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The Impact of Credit Rating, Ownership and Relationships on Loan Spreads-Taiwan's Evidence

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Abstract

Using panel data from Taiwan, this paper performed empirical test to explore how the credit status and relationship have impacted loan spreads. Our findings are as follows : (1) Private financial holding companies and private non-financial holding companies grant loan spreads that are significantly lower than those of state-owned banks. Foreign banks grant loan spreads that are significantly higher than those of state-owned banks, and only foreign bank loan spreads are significantly higher than those of state-owned banks when borrowers are considered to be high risk. (2) Banks reduce their loan spreads only for high credit risk borrowers with obvious improvements in credit ratings, but this does not apply to general borrowers even when the credit rating condition is improved. Furthermore, creditor banks unreasonably increase their loan spreads, when the borrowing companies have their credit ratings upgraded. (3) Empirical findings show that the biggest and main creditor banks exhibit significantly lower loan spreads, and were also willing to give high credit risk customers lower lending spreads, which imply that Taiwan's banks emphasis "banking relationship" while lending. (4) However, robust test over the past decade shows that the banks will raise the lending spreads while the borrower's risk increasing and reduce the lending spreads while the borrower's credit rating upgraded.

Keywords: Credit rating, Banking Relationships, Ownerships, Lending Performance, Loan Spreads

1. Introduction

At the end of 2006, the Basel Committee on Banking Supervision of the Bank of International Settlements started to require all international banks, to calculate the capital to risk (weighted) assets ratio or the capital adequacy ratio through the use of a standardized approach as well as an internal ratings-based approach, so that the borrower's credit rating is incorporated into the determination of the risk weights of loan assets. Since businesses with lower credit ratings have higher risk weights, a larger provision for self-capital is required, which results in not only the higher credit risk, but also a higher cost of capital. Therefore, banks place emphasis on the clients' credit status in terms of high or low, as well as an upgrade or downgrade of the credit rating. If a bank faces a loan applicant with a poor, downgraded credit rating or a renewal contract with a worse credit condition beyond the credit threshold, it can consider whether to increase the loan spread[1] before rejecting or accepting the application.

Over the past decade, Taiwan's financial system has encountered the following significant changes: the approval of 15 new banks, through the pronouncement or amendment of the Six Financial Laws[2] and private placement system to facilitate the first and second financial reforms. The first financial reform promoted the "258" policy[3], which caused many banks to recognize more than 50 billion in bad debt losses[4] due to the failure of corporate finance. During the second financial reform, there was a major credit card crisis, and many banks experienced the failure of retail finance to recognize the huge credit card losses[5]. The continuous negative impacts on the market not only affected bank profitability, but also increased the liquidity risk, thereby further affecting the credit capacity. In addition, over-banking and idle cash have existed in Taiwan's banking market for a long time. As to whether lending attitudes or the methods resulting in the losses mentioned earlier can effectively reduce the bank's credit risk and increase the interest revenue, or whether, due to the dramatic competitive environment, moral hazard and adverse selections will emerge, are all concerns of the financial authorities and the public at large.

As mentioned above, Taiwan's lending market is highly competitive, and to prudently select clients and achieve the goal of a successful lending business in such a financial environment is the greatest concern of all banks. In order to clarify whether the banks in Taiwan possess great lending ability, we have designed our research as follows. According to whether banks have written off huge amounts of bad debts (WOBD hereafter) or experienced heavily credit card debt losses (HCCL hereafter), we choose their clients as experimental (WOBD and HCCL have occurred) and the control sample (WOBD and HCCL have not occurred), respectively[6] This is in order to understand how banks with different performances deal with clients with high or low credit ratings as well as upgraded or downgraded credit ratings. We define banks with WOBD or HCCL as having low performance and those with the opposite as having high performance. In general, creditor banks have more clients with better credit ratings, result in lower loan spreads on average. On the other hand, creditor banks have more clients with worse credit ratings, result in higher loan spreads on average. We can only speculate that individual banks respond to different loan application cases differently, but we cannot directly conclude that the lending behavior gives rise to serious problems of "moral

hazard and adverse selection." So as not to distort the inferences of the empirical results, we add the dimension of the banking relationship to further observe whether the loan spreads applied to sample banks are reasonable and valid[7]. A financial environment characterized by over-banking and too much idle cash in Taiwan's banking market results in companies often maintaining multiple relationships and more so than in other countries (Berger et al., 2008). The empirical findings of Kuo and Chen (2012) indicate that publicly-held companies in Taiwan deal with 2.86 banks on average, with the utilization rate of the credit availability and collateral loans ratio being 69% (median) and 36% (mean), respectively. Although the utilization rate of the credit availability is less than 70% and more than half of the loans are unsecured by nature, the credit indicators still exhibit high credit risk. However the financial environment is favorable to borrowers, and so these firms, regardless of their credit status and banking relationships, still have opportunities to obtain loans at bargain prices from banks. Would such circumstances, however, change in cases where there is different ownership and lending performance? It is worth examining this issue more deeply[8].

Micro and small enterprises in Taiwan seldom publicly announce information about credit ratings or upgrades or downgrades. Enterprises belonging to this category frequently deal with the biggest creditor bank and rarely deal with the main banks or non-main banks[9]. Due to considerations of representativeness, we exclude samples of micro and small enterprises, and only listed, OTC and emerging companies are included. Another consideration concerns the failure of corporate and retail finance during the period under study. As to corporate finance, we divide the samples into firms borrowing from banks with or without WOBD. As for retail finance, we divide the samples into firms borrowing from banks with or without HCCL[10]. If a bank belongs to WOBD or HCCL, we regard it as bank with poor lending performance and high credit risk. If banks suffer the failure of both corporate and retail finance, it might be reasonable to suggest that abnormal[11] lending behavior may exist. In order to avoid confusion in empirical analysis (the samples are only affected by WOBD or HCCL individually or are affected by both WOBD and HCCL simultaneously), we deliberately conduct empirical tests according to each event, respectively[12]. Furthermore, we also simply divide the banks into those with or without WOBD and HCCL to distinguish between the banks with low risk and better lending performance and the banks with high risk and poor lending performance.

Our empirical results indicate that Private financial holding companies and private non-financial holding companies grant loan spreads that are significantly lower than those of state-owned banks. Foreign banks grant loan spreads that are significantly higher than those of state-owned banks, and only foreign bank loan spreads are significantly higher than those of state-owned banks when borrowers are considered to be high risk. Banks reduce their loan spreads only for high credit risk borrowers with obvious improvements in credit ratings, but this does not apply to general borrowers even when the credit rating condition is improved. We also find that the biggest and main creditor banks exhibit significantly lower loan spreads, and willing to give high credit risk customers lower lending spreads, which imply that Taiwan's banks emphasis "banking relationship" while lending.

The rest of our paper is organized as follows: In Section 2, we introduce literatures and

hypotheses. The data sources and model development are explained in Section 3. In Section 4, we show and analyze the empirical results. Finally, the conclusions are drawn.

2. Literature and Hypotheses

After allowing for the establishment of new banks, the Taiwanese banking market has often been criticized for its small scale and over-banking. These shortcomings make banks suffer dramatically from price competition in lending business. Therefore, if one wants to check whether the loan spreads are reasonable, one should be concerned with both the credit system and competitive environment. The credit system is often set in accordance with the principle of the five-p's: people (who borrow), purpose (for what), payment (resource to payoff), protection (the safety of the lending asset) and prospect (the profitability of the fund). According to these indexes, banks set their own credit system and credit regulation for their credit officers to follow their policy and write credit reports to describe each client's credit state and relationships for determining the approval or rejection of the loan application. Since the financial environment is changeable, banks should consider their own situation in light of market realities in order to set a reasonable loan spread. We refer to the prior literature related to our study in three parts. First, we introduce banking relationships between banks and clients, and then discuss how the credit risk of banks and clients impacts the loan decision. Finally, we discuss the impact of the ownership type on lending business.

2.1 Banking relationships

Three methods are used to measure the borrower-lender relationships. First, we focus on single or multiple relationships, where the borrower chooses to deal with at least one bank (domestic or foreign bank). The research point concerns the factors impacting the behavior of choosing a single or multiple relationships. Second, we focus on the number and duration of the relationship banks. If the borrower deals with many banks which display a preference for multiple relationships, the longer duration signals the better the borrower-lender relationships. Third, we measure the relationships with loan spreads and credit availability. The lower the loan spread and the more credit availability is a sign of better borrower-lender relationships. Our research focuses on how the borrower deals with banks with different ownership and lending performance, and is related to the first and the third[13] methods.

Banking relationships are influenced by bank size. Large banks with excellent technological ability and better management systems specialize in using "hard information" to make standardized loans, while small banks specialize in using "soft information" and developing relationships to make non-standardized loans[14] (Stein, 2002; Carter David A. et al. 2005). The credit officers of small banks prefer making the most of vital information which they obtain from the closer relationships, and the soft information is often regarded as a critical instrument in comprehending the detailed information of the borrowers. With respect to a single relationship, when the borrower experiences an unfavorable outcome, the bank will immediately tighten the credit availability to reduce the lending scale or increase the interest rate and will dominate all situations in response to the advantage of its monopolistic position. Even if the borrower is in a normal situation, the relationship bank will still charge a higher interest rate (Berger-Udell, 2002). Cole et al. (2004) indicated that large banks will lay

emphasis on the financial ratios of the borrower and will ignore the opaque firms that are small size in terms of assets while lending.

