW Discussion Paper No. 04-07, Center for European Economic Research.
- Diamond, Douglas, 1991, Monitoring and reputation: The choice between bank loans and directly placed debt, *Journal of Political Economy* 99, 689-721.
- Dow, James, and Gary Gorton, 1997. Stock market efficiency and economic efficiency: Is there a connection? *Journal of Finance* 52, 1087-1129.
- English, William B., William R. Nelson, 1999. Bank risk rating of business loans. In Proceedings of the 35th Annual Conference on Bank Structure and Competition.
- Fidrmuc, Jarko, Christa Hainz, and Anton Malesich, 2007. Default rates in the loan market for SMEs: Evidence from Slovakia, Working Paper, University of Munich.
- Frame, W. Scott, Aruna Srinivasan, and Lynn Wooseley, 2001. The effect of credit scoring on small-business lending, *Journal of Money, Banking, and Credit* 33, 813-825.

- Grunert, Jens, Lars Norden, and Martin Weber, 2005. The role of non-financial factors in internal credit ratings, *Journal of Banking and Finance* 29, 509-531.
- Machauer, Achim, and Martin Weber, 1998. Bank behavior based on internal credit ratings of borrowers, *Journal of Banking and Finance* 110, 407-443.
- Peterson, Mitchell A. 2004. Information: Hard and soft, Working Paper, Northwestern University.
- Ramakrishnan, Ram T S, and Anjan V Thakor, 1984. Information reliability and a theory of financial intermediation, *Review of Economic Studies* 51, 415-432.
- Scott, Jonathan A. 2004. Small Business and the Value of Community Financial Institutions, *Journal of Financial Services Research* 25, 207-230.
- Uchida, Hirofumi, Gregory F. Udell, and Nobuyoshi Yamori, 2007. SME financing and the deployment of lending technologies in Japan, Working Paper, Indiana University.

APPENDIX I. Variable Definitions

Variables	Definition	Measured as of Year
Default	A dummy variable that equals one if a firm defaults its short-term loans, and equals zero otherwise. Default occurs if the short-term loan is unpaid or written off at the end of the following year.	This variable is measured at one year after the year when the loan is originated.
Rating	Bank's internal credit rating score. The score is 12 for a firm with the highest credit rating, and 11 for the second highest credit rating, and so on. It is 1 for the lowest credit rating.	This variable is measured as of the year when the loan is originated.
Size	The natural log of book value of total assets at the end of year.	This variable is measured at one year before the year when the loan is originated.
Leverage	Financial leverage, calculated as total liabilities divided by total assets at the end of year.	
ROA	Return on assets, calculated as net income divided by total assets.	
Asset Turnover	Asset turnover ratio, calculated as total sales divided by total assets.	
Cash	Cash reserve ratio, calculated as the sum of cash and short-term investments divided by total assets at the end of year.	
Sales Growth	Sales growth is calculated as the difference in the natural log of sales between current year and previous year.	
Log(GDP)	The natural log of GDP per capita of the province where the loan is originated.	This variable is measured as of the year when the loan is originated.
State	A dummy variable equal to one if a firm is owned or controlled by the state, and zero otherwise.	
Old Client	A dummy variable equal to one if the year that a firm obtained its first loan is more than or equal to 2 years ago, and equals zero otherwise.	
Frequent Borrower	A dummy variable equal to one if the firm borrows more than 13 times from the bank between 2003 and 2006, and zero otherwise.	

Table 1. Loan sizes for Chinese firms

The sample period is 2003-2006. In Panel A, a firm is classified as stated-owned if it is owned or controlled by the government. In Panel B, a province where the bank's branches reside is classified as a region of high economic development if its average GDP per capita in 2005 exceeds 20,000 RMB Yuan. A province is classified as a region of low economic development if its average GDP per capita in 2005 falls below 10,000 RMB Yuan. The rest of regions are classified as of medium economic development.

Panel A: Loan sizes based on firm's ownership									
Loan maturity	Number of firms			Number of loans			Total amount (billion RMB)		
	Overall	State	Non-state	Overall	State	Non-state	Overall	State	Non-state
2003									
<1 year	1,860	494	1,366	9,793	4,665	5,128	57.32	35.13	22.19
1 year	806	333	473	3,029	1,692	1,337	32.69	25.03	7.66
>1 & <=5 years	263	91	172	768	367	401	15.11	10.57	4.55
>5 years	16	10	6	54	45	9	2.10	1.93	0.17
2004									
<1 year	1,512	287	1,225	4,967	1,471	3,496	45.61	26.25	19.36
1 year	744	225	519	2,783	1,128	1,655	30.60	19.52	11.08
>1 & <=5 years	117	56	61	333	208	125	9.84	8.06	1.78
>5 years	9	8	1	64	62	2	4.54	4.39	0.15
2005									
<1 year	1,685	213	1,472	5,156	1,165	3,991	43.37	22.05	21.32
1 year	619	167	452	2,149	847	1,302	29.14	18.73	10.41
>1 & <=5 years	90	35	55	311	164	147	13.68	11.10	2.57
>5 years	7	5	2	58	49	9	2.04	1.86	0.19
2006									
<1 year	1,968	175	1,793	5,822	981	4,841	48.70	24.46	24.24
1 year	839	155	684	2,394	867	1,527	33.15	21.21	11.94
>1 & <=5 years	142	38	104	371	142	229	10.23	5.54	4.69
>5 years	6	2	4	21	8	13	1.40	0.45	0.95

Table 1 continued.

Panel B: Loan sizes based on degree of economic development									
Loan maturity	Number of firms			Number of loans			Total amount (billion RMB)		
	High	Medium	Low	High	Medium	Low	High	Medium	Low
2003									
<1 year	1,112	533	217	4,425	3,866	1,502	25.18	23.38	8.77
1 year	277	328	201	614	1,439	976	7.50	16.64	8.55
>1 & ≤5 years	130	89	44	338	289	141	5.60	4.36	5.15
>5 years	5	8	3	8	41	5	0.11	1.39	0.60
2004									
<1 year	1,016	349	147	2,864	1,467	636	21.74	16.29	7.58
1 year	280	286	179	697	1,224	862	8.15	14.40	8.05
>1 & ≤5 years	55	41	23	133	149	51	2.99	5.34	1.51
>5 years	2	7		7	57		1.30	3.24	
2005									
<1 year	1,303	264	118	3,545	1,093	518	24.18	13.51	5.69
1 year	272	204	143	627	942	580	8.73	13.65	6.76
>1 & ≤5 years	54	26	12	156	117	38	3.17	7.33	3.18
>5 years	2	4	1	9	47	2	0.19	1.71	0.14
2006									
<1 year	1,589	238	141	4,336	1,018	468	25.28	16.48	6.94
1 year	502	216	121	1,068	884	442	12.55	14.37	6.23
>1 & ≤5 years	99	30	13	219	127	25	4.92	4.21	1.10
>5 years	4	2		16	5		1.08	0.32	

Table 2. Loan interest rates for Chinese firms

The sample period is 2003-2006. Our sample does not contain policy-oriented (favorable) interest rates. The weighted average interest rate is calculated for each firm and the average of the weighted interest rates cross firms is reported. In Panel A, a firm is stated-owned if it is owned or controlled by the government. t-statistics testing the difference in mean interest rates between state-owned and non-state-owned firms are based on uneven variance. In Panel B, a province where the bank's branches reside is classified as a region of high economic development if its average GDP per capita in 2005 exceeds 20,000 RMB Yuan. A province is classified as a region of low economic development if its average GDP per capita in 2005 falls below 10,000 RMB Yuan. The rest of regions are classified as of medium economic development. Panel B provides t-statistics testing the difference in mean interest rates between each two groups. ***, **, and * indicate significance at 1%, 5% and 10% levels respectively.

Panel A: Loan interest rate based on firm's ownership							
Interest rate	Overall sample		State-owned firms		Non-state-owned firms		t-statistics
	Obs.	Mean	Obs.	Mean	Obs.	Mean	
2003							
<1 year	1,627	5.96%	431	5.80%	1,196	6.02%	-6.080***
1 year	787	5.98%	324	5.84%	463	6.08%	-5.479***
>1 & <=5 years	139	5.75%	55	5.65%	84	5.81%	-1.824*
>5 years	11	6.07%	7	6.09%	4	6.05%	0.092
2004							
<1 year	1,461	6.30%	268	5.94%	1,193	6.38%	-8.505***
1 year	734	6.20%	219	5.92%	515	6.32%	-7.191***
>1 & <=5 years	75	5.94%	36	5.63%	39	6.22%	-3.310***
>5 years	8	6.11%	7	6.16%	1	5.76%	
2005							
<1 year	1,624	6.52%	197	6.04%	1,427	6.59%	-10.576***
1 year	611	6.42%	162	6.07%	449	6.55%	-7.139***
>1 & <=5 years	60	6.05%	27	5.66%	33	6.37%	-3.658***
>5 years	5	5.94%	3	6.02%	2	5.81%	
2006							
<1 year	1,912	6.79%	164	6.29%	1,748	6.84%	-8.788***
1 year	826	6.80%	151	6.21%	675	6.94%	-11.266***