Sharpe (1990) indicated that a borrower with good credit quality can use its operating advantage to improve the debt capacity and obtain a lower loan spread. This is so, provided that, in the case of long-term debt, the borrower is unwilling to pay an interest rate that is higher than that in the same industry. Peterson-Rajan (1995) suggested that as the relationship bank has the market power (private financial holding bank in this study), when the borrower faces a difficult time accompanied by low credit quality, the relationship bank still can provide what the borrower needs to reflect its excellent ability for assuming credit risk. However, the conclusions regarding the impact of the extension of credit availability and market power on banking relationships are still inconsistent (i.e., the concentration risk of the financial industry and the establishment and banishment of the entrance barrier). Peterson-Rajan (1995) and Cetorelli-Gambera (2001) found that when banks increase their market power, they will increase the credit availability for the relationship borrower. However, the findings of Black-Strahan (2002) and Berger et al. (2004) present opposite conclusions. Boot-Thakor (1994) and Petersen-Rajan (1995) concluded that the duration and numbers of borrower-lender relationships or business types and whether the creditor bank is the biggest or main bank are the ideal index of banking relationships. The closer relationships result in lower loan spreads and less requirements regarding collateral. Greenbaum et al. (1989), Sharpe (1990) and Rajan (1992) found that banks with better borrower-lender relationships by contrast more strictly claimed the contract content. However, Elsas-Krahnen (1998), Harhoff-Korting (1998) and Machauer-Weber (2000) pointed out that banking relationships had nothing to do with the contract content. Djankov et al. (2005) found that the new arrangement of financing contracts between the main creditor banks and borrowers increased the borrower's stock price and generated cumulated abnormal returns (CAR) that were significantly larger than 0.

2.2 How does the credit risk of borrower and lender affect lending decisions?

Prior research claimed that the loan spreads mainly reflect the bank's cost of capital and the credit risk of the borrowers. Santos-Winton (2008) found that companies only borrow from banks if they can afford higher borrowing rates than companies borrowing from banks and issuing bonds simultaneously. If the above two types of financing occurred during the recession period, the loan spreads will become more apparent, and the former will even encounter the embarrassment of a hold-up. Gorton-Kahn (1996) found that banks sometimes give borrowers with poor operating conditions relatively low borrowing rates, the intention being to prevent borrowers with bad credit from bearing high financing costs and accelerating their bankruptcy. In addition to cost of capital and the credit risk of the borrowers, some scholars indicated that factors impacting the loan spread include banking relationship but the empirical results are inconsistent. Berger-Udell (1995) indicated that the better the banking relationships, the lower the loan spread. Elsas-Krahnen (1998) and Machauer-Weber (2000) found banking relationships had nothing to do with loan spreads. Degryse-Cayseele (2000) reached the opposite conclusion whereby the better the banking relationships are, the higher the loan rate.

Since the Basel Committee promoted the risk management system recently, attention has been drawn to the factors impacting the loan spread, including the borrower's credit quality, risk level, as well as the financial position of the creditor banks. Hubbard et al (2002) found that banks with worse financial substance[15] often charge borrowers a higher loan rate. By being sensitive to the worse financial position of the relationship banks, the borrowers always keep sufficient working capital to avoid the lack of investment funds. Coleman et al. (2002)'s empirical findings indicated that banks with higher operating risk[16] charged higher loan rates and offered relatively short-term debt to their borrowers. On the other hand, banks with excellent capital management ability would like to provide long-term debt with a higher loan rate. With regard to competition and market power, Boot-Thakor (2000) found that banks would maintain a free-rider mentality in order to reduce their huge investment in the monitoring technology and lessen their expenses for supervision which are consistent with the findings of Broecker (1990) and Sharp (1990): the more competitive the banking industry, the worse the quality of the loan portfolio.

2.3 The impact of bank ownership types on lending business

Berger et al. (2008) used data from India to verify the impact of bank ownership types on lending businesses, while other studies seemed to focus on the comparison of lending performance. DeYoung-Nolle (1996) and Berger et al. (2000) found that the performance of foreign banks was worse than that of local private banks in developed countries. If data for developing countries are used instead, the efficiency value (Bonin et al., 2005) and competitiveness (Claessens-Laeven, 2004) of foreign banks were higher than local banks. Claessens et al. (2001) indicated that the more foreign banks there are in Korea, the worse the profitability and net interest margin vis-à-vis local banks. When the analysis is extended to compare whether banks could sufficiently provide or make available the amount that the borrowers need, the empirical results are inconsistent. Detragianche et al. (2006) indicated that foreign banks adopted a conservative attitude with respect to the financing demands of the borrowers, especially for those enterprises with worse disclosure regarding their financial information. Esty (2004) used countries with sound regulations and laws and creditor interests with more concentrations and smaller shareholding percentages from the government to conduct research, and the results showed that foreign banks provided higher financing amounts and availability in such countries. Mian (2006) pointed out that foreign banks which set up branches in countries with similar cultures and shorter geographical distances with the parent company would be most able to provide capital to local companies. Peria-Mody (2004) used the Latin American financial market to explore the differences in entering a new market between setting up branches and merging with local banks, and the empirical results indicated that the loan spreads in the former were lower than those in the latter. The findings for Giannetti-Onegena (2009) indicated that big firms and foreign businesses intended to deal with foreign banks. Small firms preferred having relationships with local private banks. The new customers were not all big enterprises and foreign businesses. De la Torre et al. (2008) found that more large banks and foreign banks use "credit scoring criteria" to evaluate the opaque SMEs. Although the scales of foreign banks are very small in the host country, with the support of the multinational parent company they

still conduct the lending business of large institutions.

In the prior literature, we found that the performance of the state-owned banks in developing countries was worse with low efficiency values and high non-performing loan ratios. State-owned banks with high market shares had three negative characteristics: the credit availability provided to borrowers is not sufficient, the lending role is weakened gradually in the process of financial development, and lending plays an supplementary role in retarding economic growth (La Porta et al. (2002), Barth et al. (2004), Beck et al. (2004)). Sometimes, state-owned banks that are required to grant credit or offer subsidies to borrowers with poor physical substance for political reasons, completely ignore the borrowers' credit quality (Cole 2004) or lend most of the funds to large enterprises only, and completely neglect the financial needs of the SMEs (Francisco-Kumar, 2004). The founding objective of the state-owned banks may result in lower efficiency and higher non-performing loan ratios, especially in terms of offering subsidies to the loan applicant with negative net present value or providing lower interest rates to the enterprises experiencing financial difficulty. Sometimes, state-owned banks are criticized for their poor governance mechanism and improper management, and not for lack of policy fairness and justice.

2.4 Hypotheses Development

Prior studies focus on how the ownership, scale and relationships impact the banking relationship. To our knowledge, there are few studies investigating the impact of loan spreads through the lending performance and credit risk of the banks. According to the reports of newspapers and magazines, most of the banks with WOBD are domestic and featured by their large size. Banks with HCCL include both large and small banks and many are newly-established banks. Concerning the hypotheses of loan spreads we take "Careless Lenders and Bad Borrowers" (Shen and Wang, 2002) and "The Top One and Non-top One Financing Bank–viewpoints of lending behavior," (Chen and Lai, 2003) for reference. We also refer to the five relationships motivation theory[17] and the governance mechanism presented by Berger et al. (2008) as a basis to conclude how the related factors impact loan spreads. Here we describe the four research hypotheses as follows:

Hypothesis 1: From the perspective of lending performance, banks with "WOBD" or "HCCL" will require higher loan spreads; when facing borrowing enterprises with poor credit rating and high credit risk, the intention will be stronger.

According to the empirical findings of Hubbard et al. (2002) and Coleman et al. (2002), the worse the financial substance of the banks, the higher the interest rate they will charge the borrowers. Therefore, in measuring the lending performance by the features of "WOBD" or "HCCL", we predict that banks with higher credit risk and poor performance will charge higher loan spreads to reflect the higher cost of capital. As for borrowers with bad credit quality, banks will charge higher loan spreads to reflect the higher risk they are assuming.

Hypothesis 2: Different ownership type banks will require different loan spreads. However, when facing borrowing firms with high credit risk, all banks will require higher loan spreads regardless of the ownership type.

Prior research lays emphasis on a comparison of the overall operating performance of different ownership types of banks, ignoring the item of loan spreads. For example, the performance of foreign banks in developed countries is not as good as that of local private banks, for foreign banks in developing countries have higher efficiency values and competitiveness than banks in the host countries. Some scholars claim that a study of the loan spreads should take the factors of information asymmetry, credit records, collateral, and credit availability into consideration (Chaplinsky-Haushalter (2010)). Therefore, in addition to observing ownership types, we also consider the interaction of ownership and credit risk to further observe how different ownership banks respond to loan spreads about different credit risk firms.