>1 & <=5 years	66	6.46%	30	6.06%	36	6.80%	-3.783***
>5 years	5	7.13%	2	7.57%	3	6.84%	

Table 2 continued.

Panel B: Loan interest rates based on degree of economic development									
Interest rate	High		Medium		Low		t-statistics		
	Obs.	Mean	Obs.	Mean	Obs.	Mean	(2) - (4)	(4) - (6)	(2) - (6)
	(1)	(2)	(3)	(4)	(5)	(6)			
2003									
<1 year	971	5.92%	475	6.05%	181	5.94%	-3.472***	1.897*	-0.364
1 year	269	5.87%	322	6.02%	196	6.08%	-2.946***	-1.051	-3.753***
>1 & <=5 years	68	5.70%	50	5.87%	21	5.61%	-1.881*	2.036**	0.738
>5 years	2	5.47%	6	6.14%	3	6.34%	-1.659	-0.439	
2004									
<1 year	989	6.33%	332	6.28%	140	6.11%	1.055	1.974**	2.743***
1 year	276	6.20%	281	6.21%	177	6.19%	-0.187	0.252	0.063
>1 & <=5 years	34	5.96%	30	5.99%	11	5.71%	-0.14	1.098	0.928
>5 years	2	5.94%	6	6.17%			-0.592		
2005									
<1 year	1260	6.56%	250	6.43%	114	6.35%	2.466**	0.823	2.498**
1 year	269	6.43%	200	6.40%	142	6.45%	0.453	-0.548	-0.16
>1 & <=5 years	31	6.26%	19	5.63%	10	6.19%	3.360***	-1.704	0.2
>5 years	2	5.81%	2	5.81%	1	6.43%			
2006									
<1 year	1544	6.82%	229	6.61%	139	6.76%	3.734***	-1.654*	0.814
1 year	492	6.95%	213	6.51%	121	6.71%	6.987***	-2.108**	2.723***
>1 & <=5 years	32	6.89%	26	6.14%	8	5.83%	3.553***	2.103**	5.148***
>5 years	3	7.33%	2	6.84%					

Table 3. Internal credit rating and default rate for Chinese firms

The sample period is 2003-2006. Internal credit rating starts in 2004. A crediting rating score ranks from 1 to 12, with 1 being the lowest credit quality and 12 the highest. Short-term loan default rate is based on the fraction of short-term (one year or less) loans that are not paid or are written off at the end of the subsequent year. Among loans mature in less than one year, only these with a maturity of more than six months and initiated on and after 1st July are included. In Panel A, a firm is classified as state-owned if it is owned or controlled by the government. t-statistics testing the difference in mean internal credit rating between state-owned and non-state-owned firms are based on unequal variance. In Panel B, a province where the bank's branches reside is classified as a region of high economic development if its average GDP per capita in 2005 exceeds 20,000 RMB Yuan. A province is classified as a region of low economic development if its average GDP per capita in 2005 falls below 10,000 RMB Yuan. The rest of regions are classified as of medium economic development. ***, **, and * indicate significance at 1%, 5% and 10% levels respectively.

Table 3 continued.

Panel A: Internal credit rating and default rate based on firm's ownership														
	Internal credit rating							Short-term loan default rate						
	Overall		State		Non-state		t-statistics	Overall		State		Non-state		χ^2
	Obs.	Mean	Obs.	Mean	Obs.	Mean		Obs.	Mean	Obs.	Mean	Obs.	Mean	
(1)	(2)	(3)	(4)	(5)	(6)	(4) - (6)	(7)	(8)	(9)	(10)	(11)	(12)	(10) - (12)	
2003														
<1 year								1,164	14.71%	311	25.70%	853	10.70%	41.219***
1 year								806	16.97%	333	21.90%	473	13.50%	9.753***
>1 & <=5 years														
>5 years														
2004														
<1 year	1,045	7.775	281	7.377	764	7.921	-2.508**	1,059	7.77%	198	14.60%	861	6.20%	16.246***
1 year	659	7.900	221	7.891	438	7.904	-0.056	744	13.03%	225	14.70%	519	12.30%	0.755
>1 & <=5 years	95	9.547	52	9.750	43	9.302	1.114							
>5 years	7	10.429	7	10.429										
2005														
<1 year	1,641	7.932	209	7.981	1,432	7.925	0.268	1,129	1.90%	160	3.10%	969	1.70%	1.634
1 year	601	8.191	163	8.276	438	8.160	0.515	619	4.37%	167	2.40%	452	5.10%	2.12
>1 & <=5 years	73	9.397	31	10.323	42	8.714	3.531***							
>5 years	4	8.250	3	9.000	1	6.000								
2006														
<1 year	1,966	8.153	175	8.366	1,791	8.132	1.208							
1 year	839	8.400	155	8.755	684	8.319	2.158**							
>1 & <=5 years	142	8.972	38	10.026	104	8.587	4.591***							
>5 years	6	9.667	2	10.500	4	9.250	1.263							

Table 3 continued.

Panel B: Internal credit rating and default rate based on degree of economic development																			
	Internal credit rating									Short-term loan default rate									
	High			Medium			Low			High			Medium			Low			χ^2
	Obs.	Mean		Obs.	Mean		Obs.	Mean		t-statistics	Obs.	Mean		Obs.	Mean		Obs.	Mean	
(1)	(2)	(3)	(4)	(5)	(6)	(2)-(4)	(4)-(6)	(2)-(6)	(7)	(8)	(9)	(10)	(11)	(12)	(8)-(10)	(10)-(12)	(8)-(12)		
2003																			
<1 year										681	8.80%	349	25.80%	134	15.70%	53.454***	5.598**	5.889**	
1 year										277	16.60%	328	19.80%	201	12.90%	1.033	4.144**	1.227	
>1 & <=5 years																			
>5 years																			
2004																			
<1 year	564	7.988	338	7.559	143	7.448	2.171**	0.378	1.987**	719	3.30%	231	16.50%	109	18.30%	49.274***	0.189	42.385***	
1 year	203	7.995	279	8.211	177	7.299	-0.907	3.542***	2.472**	279	6.80%	286	16.10%	179	17.90%	11.930***	0.254	13.497***	
>1 & <=5 years	40	9.650	36	9.972	19	8.526	-0.857	2.202**	1.651										
>5 years	1	11.000	6	10.333															
2005																			
<1 year	1,269	7.954	257	7.868	115	7.843	0.479	0.081	0.444	855	0.60%	183	4.90%	91	7.70%	21.272***	0.851	33.175***	
1 year	263	8.194	197	8.401	141	7.894	-0.994	1.861*	1.26	272	1.80%	204	5.90%	143	7.00%	5.536**	0.175	7.149***	
>1 & <=5 years	41	9.049	20	10.100	12	9.417	-2.176**	0.699	-0.382										
>5 years	1	6.000	2	10.500	1	6.000													
2006																			
<1 year	1,587	8.121	238	8.471	141	7.972	-2.479**	2.323**	0.867										
1 year	502	8.297	216	8.741	121	8.215	-2.652***	1.981**	0.358										
>1 & <=5 years	99	8.758	30	9.467	13	9.462	-1.996*	0.005	-0.794										
>5 years	4	10.000	2	9.000			0.49												

Table 4. Descriptive statistics for firms default

The sample period is 2003-2006. Dummy variable Default equals 1 if the short-term loan is not paid or is written off at the end of the subsequent year, and 0 otherwise. Internal credit rating ranks from 1 to 12, with 1 being the lowest credit quality and 12 the highest. Size is the log of book value of total assets. t-statistics are based on uneven variance. ***, **, and * indicate significance at 1%, 5% and 10% levels respectively.