Hypothesis 3: As closer relationships exist between banks and firms, banks are willing to give borrowers lower loan spreads, and even the borrowers that have high credit risk banks are still able to obtain them.

In accordance with securities and financial regulations and the review system, the highest credit review and decision unit is the bank's board of directors, it has the greatest authority to determine the loan rate, credit availability and risk limit. To fairly express the top decision-makers' determination, we divide the creditor bank into three kinds by the total borrowing amount or debt capacity of the enterprise, in terms of the largest, main or non-main creditor bank to describe their relationship level. However, the prior literature concerning the banking relationships and loan spreads gives rise to inconsistent conclusions. Berger-Udell (1995) stated that the closer the relationships, the lower the loan spreads; some scholars have argued that banking relationships do nothing about loan spreads. (Elsas-Krahnen, 1998; Machauer-Weber, 2000); Degryse-Cayseele (2000) indicated that the closer the relationships, the higher the loan spreads. Overbanking causes the Taiwan banking market to be competitive, and whether or not relationship lending is advantageous or disadvantageous for the borrower in such an environment is worth examining carefully. Furthermore, we are also concerned with whether the loan spreads exhibit significant differences in terms of borrowers with different credit risks.

Hypothesis 4: Banks are willing to grant lower loan spreads to firms with rising credit ratings and require higher loan spreads for borrowers with descending credit ratings. If the borrowing company belongs to the high risk group but has improved its credit rating in recent years, banks will normally charge lower loan spreads to reflect the improvement in the credit quality while renewing the loan agreement.

According to the findings of Tang (2009), a company with a rising credit rating generally receives lower loan spreads. Based on the "Risk add and subtract yard system" applied in practice, firms with worse credit ratings add more yards and receive higher borrowing spreads. If the credit rating of the borrowers is obviously ascending or descending during the past three years, in response to the regulation of review mechanism, the lending bank will undertake evaluating procedures every three or six months to adjust the rate for reflecting changes in credit quality. Therefore, if companies with high credit risk upgrade their credit rating, the lending bank will lower loan spreads to reflect that the borrower's credit quality had been improved.

3. Data and methodology

3.1 Data sources

The main data sources are the long-term and short-term borrowings data[18] of the publicly-held companies contained in the database of the Taiwan Economic Journal together with the financial statements of these companies and financial data kept by relationship creditor banks. If part of the sample is missing any data, we will search for it from the Market Observation Post System (MOPS) or banking website. For materiality considerations, observations in this study possess two characteristics: (1) the largest borrowing amount of the sample company in the current year; (2) the relationship creditor bank must be on the list of the top 20 creditor banks. According to the statistics, the average firms' borrowing amount from the largest creditor banks is NT$765 million; from the second largest creditor banks it is NT$389 million on average; the median from the 20th is NT$100 million. As mentioned before, we aim to understand after the first and second financial reforms the impact of the WOBD and HCCL events, and how the banks have set their loan spreads in response to the borrowers' credit state and banking relationship. Therefore, our empirical periods purposely select the period 2006-2008[19], and include 513 listed companies, 404 OTC companies, 133 emerging market companies and 160 companies that are publicly-held but not belonging to the former three. Due to bank credit officers requiring the borrower to provide financial statements for the past three years as an important basis for credit ratings, therefore the corresponding empirical periods are 2003-2008 for borrowers.

3.2 Variable definitions and model development

With regard to the factors impacting the loan spreads, in addition to lending performance and credit risk (measured by with or without WOBD and HCCL), we include ownership types and relationship levels. Among the influential factors which are relevant to the borrower's

credit quality are the borrower's credit rating (measured by the TCRI figure) and the credit state (which focuses on the changes in the credit rating in terms of an upgrade or downgrade 3 years before the loan). We classify the control variables of the empirical model into two kinds: (1) Those related to the scale (natural logarithm of total assets) of the creditor bank (the dimension symbol is the bank) and cost-to-revenue ratio (measured by operating expenses to the operating revenue ratio). (2) Those related to the scale, debt ratio and profitability (measured by the pretax income to operating revenue ratio) of the borrower firms (the dimension symbol is the firm). To be consistent with practical convention, these variables are calculated by the arithmetic average of the past three years.

After 2000, the passage of the Six Financial Laws and Private Placement system led to the derivation of related innovations accompanied by mergers and reorganization, which resulted in significant changes in the substantial or controlling shareholders. In order to understand whether the loan spreads are affected, we adopt the method of Xie (2008) divide the ownership (dimensions symbol ownership) into four types: state-owned, private financial holding, private non-financial holding and foreign banks, and denote it by the dummy variables of hold, non-hold and fore. In addition, we take the concept from Chen & Lai (2003) and divide the banking relationships (dimensions symbol relation_type) into three levels: the largest creditor banks, the main banks (loan amounts ranked No. 2 to No. 4) and non-main banks (loan amounts ranked No. 5 to No. 20), and denote it by the dummy variables of largest and main. We use the TCRI system[20] to evaluate the borrower's credit rating, which is developed by the Taiwan Economic Journal (TEJ), regarding TCRI$\leq$ 4 as the low credit risk firms and TCRI$\geq$ 7 as the high credit risk firms. To effectively distinguish the level of credit risk, we delete TCRI =5 and TCRI =6. Then we define the borrower's credit state (dimensions symbol TCRI_state) as being one of three kinds. If the sample company's credit rating 3 years before the loan application appears to be rising in 2 and above 2 years, we will regard it as the upgrade state. If the sample company's credit rating 3 years before the loan application appears to be descending in 2 and above 2 years, we will regard it as the downgrade state. Other sample companies are treated as being in the normal state. We use upgrade and downgrade to denote the credit state. Since the relevant dimensions may affect loan spreads under different firms' credit ratings, we therefore include the interaction of the main dimensions with the credit state in our examination. We summarize the definitions and measurement methods of all variables in Table 1. For clarity we only display the basic model for loan spreads, and the related derived models are listed in the relevant columns of Table 5-7.

$$R_{ijt} = \beta_0 + \beta_1 * TCRI_{jt} + \sum_{k=1}^{2} \psi_k status_k + \sum_{k=1}^{6} \gamma_k ownership_k + \sum_{k=1}^{4} \xi_k relation\_type_k + \sum_{k=1}^{4} \lambda_k TCRI\_state_k + \sum_{k=1}^{3} \varphi_k firm_k + \sum_{k=1}^{2} \delta_k bank_k + e_{ijt} \quad (1)$$

In Equation (1), the i, j and t denote bank i, firm j and year t respectively, and the other variables are defined in Table 1.

Table 1. Summary of Variables

Dependent Variables				
Dimensions	Variable Name	Variable Symbol	Variable Definition	
Loan spreads to firms	Loan spreads	R	Loan spreads of banks less the prime interest rate	
Independent Variables				
Dimensions	Variable Name	Variable Symbol	Variable Definition	Expected direction
Firms' credit rating (symbol TCRI)	Firm with low or high credit risk	TCRI	Dummy variable, among the previous three years, 2 and above 2 years credit rating TCRI≧7, denote as TCRI=1; among the previous three years, 2 and above 2 years credit rating TCRI≦4 denote as TCRI=0	+
Lending performance of bank (symbol status)	Writing off bad debt or not	bad_debt	Dummy variable, with or without writing off bad debt over 50 billion in recent 5 years with=1 without=0	+
		bad_debt* TCRI	Interaction of bad_debt_{it} and $TCRI_{jt}$	+
	Heavy credit card loss or not	card_debt	Dummy variable, with or without heavy credit card loss with=1 without=0	+
		card_debt* TCRI	Interaction of $card\_debt_{it}$ and $TCRI_{jt}$	+
Ownership type (symbol ownership)	Private financial holding bank	hold	Dummy variable, Private Financial Holding Bank=1, otherwise=0	+/−
		hold*TCRI	Interaction of hold and TCRI	+/−
	Private non-financial holding bank	Non-hold	Dummy variable, Private but not Financial Holding Bank=1, otherwise=0	+/−
		Non-hold* TCRI	Interaction item of non-hold and TCRI	+/−
	Foreign bank	fore	Dummy variable, foreign Bank=1, otherwise=0	+/−
		fore *TCRI	Interaction of fore and TCRI	+/−
Relationships (symbol relation_type)	The largest creditor bank	largest	Dummy variable, denoting bank providing the largest amount loaned as largest=1 otherwise=0	−
		largest* TCRI	Interaction of largest and TCRI	−

	Main bank	main	Dummy variable, denoting bank providing the amount loaned ranking from 2 to 4 as main=1 otherwise=0	−
		main * TCRI	Interaction of main and TCRI	−
Credit state of borrower (symbol TCRI_state)	Ascending credit state	upgrade	Dummy variable, we regard upgrade if among the previous three years, in 2 or more than 2 years the current year's credit rating is lower than that in the preceding year. upgrade=1, otherwise=0.	−
		upgrade* TCRI	Interaction of upgrade and TCRI	−
	Descending credit state	downgrade	Dummy variable, we regard downgrade if among the previous three years, in 2 or more than 2 years the current year's credit rating is higher than that in the preceding year. Downgrade = 1, otherwise = 0.	+
		downgrade* TCRI	Interaction of downgrade and TCRI	+
Borrower's Characteristics (symbol firm)	Firm's Scale	Size1	Natural logarithm of total assets	−
	Debt ratio	Leverage	Total liabilities/Total assets (%)	+
	Profitability ratio	Ros	Pretax income / Net operating revenue	−
Characteristics of creditor bank (symbol bank)	Scale of bank	Size2	Natural logarithm of total assets	−
	Cost to revenue ratio	Cost_income	Operating expense/net operating revenue (%)	+

Note: "+" and "-" indicate that the variable coefficients are expected to be positive and negative; "+/-" indicates that the direction of the variable coefficient is uncertain.