	2004			2005		
	Default = 0	Default = 1	t-statistics	Default = 0	Default = 1	t-statistics
Panel A: Overall sample						
Rating	8.30	5.38	11.009***	8.40	4.55	7.218***
Size	18.92	18.29	3.963***	18.63	18.66	-0.135
Leverage	0.51	0.56	-3.015***	0.48	0.55	-2.147**
ROA	0.07	0.03	8.563***	0.09	0.05	2.796***
Asset Turnover	1.00	0.80	3.885***	1.25	0.90	4.004***
Cash	0.07	0.05	5.149***	0.07	0.04	4.183***
Sales Growth	0.34	0.16	2.803***	0.33	0.23	1.233
Panel B: State-owned firms						
Rating	8.23	5.11	6.533***	8.32	4.38	3.220**
Size	20.37	19.15	4.619***	20.81	18.40	4.135***
Leverage	0.55	0.62	-2.621**	0.54	0.66	-1.779
ROA	0.04	0.02	3.599***	0.05	0.01	1.955*
Asset Turnover	0.79	0.71	1.175	0.83	0.68	1.639
Cash	0.09	0.06	2.556**	0.09	0.04	3.531***
Sales Growth	0.23	0.22	0.066	0.25	0.15	0.723
Panel C: Non-state-owned firms						
Rating	8.33	5.53	8.744***	8.41	4.60	6.346***
Size	18.39	17.82	3.115***	18.10	18.73	-2.569**
Leverage	0.49	0.52	-1.623	0.46	0.52	-1.568
ROA	0.09	0.04	7.317***	0.10	0.06	2.332**
Asset Turnover	1.08	0.86	3.316***	1.36	0.96	3.722***
Cash	0.07	0.04	5.235***	0.07	0.03	3.263***
Sales Growth	0.38	0.13	3.217***	0.35	0.25	1.013

Table 5. Correlation analysis

The sample period is 2003-2006. Dummy variable Default equals 1 if the short-term loan is not paid or is written off at the end of the subsequent year, and 0 otherwise. Internal credit rating ranks from 1 to 12, with 1 being the lowest credit quality and 12 the highest. Size is the log of book value of total assets. ***, **, and * indicate significance at 1%, 5% and 10% levels respectively.

	Default	Rating	Size	Leverage	ROA	Asset Turnover	Cash	Sales Growth	State
Rating	-0.365***								
Size	-0.057***	0.323***							
Leverage	0.114***	-0.247***	0.289***						
ROA	-0.178***	0.322***	-0.280***	-0.402***					
Asset Turnover	-0.114***	0.090***	-0.320***	-0.147***	0.495***				
Cash	-0.112***	0.183***	0.145***	0.084***	0.070***	0.107***			
Sales Growth	-0.069***	0.152***	0.019	-0.057***	0.180***	0.175***	0.063***		
State	0.059***	-0.044**	0.486***	0.208***	-0.297***	-0.230***	0.115***	-0.078***	
Log(GDP)	-0.187***	0.052**	-0.185***	-0.107***	0.207***	0.218***	0.005	0.047**	-0.306***

Table 6. The determinants of loan default

This table reports the probit regression results. The dependent variable is the dummy variable Default equal to 1 if the short-term loan is not paid or is written off at the end of the subsequent year, and 0 otherwise. Size is the log of book value of total assets. State is a dummy variable equal to 1 if the firm is state-owned and 0 otherwise. Size, ROA, Cash, and Sales Growth are measured as one year prior to the time the loan was originated. Industry classification is based on 5 manufacturing industries. For each regression model, we report both coefficient estimates and marginal effects. z-statistics based on robust standard errors are reported in the parentheses. ***, **, and * indicate significance at 1%, 5% and 10% levels respectively.