4. Empirical Analysis and Results

The empirical analysis procedures of this study are summarized in the following four parts. First, we use the t test and the nonparametric Wilcoxon rank sum methods to verify whether the mean or median of the banks with or without "WOBD" and "HCCL", banks with four different types of ownership, and companies with high or low credit risk exhibit significant statistical differences in their characteristics. Then, we select publicly-held borrowing companies as empirical and control samples from banks with or without "WOBD" to test the impact of clients' credit status and relationships on loan spreads under the regression model. We divide our clients with banks with or without WOBD as experimental samples and controlling samples and use the ordinary least squares empirical model to examine the factors impacting the loan spreads. The impacting factors include the financial attributes of banks and borrowing companies. In addition, we take the lending performance, ownership, banking relationship and the credit state (upgrade or downgrade) into consideration. As for

understanding whether the loan policy-making process is just, we use the TCRI index to show the credit risk level[21] of borrowing companies. Moreover, in this study we also include the interaction items of different credit systems and lending behavior to further explore the factors impacting the loan spread. In the third section, we apply the same method as in the second section except that the sample bank groups are changed to banks with or without "HCCL". In the fourth section, we perform the robustness test by extending the empirical period to 2010 and discuss certain important variables in detail.

4.1 Descriptive Statistics

As mentioned earlier, we shall determine the creditor banks first, then select the borrowing companies which are publicly-held from related banks as empirical and control samples. Since our samples are from creditor banks and borrowing companies, therefore we introduce the summary statistics of each index individually. With regard to the samples of creditor banks, we discuss this by dividing the banks into those with and without "WOBD", with and without "HCCL", as well as four different types of ownership. As to the characteristics of the banks, we use six indexes, namely, those of total assets, the cost-to-revenue ratio, the return on assets, the return on equity, the pretax income ratio and the gross profit ratio. Moreover, we divide the borrowing companies into high and low credit risk companies by the credit ratings of TCRI and discussing the characteristics in terms of total assets, the pretax income ratio, debt ratio, TCRI rating, loan rate and loan spreads. We use the t test and nonparametric methods to verify whether there exist significant differences among banks with or without "WOBD" and "HCCL" as well as among borrowing companies with high and low credit risk based on the mean and median for each index for the four different types of ownership[22]. Table 2 shows the results of the 126 observations for creditor banks. During the empirical period there are 21 observations for 7 banks with "WOBD"[23] and 105 observations for 35 banks without "WOBD". Furthermore, there are 21 observations from 7 banks with "HCCL"[24] and 105 observations from 35 banks without "HCCL", but for M&A reasons, therefore the final number of observations is 104.

Based on a comparison of banks with or without "WOBD", the mean and median of total assets in banks with "WOBD" are NT$1,646 billion and NT$1,574 billion, respectively, which is significantly higher than NT$1223.1 billion and NT$1102.5 billion for banks without "WOBD" at the 1% level. It is worth mentioning that although banks with "WOBD" signal poor performance in the past five years, due to the advantages of their large scale, excellent human resources and adaptability, the operating performance of the subsequent three years are significant higher than banks without "WOBD". We show the detailed figures for the five indexes as follows: Banks with "WOBD" are obviously better than banks without "WOBD", the cost revenue ratio ranges from 27.21% to 34.52%, ROA from 0.26% to 0.05%, ROE from 4.82% to -1.74%, the pretax income ratio ranges from 11.00% to 0.38%, and the gross profit ratio from 34.07% to 28.09%. We stated that banks with "HCCL" signal poor performance in retail finance. Panel B in Table 2 shows that banks with "HCCL" are characterized by their smallness of the scale of their assets, poor performance (measured by their cost-to-revenue ratio) and profitability. The mean and median of the total assets of the banks with "HCCL" (NT$957.6 billion and NT$857.3 billion) are significantly lower than for

banks without "HCCL" (NT$1452.5 billion and NT$1589.7 billion). Overall, the operating efficiency and profitability of banks with "HCCL" are lower than for banks without "HCCL". This is displayed by the medians of the following five indexes: the cost-to-revenue ratio ranges from 31.29% to 25.74%, ROA from 0.1% to 0.42%, ROE from 1.68% to 7.79%, the pretax income ratio from 4.28% to 16.53% and the gross profit ratio from 34.48% to 35.63%.

Table 3 presents a comparison of the four different types of ownership for banks from the perspective of total assets, operating efficiency and profitability. The empirical results indicate that the total assets scale ratings are as follows: the state-owned banks (mean NT$2582.3 billion), private financial holding companies (mean NT$1355.0 billion), private non-financial holding companies (mean NT$439.0 billion) and foreign banks (mean NT$2872 billion). In terms of the cost revenue ratio displaying the operating efficiency, the worst is state-owned banks (median 52.57%) followed by foreign banks (median 38.22%), private non-financial holding companies (median 30.35%) and private financial holding companies, which have the best operating efficiency (median 25.74%). From the perspective of profitability, we find that state-owned and private holding banks are little different, the means of ROA and ROE range from 0.37% to 0.30% and 9.33% to 3.00%, respectively, and are significantly higher than for private non-financial holding banks and foreign banks for which the means range from -0.54% to -0.65% and -10.11% to -14.77%.

Table 4 summarizes the descriptive statistics of the borrowing companies' characteristics, which include 36,024 observations from 2003 to 2008. Distinguished by their credit risk, companies with TCRI $\geqq$ 7 are regarded as high credit risk companies, with a total of 16,187 observations, while TCRI $\leqq$ 4 are regarded as low credit risk companies, with a total 4,643 observations. From the observations we find that most publicly-held companies are with high credit risk, which is featured by the disadvantages in terms of the small scale of assets, poor profitability, a high debt ratio and loan spreads. Compared to companies with high credit risk, companies with low credit risk display the advantages in the following indexes: total assets ranging from 113.906 billion to 4.879 billion; a pretax income ratio from 10.91% to -1.95%; a debt ratio from 41.40% to 53.41%; a borrowing interest rate from 2.909% to 3.534%, and a borrowing spread from -1.429% to -0.734%.

Table 2. Description Statistics - by lending performance

		Sample	Mean	Median	Std.	Min.	Max.
Panel A with(wi) or without(wo) "WOBD"							
wi	Total assets (10 billion)	21	164.6***	157.40***	50.99	82.29	248.7
	Cost-to-revenue ratio (%)	21	27.21***	25.74***	3.63	22.80	34.47
	ROA (%)	21	0.26***	0.42***	0.72	-2.36	0.82
	ROE (%)	21	4.82 ***	10.01***	13.74	-46.08	13.98
	Pretax income ratio (%)	21	11.00***	16.53***	20.26	-55.59	33.38
	Gross profit ratio (%)	21	34.07***	35.63***	16.77	-23.17	53.79
wo	Total assets (10 billion)	105	122.31	110.25	89.74	0.16	359.41
	Cost-to-revenue ratio (%)	105	34.52	26.89	23.05	10.32	267.43
	ROA (%)	105	0.05	0.17	1.34	-6.67	5.86
	ROE (%)	105	-1.74	2.33	19.01	-113.05	14.7
	Pretax income ratio (%)	105	0.38	5.75	30.74	-188.84	72.3
	Gross profit ratio (%)	105	28.09	35.3	27.41	-160.86	91.21
Panel B with(wi) or without(wo) "HCCL"							
wi	Total assets (10 billion)	21	95.76***	85.73***	39.63	16.45	158.61
	Cost-to-revenue ratio (%)	21	31.36***	31.29***	3.91	24.57	62.41
	ROA (%)	21	-0.30***	0.1***	1.15	-6.67	0.82
	ROE (%)	21	-5.74***	1.68***	18.87	-70.06	12.8
	Pretax income ratio (%)	21	-6.94***	4.28***	26.51	-132.63	18.79
	Gross profit ratio (%)	21	25.34***	34.48***	25.53	-62.74	53.79
wo	Total assets (10 billion)	104	145.25	158.97	85.28	0.16	359.41
	Cost-to-revenue ratio (%)	104	32.22	25.74	21.09	10.32	267.43
	ROA (%)	104	0.27	0.42	1.11	-5.55	5.86
	ROE (%)	104	2.80	7.79	16.52	-113.05	14.7
	Pretax income ratio (%)	104	8.01	16.53	27.15	-188.84	72.3
	Gross profit ratio (%)	104	31.95	35.63	23.44	-160.86	91.21

Table 3. Descriptive Statistics - by ownership of banks

	Sample	Mean	Median	Std.	Min.	Max.
State-owned banks						
Total assets (10 billion)	8	258.23	242.15	57.56	184.84	359.41
Cost-to-revenue ratio (%)	8	41.13	52.57	17.01	22.80	64.09
ROA (%)	8	0.37	0.41	0.05	0.31	0.42
ROE (%)	8	9.33	9.73	1.70	7.18	11.30
Pretax income ratio (%)	8	14.84	16.52	2.29	11.71	16.53
Gross profit ratio (%)	8	32.32	31.54	2.08	30.19	35.15
Private financial holding companies						
Total assets (10 billion)	42	135.50	148.74	48.20	22.67	205.05
Cost-to-revenue ratio (%)	42	27.66	25.74	17.87	10.32	267.43
ROA (%)	42	0.30	0.49	1.09	-5.17	5.86
ROE (%)	42	3.00	8.13	15.96	-108.02	13.98
Pretax income ratio (%)	42	8.77	16.55	24.25	-121.92	72.30
Gross profit ratio (%)	42	34.14	37.60	20.36	-87.34	91.21
Private non-financial holding companies						
Total assets (10 billion)	34	43.90	30.97	39.61	0.16	116.21
Cost-to-revenue ratio (%)	34	36.15	30.35	21.26	15.36	122.44
ROA (%)	34	-0.54	0.01	1.38	-6.67	1.77
ROE (%)	34	-10.11	0.24	21.56	-113.05	14.70
Pretax income ratio (%)	34	-14.70	0.72	37.03	-188.84	35.90
Gross profit ratio (%)	34	15.85	24.76	35.84	-160.86	56.49
Foreign-owned banks						
Total assets (10 billion)	17	28.72	28.44	20.26	0.76	63.64
Cost-to-revenue ratio (%)	17	46.07	38.22	15.54	29.95	94.82
ROA (%)	17	-0.65	-0.69	0.61	-1.26	0.00
ROE (%)	17	-14.77	-15.55	13.80	-28.53	0.06
Pretax income ratio (%)	17	-18.81	-19.07	14.53	-33.32	-3.95
Gross profit ratio (%)	17	18.50	17.72	17.21	1.34	36.76

Table 4. Descriptive Statistics - by credit risk of borrowing companies

	Sample	Mean	Median	Std.	Min.	Max.
Total sample						
Total assets (10 billion)	36,024	214.26	36.92	1,107.47	1.47	15,545.37
Pretax income ratio (%)	36,024	3.74	3.73	13.81	-99.53	98.79
Debt ratio	36,024	48.60	48.41	13.82	3.91	97.4
TCRI credit rating	36,024	6.27	6	1.53	1	9
Borrowing interest rate (%)	21,613	3.235	2.890	1.292	0.020	10.050
Borrowing spread (%)	21,613	-1.050	-1.401	1.382	-5.563	6.127
Sample with TCRI≧7						
Total assets (10 billion)	16,187	48.79***	22.49***	111.28	1.47	2180.60
Pretax income ratio (%)	16,187	-1.95***	0.85***	14.18	-99.53	98.79
Debt ratio	16,187	53.41***	53.80***	13.91	3.91	97.40
Borrowing interest rate (%)	9,082	3.534***	3.257***	1.267	0.020	10.050
Borrowing spread (%)	9,082	-0.734***	-1.010***	1.345	-5.028	6.127
Sample with TCRI≦4						
Total assets (10 billion)	4,643	1,139.06	266.93	2,842.43	10.28	15,545.37
Pretax income ratio (%)	4,643	10.91	8.06	13.32	-28.06	98.20
Debt ratio	4,643	41.40	40.06	11.05	8.44	70.67
Borrowing interest rate (%)	2,950	2.909	2.540	1.335	0.020	9.100
Borrowing spread (%)	2,950	-1.429	-1.770	1.422	-5.563	5.466

4.2 Factors impacting the loan spreads - banks with or without "WOBD"

This section aims to focus on banks with or without "WOBD", and from those banks we select the relationship borrowers as samples to explore the factors impacting the loan spreads. By distinguishing these factors from the aspects of creditor banks and borrowing companies, for the former we emphasize lending performance[25], ownership type and relationships, and for the latter we focus on credit risk ratings and ratings upgrade or downgrade statuses. The empirical results are shown in Table 5. Model (1) in Table 5 simply verifies the impact of related dimensions on loan spreads. Model (2) includes the interaction items of credit risk of the borrowing companies (measured by a dummy variable) with each dimension verifying whether the level of credit risk impacts the loan spreads. Furthermore, model (3) includes the upgrade and downgrade credit status of borrowing companies to verify how they affect the loan spreads.

The results of model (1) in Table 5 indicate that for borrowing companies with a high credit risk level, the creditor banks will charge higher loan spreads. The loan spreads for banks with WOBD are obviously higher than for banks without WOBD, a finding that is consistent with the empirical results of Coleman et al. (2002). The loan spreads of private financial holding institutions and private non-financial holding banks are significantly lower than those for state-owned banks, which means that after the M&A involving the financial institution, the private financial holding institutions make the most of lowering their interest rates to attract borrowers. The loan spreads of private financial holding institutions are significantly lower

than those of the non-financial holding banks which imply that the private financial holding institutions create scale and scope economies by means of expanding the territory and receive more competition advantages in their lending business. The foreign banks seem to be conservative in the Taiwan banking industry for, perhaps out of consideration for the cost of capital, they always required higher loan spreads. The relationship level presents no significant influence on loan spreads which is inconsistent with the finding of Chen and Lai (2003): "the relationship level will affect the loan spreads"[26].

The results of Empirical model (2) in Table 5 indicate that companies borrowing from banks with WOBD receive higher loan spreads than companies borrowing from banks without WOBD. However, there is no significant difference in loan spreads between borrowing companies dealing with banks with or without WOBD, which suggests that banks with WOBD did not require higher loan spreads from borrowing companies with high credit risk which somehow reveals that banks are unable to take advantage of the borrowers. Although companies borrowing from private financial holding institutions and private non-financial holding banks receive lower loan spreads than state-owned banks, there is no difference in the case of borrowing companies with high credit risk, which is consistent with the findings of Panetta et al. (2009): "After the M&A of Taiwan financial institutions, the information advantage of the Taiwan financial market disappears and banks post-M&A did not possess the ability to take advantage of borrowers." As for the borrowers with a high level of credit risk, the banks did not ask for an extra risk premium, which may explain why for post-M&A Taiwan financial institutions, banks have increased their risk tolerance, and therefore did not respond to the interest rate. Empirical model (2) presents the results indicating that the loan spreads of foreign banks are significantly higher than those of state-owned banks when facing borrowing companies with high credit risk, which implies that the pricing strategies of foreign banks can reasonably respond to the credit quality of the borrowing companies and pay more attention to the information presented in the financial statements, which is consistent with the findings of Berger-Udell (2001): banks that are large in size, foreign banks and banks facing a financial crisis tend to engage in transactional lending[27].

The results of Empirical model (3) in Table 5 indicate that in the case of borrowing companies with upgraded credit ratings, banks adversely increase the loan spreads. With regard to the high-risk borrowing companies, if they can upgrade their credit rating 3 years before financing, the bank will lower the loan spreads, revealing that the lending price only responds to high-risk borrowing companies when their credit quality improves. For common borrowers, banks do not adjust the interest rate for them even if their credit qualities have improved. With respect to the characteristics of the borrowing companies, we find that for borrowing companies that are small in size and have high debt ratios, banks will often grant them higher loan spreads. From the characteristics of the banks, we find that the banks that are large in size and characterized by low efficiency will often give borrowers higher loan spreads.