	Model 1		Model 2		Model 3		Model 4	
	Coef.	dF/dX	Coef.	dF/dX	Coef.	dF/dX	Coef.	dF/dX
Size	-0.143*** (-5.80)	-0.015	-0.150*** (-5.45)	-0.016	-0.109*** (-3.10)	-0.011	-0.136*** (-3.84)	-0.013
Leverage	0.872*** (2.92)	0.092	0.863*** (2.90)	0.091	0.781*** (2.59)	0.082	0.695** (2.28)	0.066
ROA	-4.438*** (-3.82)	-0.467	-4.333*** (-3.67)	-0.456	-4.388*** (-3.71)	-0.46	-3.968*** (-3.27)	-0.375
Asset Turnover	-0.165* (-1.75)	-0.017	-0.164* (-1.74)	-0.017	-0.151 (-1.62)	-0.016	-0.174* (-1.74)	-0.017
Cash	-3.059*** (-3.57)	-0.322	-3.133*** (-3.58)	-0.33	-2.972*** (-3.51)	-0.311	-3.121*** (-3.64)	-0.295
Sales Growth	-0.017 (-0.21)	-0.002	-0.015 (-0.18)	-0.002	-0.01 (-0.12)	-0.001	-0.029 (-0.37)	-0.003
State			0.079 (0.66)	0.009	2.145** (1.98)	0.485	2.544** (2.34)	0.586
State × Size					-0.108* (-1.92)	-0.011	-0.132** (-2.33)	-0.013
log(GDP)	-0.619*** (-7.81)	-0.065	-0.605*** (-7.47)	-0.064	-0.607*** (-7.48)	-0.064	-0.428*** (-4.94)	-0.04
Constant	7.368*** (7.87)		7.340*** (7.84)		6.652*** (6.57)		5.658*** (5.57)	
Industry Fixed Effect							Yes	
Year Fixed Effect							Yes	
No. of observations	2,063		2,063		2,063		2,063	
Wald χ^2	136.95***		137.66***		139.94***		156.24***	
McFadden's R^2	0.16		0.161		0.164		0.197	

Table 7. Can internal credit rating predict loan default?

The sample period is 2003-2006. The dependent variable is the dummy variable Default equal to 1 if the short-term loan is not paid or is written off at the end of the subsequent year, and 0 otherwise. Rating is the bank's internal credit rating ranking from 1 to 12, with 1 being the lowest credit quality and 12 the highest. Size is the log of book value of total assets. State is a dummy variable equal to 1 if the firm is state-owned and 0 otherwise. Size, ROA, Cash, and Sales Growth are measured as one year prior to the time the loan was originated. Industry classification is based on 5 manufacturing industries. For each regression model, we report both coefficient estimates and marginal effects. z-statistics based on robust standard errors are reported in the parentheses. ***, **, and * indicate significance at 1%, 5% and 10% levels respectively.

	Model 1		Model 2		Model 3		Model 4	
	Coef.	dF/dX	Coef.	dF/dX	Coef.	dF/dX	Coef.	dF/dX
Rating	-0.222*** (-14.08)	-0.022	-0.227*** (-13.90)	-0.019	-0.206*** (-9.81)	-0.019	-0.229*** (-9.49)	-0.018
Size					0.031 (0.81)	0.003	0.045 (1.04)	0.003
Leverage					-0.176 (-0.57)	-0.016	-0.447 (-1.39)	-0.034
ROA					-0.844 (-0.83)	-0.078	-0.088 (-0.09)	-0.007
Asset Turnover					-0.13 (-1.30)	-0.012	-0.065 (-0.66)	-0.005
Cash					-1.989** (-2.36)	-0.183	-2.083** (-2.41)	-0.16
Sales Growth					0.026 (0.37)	0.002	0.018 (0.25)	0.001
State					2.059* (1.82)	0.43	1.824 (1.56)	0.323
State × Size					-0.112* (-1.91)	-0.01	-0.102* (-1.68)	-0.008
log(GDP)	-0.654*** (-8.56)	-0.065	-0.456*** (-5.40)	-0.038	-0.638*** (-7.60)	-0.059	-0.471*** (-5.25)	-0.036
Constant	6.474*** (8.73)		4.912*** (5.99)		6.033*** (5.66)		4.664*** (4.21)	
Industry Fixed Effect			Yes				Yes	
Year Fixed Effect			Yes				Yes	
No. of observations	2,063		2,063		2,063		2,063	
Wald χ^2	270.77***		280.88***		283.77***		302.34***	
McFadden's R^2	0.233		0.273		0.249		0.287	

Table 8. Does internal credit rating incorporate fundamental factors?

The sample period is 2003-2006. In Panel A, we classify our sample based on the terciles of international credit rating, with firms in the top tercile having the highest credit quality, and firms in the bottom tercile of lowest credit quality. In Panel B, the dependent variable in the OLS regressions is the internal credit rating, ranking from 1 to 12, with 1 being the lowest credit quality and 12 the highest. Size is the log of book value of total assets. State is a dummy variable equal to 1 if the firm is state-owned and 0 otherwise. Size, ROA, Cash, and Sales Growth are measured as one year prior to the time the loan was originated. Industry classification is based on 5 manufacturing industries. t-statistics testing the difference in group means are based on robust standard errors and are reported in the parentheses. ***, **, and * indicate significance at 1%, 5% and 10% levels respectively.