Table 5. The impact of the customer's credit state and relationships on loan spreads- sampling with or without "WOBD"

Dimensions	Independent variables	Loan spreads (1)	Loan spreads (2)	Loan spreads (3)
	Intercept	-0.9139	-0.7889	-0.8547
		(0.0278)**	(0.0610)*	(0.0420)**
TCRI	TCRI	0.4123	0.3814	0.4131
		(<.0001)***	(<.0001)***	(<.0001)***
status	bad_debt_{it}	0.1480	0.1871	0.1856
		(<.0001)***	(<.0001)***	(<.0001)***
	bad_debt_{it}*$TCRI_{jt}$		-0.0504	-0.0442
			(0.4170)	(0.4784)
Ownership	$hold_{it}$	-0.3380	-0.4167	-0.4086
		(<.0001)***	(<.0001)***	(<.0001)***
	$hold_{it}$*$TCRI_{jt}$		0.1005	0.0928
			(0.1103)	(0.1419)
	$nonhold_{it}$	-0.1870	-0.2709	-0.2623
		(0.0049)***	(0.0047)***	(0.0062)***
	$nonhold_{it}$*$TCRI_{jt}$		0.1037	0.0843
			(0.3036)	(0.4047)
	$fore_{it}$	0.2597	0.0638	0.0717
		(0.0013)***	(0.4941)	(0.4422)
	$fore_{it}$ *$TCRI_{jt}$		0.4968	0.4970
			(0.0010)***	(0.0009)***
Relation_type	$largest_{it}$	0.0199	0.1047	0.1153
		(0.6426)	(0.0945)*	(0.0661)*
	$largest_{it}$*$TCRI_{jt}$		-0.1278	-0.1226
			(0.1209)	(0.1403)
	$main_{it}$	0.0260	0.0648	0.0680
		(0.4651)	(0.1957)	(0.1760)
	$main_{it}$ * $TCRI_{jt}$		-0.0746	-0.0663
			(0.2796)	(0.3385)
TRCI_state	$upgrade_{jt}$			0.6157
				(0.0012)***
	$upgrade_{jt}$* $TCRI_{jt}$			-0.9321
				(<.0001)***
	$downgrade_{jt}$			-0.0047
				(0.9653)
	$downgrade_{jt}$* $TCRI_{jt}$			-0.0635

Dimensions	Independent variables	Loan spreads (1)	Loan spreads (2)	Loan spreads (3)
				(0.6093)
firm	Size1	-0.0961	-0.0984	-0.0962
		(<.0001)***	(<.0001)***	(<.0001)***
	Leverage	0.0069	0.0067	0.0072
		(<.0001)***	(<.0001)***	(<.0001)***
	Ros	-0.0085	-0.0087	-0.0086
		(<.0001)***	(<.0001)***	(<.0001)***
bank	Size2	0.0241	0.0223	0.0217
		(0.1429)	(0.1763)	(0.1876)
	cost_income	0.1903	0.1757	0.1909
		(0.0169)**	(0.0298)**	(0.0183)**
	Adj.R^2	0.1977	0.1999	0.2041
	F- value	109.8	74.264	62.314
	Samples	4447	4447	4447

Notes 1：*** significant at the 1% level,** significant at the 5% level,* significant at the 10% level, and the empirical period is 2008.

Notes 2: Residual heterogeneity has been adjusted by using the White heteroskedasticity robustness test.

4.3 Factors impacting the loan spreads - banks with or without "HCCL"

The results of model (1) in Table 6 show that borrowing companies with high credit risk often receive higher loan spreads. Banks with HCCL will require higher loan spreads which are consistent with the conclusions of "the companies that borrow from the banks with WOBD will receive higher loan spreads," which also reveal that banks that are heavily impacted by retail and corporate finance will ask the borrower to pay a higher interest rate. Model (1) also indicates that the private financial holding institutions and private non-financial holding institutions will grant lower loan spreads than state-owned banks. The largest and main banks with closer relationships will grant borrowing companies lower loan spreads, and the largest banks will grant lower loan spreads[28] than the main banks which is consistent with the findings of Berger-Udell (1995) that the borrowing companies which have closer relationships with the creditor banks can receive lower loan spreads.

Model (2) includes all interaction items related to the borrowing companies' credit risk with each dimension, and the results show that companies borrowing from banks with HCCL receive higher loan spreads than companies borrowing from banks without HCCL. However, if we only verify borrowing companies with high credit risk, the adverse results indicate that banks with HCCL will grant lower loan spreads than banks without HCCL. Therefore we refer the heavy losses to banks with HCCL to their ignoring the strict review of the identification, financial position and solvency of the borrowers while issuing the card debt and simultaneously as banks are regarded as having high credit risk. The findings indicate that banks with HCCL failed to learn their lessons from past experiences and still granted lower loan spreads to high credit risk borrowing companies in their corporate finance business. Private financial holding institutions and private non-financial holding institutions

grant lower loan spreads than state-owned banks. However, if we focus on a comparison of the borrowing companies with high credit risk, there is no statistically significant difference, which implies that the M&A of financial institutions does not work in terms of increasing the ability to sift borrowers. Through model (2) we find that the largest banks grant lower loan spreads to borrowing companies, especially the borrowing companies with high credit risk, which we still found granted excellent loan spreads to borrowers with closer relationships. The findings indicate that the fact that the largest and main banks grant lower loan spreads to borrowers with high credit risk are consistent with the prediction of Chen and Lai (2003): when banks build intimate relationships with borrowers, they deeply understand the profitability of the borrowing companies, if they envision the true performance potential of the enterprises, they will be delighted to grant lower loan spreads. Another possible reason is that the loan spreads based on relationship lending do not truly reflect the credit risk of the borrowers.

Finally, the evidence shows that the borrowing companies had raised the credit rating in at least two years during the past three years, and that the creditor banks had adversely increased the loan spreads, which obviously indicates that banks in Taiwan are reluctant to implement the review system even in such a dramatically competitive lending market characterized by significant information asymmetry. If we include the interaction of both high credit risk and the upgrading state in the model, we will find that high-credit risk borrowing companies with an upgraded state can receive lower loan spreads, which is consistent with the results of model (3) in Table 5, and indicates that creditor banks will positively reflect the price of risk while the high credit risk borrowing companies will significantly increase their credit ratings.

Table 6. The impact of the customer's credit state and relationships on loan spreads - sampling with and without HCCL

Dimensions	Independent variables	Loan spreads (1)	Loan spreads (2)	Loan spreads (3)
	Intercept	0.8570	0.6754	0.6368
		(0.0239)**	(0.0798)*	(0.0993)*
TCRI	TCRI	0.1179	0.3204	0.3636
		(0.0094)***	(0.0002)***	(<.0001)***
status	$card\_debt_{it}$	0.2433	0.4577	0.4645
		(<.0001)***	(<.0001)***	(<.0001)***
	$card\_debt_{it}*TCRI_{jt}$		-0.2840	-0.2905
			(0.0251)**	(0.0214)**
ownership	$hold_{it}$	-0.4595	-0.3888	-0.3798
		(<.0001)***	(<.0001)***	(<.0001)***
	$hold_{it}*TCRI_{jt}$		-0.0932	-0.1040
			(0.1841)	(0.1375)
	$nonhold_{it}$	-0.4352	-0.3290	-0.3322
		(<.0001)***	(0.0008)***	(0.0006)***

Dimensions	Independent variables	Loan spreads (1)	Loan spreads (2)	Loan spreads (3)
	$nonhold_{it}$*$TCRI_{jt}$		-0.1299	-0.1305
			(0.1940)	(0.1884)
	$fore_{it}$	0.0713	0.1400	0.1583
		(0.3369)	(0.1963)	(0.1439)
	$fore_{it}$ * $TCRI_{jt}$		-0.0721	-0.0939
			(0.6091)	(0.5052)
relation_type	$largest_{it}$	-0.2669	-0.1479	-0.1276
		(<.0001)***	(0.0360)**	(0.0734)*
	$largest_{it}$*$TCRI_{jt}$		-0.1678	-0.1861
			(0.0406)**	(0.0246)**
	$main_{it}$	-0.1716	-0.0685	-0.0559
		(<.0001)***	(0.2552)	(0.3524)
	$main_{it}$ * $TCRI_{jt}$		-0.1471	-0.1585
			(0.0376)**	(0.0252)**
TRCI-state	$upgrade_{jt}$			1.5386
				(<.0001) ***
	$upgrade_{jt}$* $TCRI_{jt}$			-1.6456
				(<.0001)***
	$downgrade_{jt}$			-0.0670
				(0.6823)
	$downgrade_{jt}$* $TCRI_{jt}$			0.0497
				(0.7714)
firm	Size1	-0.1487	-0.1475	-0.1455
		(<.0001)***	(<.0001)***	(<.0001)***
	Leverage	0.0057	0.0057	0.0057
		(<.0001)***	(<.0001)***	(<.0001)***
	Ros	-0.0147	-0.0150	-0.0149
		(<.0001)***	(<.0001)***	(<.0001)***
bank	Size2	0.0310	0.0321	0.0308
		(0.0345)**	(0.0290)**	(0.0357)**
	cost_income	0.0404	0.0386	0.0364
		(0.5022)	(0.5241)	(0.5471)
	Adj.R^2		0.0955	0.0979
	F- value		81.470	68.23
	Samples		12032	12032

Note 1: The empirical period is 2006-2008, and the remaining signs or empirical methods are the same as in Table 5.

4.4 Robustness test - measuring the relationships based on financing ratios for different types of bank ownership

Since dividing the creditor banks into those characterized by high and low credit risk to observe the lending behavior and examine the factors impacting loan spreads may lack generality and validity, we perform a robustness test. First, we do not deliberately select the samples off borrowing companies from the high or low credit risk creditor banks, but on the contrary we randomly select the samples of borrower from listed, OTC and emerging companies for the period 2000-2010, and have a total of 4,381 observations. The total assets of these companies amount to 16.094 billion on average and the average credit rating is higher than level 6 based on TCRI[29]. Then, according to the concept presented by Kuo and Chen (2012), we measure the relationships based on the ratio of the financing amount to the total assets of each sample borrower instead of using the biggest creditor, the main creditor and non-main creditor to distinguish the relationships[30]. By dividing the creditor banks based on the ownership, we find that most (i.e., 2,253) of the sample companies borrow from state-owned banks, followed by private financial holding banks (1,160), private non-financial holding banks (i.e., 784), and finally foreign banks (with only 221 observations). Moreover, we find that the sample of borrowers that obtained loans from foreign banks were characterized by the best credit ratings and the largest scale of assets, and therefore the banks granted lower loan spreads. In addition, the sample of borrowers that obtained loans from the private non-financial holding banks was characterized by the worst credit ratings and profitability ratios. In addition, in taking into consideration the existence of big differences among listed, OTC and emerging companies in terms of issuing conditions, we add two dummy variables to denote the organizational types in this section. While focusing on the lending practices and environment in Taiwan, we find that it is easier for borrower with their larger scale of operations to obtain unsecured borrowing and, therefore, in the empirical model in Table 7 we include a dummy variable to denote whether the sampled borrowers provided collateral.

To sum up, the differences between Table 7 and Tables 5 and 6 are that in Table 7 we did not use lending performance (with or without WOBD or HCCL) to denote whether the credit risk of creditor banks was high or low. Furthermore, we added two dummy variables to describe the organizational types and a dummy variable to denote whether the sampled borrowers provided collateral. Moreover, we used the financing ratio among the creditor banks to measure the relationships instead of using the greatest creditor bank, main creditor bank and non-main creditor bank. For comparison purposes, the three empirical models in Tables 5, 6 and 7 are similar. Empirical model (1) is regarded as the basic model of loan spreads which include the characteristics of factors impacting borrowing companies and creditor banks, ownership types, relationships, the upgrading and downgrading of credit ratings, organizational types and whether the borrower provides collateral. In addition to the factors impacting borrowing companies and creditor banks in model (1), models (2) and (3) use the TCRI index to distinguish high from low credit risk, and also include the interaction items of each dimension to further examine the factors impacting the loan spreads.

According to the results of empirical models (1), (2) and (3) in Table 7, the loan spreads of

private financial holding banks and private non-financial holding banks are significantly lower than those of state-owned banks (in model (1) the coefficient values are -0.0078 and -0.0095), and only the foreign banks are an exception. If we compare the same dimensions in Tables 5 and 7, we find that the results of Table 7 are substantially consistent with Tables 5 and 6, which indicates that in the dramatically competitive financial environment characterized by overbanking, banks have developed a low-loan-spreads strategy, which has led to the results of WOBD and HCCL and has even caused the occurrence of problematic banks that adversely affect the financial development of the country. In recent years, about half of the private banks have operated successfully and sustained their normal lending performance. Therefore the results of Tables 5 and 6 suggest that only foreign banks increase their loan spreads while facing borrowers with high credit risk (the coefficient values in Tables 5 are 0.4968 and 0.4970), regardless of whether private banks belong to financial holding companies; when facing borrowers with high credit risk their loan spreads continue to remain unchanged. However, in Table 7, we find that private financial holding banks will increase their loan spreads while facing borrowers with high credit risk (model (2) in Table 7 shows a coefficient of 0.0189). Private non-financial holding banks will significantly increase their loan spreads when facing borrowers with high credit risk (models (2) and (3) in Table 7 reveals coefficients of 0.0216 and 0.01 with statistical significance at the 5% and 10% levels). The foreign banks adversely reduce their loan spreads when facing borrowers with high risk over the past decade (the coefficient is -0.0122).

As mentioned earlier, only the results of Table 6 indicate that closer relationships can reduce the interest burden of the borrowers; the largest and main banks still significantly reduce their loan spreads when facing borrowers with high credit risk. However, after verifying the past ten years of data for the borrowers, model (1) in Table 7 reveals that only state-owned banks with closer relationships will tend to lower their loan spreads (the coefficient is -0.0028); the remaining three types of banks increase their loan spreads adversely (the coefficient values are 0.0014, 0.0017 and 0.0099, respectively). We also find that only non-financial holding companies that maintain closer relationships with borrowers are willing to reduce their loan spreads when facing borrowers with high credit risk. We recall the results of Tables 5 and 6, which indicate that banks will reasonably increase their loan spreads while the borrowers' credit risk rises even higher. However, Table 5 indicates that when the high credit risk borrowers see their credit ratings upgraded, the banks would like to lower the loan spreads (the coefficient is -0.9321). According to the results of Table 7, only model (2) indicates that the creditor banks will increase their loan spreads (the coefficient is 0.0237), when the credit risk of the borrowers has been rising during the past ten years. If the borrowing companies increase their credit ratings, the creditor banks will obviously reduce their loan spreads (the coefficient is -0.0165), but when facing high credit risk borrowers with upgraded credit ratings, the loan spreads will adversely abnormally increase (the coefficient is 0.0237).

Moreover the results in Table 7 indicate that the loan spreads extended to listed firms and OTC-listed companies are lower than those extended to emerging companies. In general, the larger the scale of banks and firms, the lower the loan spreads that are given and taken[31]. With regard to the debt and profitability ratios, the expected positive or negative directions are

confirmed in Tables 5 to 7. The following conditions are unexpected: the cost-to-revenue ratio and loan spreads displayed are significantly negatively associated (the coefficient is -0.0328); the borrowers with collateral adversely receive higher loan spreads (the coefficient values are 0.0103 and 0.0064, respectively).

Table 7. The impact of the customer's credit status and relationships on loan spreads--measuring relationships by the financing ratio of different ownership types

Dimensions	Independent variables	Loan spreads (1)	Loan spreads (2)	Loan spreads (3)
	Intercept	-0.0032	0.0849***	0.1272***
ownership	$hold_{it}$	-0.0078***	-0.0222**	-0.0075
	$hold_{it}$*$TCRI_{jt}$		0.0189**	0.0094
	$nonhold_{it}$	-0.0095***	-0.0218**	-0.0145**
	$nonhold_{it}$*$TCRI_{jt}$		0.0216**	0.0100*
	$fore_{it}$	-0.0122***	0.0023	0.0164
	$fore_{it}$ * $TCRI_{jt}$		-0.0093	-0.0038
relation_type (measured by financing ratio of different ownership types)	From Private financial holding banks (symbol hold-r_{it})	0.0014***	0.0017	0.0034
	hold-r_{it}*$TCRI_{jt}$		-0.0002	-0.0038
	From Private non-financial holding banks (symbol nonhold-r_{it})	0.0017***	0.0172***	0.0179***
	nonhold-r_{it}*$TCRI_{jt}$		-0.0229***	-0.0154***
	From foreign banks (symbol fore-r_{it})	0.0099***	0.0243	-0.0191
	fore-r_{it}*$TCRI_{jt}$		-0.0357	0.0088
	From state-owned banks (symbol state-$owned_{it}$)	-0.0028***	0.0067	0.0068**
	state-$owned_{it}$ *$TCRI_{jt}$		-0.0073	-0.0050
TCRI_state	$TCRI_{jt}$	0.0040	0.0237***	0.0035
	$upgrade_{jt}$			-0.0165***
	$upgrade_{jt}$* $TCRI_{jt}$			0.0142**
	$downgrade_{jt}$			0.0106
	$downgrade_{jt}$* $TCRI_{jt}$			-0.0094
Organization types	listed	-0.0021***	-0.0055***	-0.0065***
	OTC	-0.0034***	-0.0053***	-0.0027***

firm	Size1	-0.0035***	-0.0013**	-0.0006**
	Leverage	0.0301***	0.0237***	0.0166***
	Ros	-0.0110***	-0.0031***	-0.0047***
With or without collateral	Collateral	0.0015	0.0103***	0.0064***
bank	Size2	0.0008**	-0.0049***	-0.0067***
	cost_income	-0.008***	-0.0031	-0.0328***
Adj.R^2		33.01%	33.95%	34.31%
F- value		41.70	34.45	31.32
Samples		2,148	2,148	2,148

Note 1: For simplicity, we omitted the p value of each independent variable, ***, ** and * represent the 1%, 5% and 10% significance levels, respectively. The empirical data cover the period 2000-2010.
Note 2: When there is heteroskedasticity in the residuals of the empirical model, the White heteroskedasticity robustness method is used to make the adjustment.