Panel A: Univariate analysis	Top	Middle	Bottom	t-test		
	(1)	(2)	(3)	(1) - (2)	(2) - (3)	(1) - (3)
2004						
Size	19.829	18.606	18.020	9.447***	4.275***	11.983***
Leverage	0.476	0.499	0.595	-2.088**	-6.876***	-8.264***
ROA	0.099	0.072	0.018	5.968***	13.247***	17.230***
Asset Turnover	1.055	0.995	0.808	1.383	4.139***	4.924***
Cash	0.086	0.066	0.047	3.446***	3.905***	6.493***
Sales Growth	0.438	0.326	0.135	2.070**	2.797***	3.948***
No. of observations	295	481	221			
2005						
Size	19.848	18.177	18.122	12.639***	0.322	8.954***
Leverage	0.462	0.469	0.545	-0.685	-4.240***	-4.445***
ROA	0.096	0.092	0.052	0.863	6.036***	6.435***
Asset Turnover	1.163	1.316	1.058	-2.865***	3.490***	1.441
Cash	0.087	0.068	0.060	3.513***	1.333	3.860***
Sales Growth	0.357	0.340	0.183	0.502	3.495***	3.470***
No. of observations	293	634	139			

Table 8 continued.

Panel B: Regression analysis	Overall sample			State	Non-state
	Model 1	Model 2	Model 3	Model 4	Model 5
Size	0.793*** (28.65)	0.851*** (29.26)	0.809*** (25.75)	1.013*** (17.85)	0.774*** (23.47)
Leverage	-3.948*** (-13.01)	-3.951*** (-13.29)	-3.827*** (-12.61)	-5.264*** (-7.58)	-3.350*** (-9.91)
ROA	10.424*** (11.82)	9.707*** (11.31)	9.639*** (11.29)	22.408*** (9.64)	7.951*** (9.73)
Asset Turnover	0.271*** (3.82)	0.266*** (3.87)	0.260*** (3.77)	1.209*** (4.71)	0.168** (2.48)
Cash	3.710*** (6.98)	4.044*** (7.65)	3.999*** (7.61)	2.940*** (2.76)	3.954*** (6.77)
Sales Growth	0.282*** (3.40)	0.248*** (3.04)	0.246*** (3.05)	0.126 (1.16)	0.264*** (2.84)
State		-0.835*** (-6.19)	-3.765*** (-3.16)		
State × Size			0.149** (2.55)		
log(GDP)	0.111 (1.16)	-0.008 (-0.09)	-0.021 (-0.22)	-0.106 (-0.58)	0.024 (0.22)
Constant	-7.017*** (-6.85)	-6.770*** (-6.70)	-5.912*** (-5.55)	-10.015*** (-5.09)	-5.749*** (-4.88)
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
No. of observations	2,063	2,063	2,063	489	1,574
F	107.44***	103.23***	97.32***	70.9***	66.25***
Adjusted R ²	0.4	0.414	0.416	0.614	0.36

Table 9. Does change in fundamental factors lead to a change in internal credit rating?

The sample period is 2003-2006. Change in Size, ROA, Cash, and Sales Growth is from 2003 to 2004 and from 2004 to 2005. In Panel A, change in rating is from 2004 to 2005 and from 2005 to 2006, where internal credit rating ranks from 1 to 12, with 1 being the lowest credit quality and 12 the highest. Rating improves if the change is positive, and deteriorates if the change is negative. We also report t-statistics testing the change in these factors being different from 0. In Panel B, the dependent variable of the OLS regression is change in internal credit rating. T-statistics based on robust standard errors are reported in the parentheses. The dependent variable in the ordered probit regression takes a value of 1 if a firm's internal credit rating improves from 2004 to 2005, or from 2005 to 2006, -1 if deteriorates, and 0 otherwise. z-statistics based on robust standard errors are reported in the parentheses. ***, **, and * indicate significance at 1%, 5% and 10% levels respectively.

	Rating improves		Rating does not change		Rating deteriorates	
	Change	t-statistics	Change	t-statistics	Change	t-statistics
Δ Size	0.164	16.151***	0.182	16.751***	0.156	13.191***
Δ Leverage	-0.017	-4.391***	0.005	1.468	0.016	3.791***
Δ ROA	0.009	3.811***	-0.008	-4.611***	-0.022	-8.651***
Δ Asset Turnover	0.087	6.091***	-0.03	-1.876*	-0.015	-1.058
Δ Cash	0.002	0.895	0.002	1.468	0	-0.097
Δ Sales Growth	-0.054	-2.132**	-0.158	-5.731***	-0.211	-5.361***
No. of observations	436		684		429	

Table 9 continued.

Panel B: Regression analysis		
Dependent Variable: Change in internal credit rating	OLS	Ordered Probit
Δ Size	0.515*** (3.33)	0.279** (2.09)
Δ Leverage	-1.986*** (-4.45)	-1.581*** (-4.31)
Δ ROA	5.956*** (6.25)	5.245*** (6.60)
Δ Asset Turnover	0.181* (1.79)	0.139 (1.54)
Δ Cash	-0.411 (-0.69)	0.45 (0.90)
Δ Sales Growth	0.04 (0.68)	0.068 (1.32)
State	-0.103 (-1.03)	-0.176** (-2.18)
log(GDP)	0.069 (0.83)	0.016 (0.23)
Intercept	-1.108 (-1.39)	
Industry Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes
No. of observations	1,549	1,549
F	10.78***	
Wald χ^2		164.11***
Adjusted R ²	0.109	
Pesudo R ²		0.064

Table 10. Bank specialty, relationship lending and loan default

The sample period is 2003-2006. The dependent variable of the probit regression is the dummy variable Default equal to 1 if the short-term loan is not paid or is written off at the end of the subsequent year, and 0 otherwise. Bank Specialty is the residual from the OLS regression of Model 3, Panel B of Table 8. Size is the log of book value of total assets. A firm is classified as a frequent borrower if it has borrowed over 13 times from the bank in the past. A firm is classified as an old client if the year that it obtained the first loan is more than or equal to 2 years ago, and equals zero otherwise. Size, ROA, Cash, and Sales Growth are measured as one year prior to the time the loan was originated. Industry classification is based on 5 manufacturing industries. For each regression model, we report both coefficient estimates and marginal effects. z-statistics based on robust standard errors are reported in the parentheses. ***, **, and * indicate significance at 1%, 5% and 10% levels respectively.

	State-owned	Non-state-owned	Frequent borrower	Infrequent borrower	Old Client	New Client
Bank Specialty	-0.179*** (-3.93)	-0.257*** (-8.61)	-0.261*** (-7.40)	-0.214*** (-6.15)	-0.261*** (-6.53)	-0.206*** (-6.17)
Size	-0.257*** (-4.06)	-0.153*** (-3.65)	-0.184*** (-3.66)	-0.193*** (-4.00)	-0.193*** (-3.94)	-0.207*** (-4.73)
Leverage	1.082* (1.71)	0.18 (0.51)	0.301 (0.62)	0.541 (1.38)	0.343 (0.67)	0.479 (1.26)
ROA	-2.74 (-1.12)	-2.493** (-2.37)	-1.471 (-1.17)	-2.654** (-2.19)	-1.788 (-1.19)	-2.171* (-1.88)
Asset Turnover	-0.047 (-0.19)	-0.142 (-1.23)	-0.002 (-0.01)	-0.128 (-1.24)	-0.209 (-1.28)	-0.096 (-0.79)
Cash	-1.359 (-1.01)	-3.759*** (-3.24)	-2.071 (-1.61)	-3.867*** (-3.28)	-3.715** (-2.33)	-2.652*** (-2.82)
Sales Growth	0.159 (1.37)	-0.161 (-1.49)	-0.253 (-1.54)	0.048 (0.49)	0.034 (0.27)	-0.065 (-0.86)
log(GDP)	-0.103 (-0.50)	-0.539*** (-5.10)	-0.505*** (-3.51)	-0.472*** (-4.06)	-0.323** (-2.15)	-0.500*** (-4.58)
Constant	4.525** (2.06)	7.093*** (5.69)	7.314*** (4.36)	6.848*** (4.94)	6.052*** (3.48)	7.367*** (5.59)
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes

No. of observations	489	1,574	947	1,116	961	1,102
Wald χ^2	76.33***	232.3***	129.68***	170.06***	122.03***	164.24***
Pseudo R ²	0.303	0.309	0.28	0.31	0.315	0.277