5. Conclusions

Over the past decade, the Asian financial crisis (1997), the occurrence of huge bad debts in the banking industry (2002-2004), credit card debt events (October 2005), the subprime mortgage (August 2007) and the Fannie Mae and Freddie Mac event (July 2008) successively impacted Taiwan's financial markets. The Taiwan government responded by implementing the first and second "financial reforms," and the related procedures resulted in major and dramatic changes to the operating status of the banking system as a whole. This study has systematically performed empirical tests in order to understand how the credit status and relationships have impacted the loan spreads. The findings of this paper are as follows: (1) Private financial holding companies and private non-financial holding companies grant loan spreads that are significantly lower than those of state-owned banks. Foreign banks grant loan spreads that are significantly higher than those of state-owned banks, and only foreign bank loan spreads are significantly higher than those of state-owned banks when borrowers are considered to be high risk. (2) Tables 5 and 6 reveal that banks reduce their loan spreads only for high credit risk borrowers with obvious improvements in credit ratings, but this does not apply to general borrowers even when the credit rating condition is improved. However, during the past decade the adverse results shown in Table 7 indicate that the creditor banks reduce their loan spreads, when the borrowing companies have their credit ratings upgraded, but even if the high credit risk borrowing companies have their credit ratings upgraded, the creditor banks will adversely increase the loan spreads. (3) Empirical findings show that the biggest and main creditor banks exhibit significantly lower loan spreads, and were also willing to give high credit risk customers lower lending spreads, which imply that Taiwan's banks emphasis "banking relationship" while lending. And only state-owned banks grant lower loan spreads to borrowers with which they have closer relationships, while the remaining three types of banks in terms of ownership adversely increase their loan spreads. Only private non-financial holding companies have their loan spreads reduced while facing high credit risk borrowers with closer relationships. These findings contribute some points in relationship lending and impacting factors on loan spreads. (4) Using data for the past decade,

Table 7 shows that only state-owned banks grant lower loan spreads to borrowers with which they have closer relationships, while the remaining three types of banks in terms of ownership adversely increase their loan spreads. Only private non-financial holding companies have their loan spreads reduced while facing high credit risk borrowers with closer relationships. Furthermore, Taiwan's bank ask higher loan spreads for OTC and listed company's clients with collateral, it may relate to the common practice of unsecured loan to such enterprises with bargain interest rate.

Notes

1. Many studies indicate that reducing the credit availability is an instrument that can be used in response, but considering the multiple relationships existing in Taiwan and the utilization rate of the credit availability being on average lower than 70%, the

Index cannot be properly reflected in the credit behavior. We have therefore omitted the Index in this study.

2. The amendment and promulgation of the Six Financial Laws relate to the following events: the "Banking Law" amendment (November 1, 2000 announcement), the "Financial Institutions Merger Act" (December 13, 2000 announcement), the "Financial Holding Company Law" (July 9, 2001 announcement and enactment on November 1 of the same year.), the "Financial Asset Securitization Act" (June 20, 2002 approved), the "Financial Supervisory Commission Organization Act" (established July 1, 2004), and the "Financial Restructuring Fund Ordinance" (approved June 22, 2005).

3.The "258" policy requires all banks to reduce the NPL ratio to below 5% and to increase the capital adequacy ratio to above 8% within two years.

4. According to "Financial Statistics Monthly" issued by the Central Bank at the end of 2008, we can simply classify the accumulated bad debts written off during the last five years as follows: Banks or financial holding companies with accumulated bad debts written off of more than NT$50 billion (7). However, to avoid trouble from related parties, we do not mention the detailed information of the banks or financial holding companies. Further information is available from the authors upon request.

While we do not believe this affects our research, we sincerely welcome any comments.

5. "The Bankers' Association of the Republic of China" announced that 8 banks experienced heavily losses during the credit card debt crisis, while the others did not encounter big losses during the credit card debt crisis. However, to avoid trouble from related parties, we do not mention the detailed information about the banks or financial holding companies. Further information is available from the authors upon request. While we do not believe this affects our research, we sincerely welcome any comments.

6. Specifically, the samples verified in this study consist of borrowers selected from banks with WOBD and HCCL. The control samples are made up of borrowers selected from banks without WOBD and HCCL.

7. Lending cases with rational efficiency simply mean that the worse the borrower's credit rating, the higher the lending rate should be. If the borrowers upgrade (downgrade) their credit rating the stipulations of the review system should decrease (increase) on the loan spreads. However, if the level of intimacy in the banking relationship is taken into

consideration, since it is unclear whether the loan spreads will maintain their reasonable positive and negative association, the creditor banks are faced with a problem of moral crisis and adverse selection.

8. The empirical results of Kuo and Chen (2012) indicate that on average there are 1.51 relationship banks for a micro-small enterprise, and the credit availability usage ratio and collateral ratio are 62% and 46%, respectively.

9. When the total annual loan amount is ranked in the second to fourth largest to the borrowing company, we denote such creditor banks as the main banks, and the other creditor banks of the borrowing company as the non-main banks.

10. Whether the bank is characterized by WOBD or not is directly related to the lending ability and risk consciousness of the bank and is displayed in the corporate performance of the creditor banks. As to whether the bank experienced HCCL or not has an indirect impact on the loanable funds and reputation of the creditor bank and is related to the retail performance.

11. To put it simply, abnormal refers to lending irrationally. For example, granting a high credit risk borrower with lower loan spreads.

12. The challenge of credit risk will be more serious for the creditor bank when facing a depressed financial environment if the top executives cannot envision the overall operating strategy and quickly transfer to the retail financing of cash and credit card lending. A lack of risk consciousness and the management mechanism of the card holder and issuer led to a second huge loss and impacted the bank both directly and indirectly simultaneously.

13. In this study we use the classification methods of the TEJ, dividing the credit risk of borrowing companies into three levels:TCRI ≤ 4 for those categorized by low credit risk, and TCRI ≥ 7, which is considered high credit risks. In between the companies are regarded as moderate, and not discussed.

14. We exclude the factor of credit availability in the empirical model. The reason can be found by referring to note 1.

15. As for the transactional lending, customers simply fill out their data regarding salary income, operating income and other fixed items. Through the help of a computer, the whole transaction or application process can be completed, which is known as lending based on hard information. Common examples are credit card lending, short-term financing collateral with accounts receivable, notes receivable and inventory. Relationship lending always uses soft information as the basis for approval or not. For example, they emphasize the value of borrowers' vision, business philosophy, and positive or negative gossip or evaluation. They can also accept collateral from top managers or act as a guarantor personally, which is known as outside collateral, and is different from the inside collateral which provides company assets as collateral.

16. Hubbard et al. (2002) measured the bank's risk based on the ratio of self-capital to total assets: the lower the ratio, the higher the risk of capital.

17.Coleman et al. (2002) used the capital adequacy ratio, the ratio of cash to total assets, and the loans to deposits ratio as a proxy for bank risk.

18. Although companies borrow from financial institutions, including life insurance companies and the securities, bills and leasing industry, since the bank loans are still the most common kind of loans, our sample therefore only includes borrowers from the banking industry and does not contain data on loans from any other industries.

19. In considering the reliability and validity, we extend the empirical periods from 2008 to 2010, while conducting the robustness tests to observe possible changes in related factors.

20. According to the Topics of credit ratings (76) issued by the TEJ, when TCRI is above level 6 the default probability will obviously increase. Therefore, it is reasonable to define a borrower with a TCRI level of 7 to 9 as the high credit risk in this study.

21. According to the viewpoints of Berger et al. (2008) there are five motives of multiple banking relationships: (1) Only one relationship bank is unable to meet all the funding requirements, so through multiple banking relationships is satisfied the shortage of funds. (2) Multiple banking relationships can mitigate the hold-up problem of a single banking relationship. (3) Multiple banking relationships can avoid the worry of repayment or early termination. (4) To avoid the relationship bank getting lost in the loose credit policies. (5) Focusing on the monitoring costs and benefits of the bank.

22. Four different ownership types of bank are verified by the F test and Wilcoxon rank sum method respectively in order to know whether the mean or median of each factor exhibits a significant difference. Due to the significant differences in the just number of samples for the four ownership types of banks and the subsequent test that focuses on comparing those three types with state-owned types individually, we therefore omit the difference test in Table 3.

23. According to "Financial Statistics Monthly" issued by the Central Bank at the end of 2008, we can simply classify the accumulated bad debts written off during the last five years as follows: bank or financial holding company with accumulated bad debts written off of more than NT$50 billion or not. However, to avoid trouble from related parties, we do not mention the detailed information of the bank or financial holding company. For more information, please contact the authors. The omission of such information does not affect this research, and we sincerely welcome any comments.

24. "The Bankers' Association of The Republic of China" declared that there were 8 banks that experienced heavy losses as a result of the credit card debt crisis, and the others did not encounter a big loss during the period of the credit card debt crisis.

However, to avoid offending the related parties, we do not mention the detailed information of the bank or financial holding company. If you need more information, welcome to write to us. The omission of such information does not affect this research, and we sincerely welcome any comments.

25. There are three banks that meet the criteria of WOBD and HCCL at the same time while we distinguish the risk type of the creditor bank based on the lending performance mentioned before. To avoid the confusion, we purposely delete the borrowing companies (publicly-held) from these three sample banks while empirical testing the impact of the characteristic of with or without WOBD and HCCL on loan spreads.

26. We use an alternative proxy to measure the level of intimacy of the banking relationship which is the ratio of the company's total borrowings to total assets. The empirical model (1) in Table 5 is not significant, but in model (2), the ratio of the company's total borrowings to

total assets is negatively associated with the loan spreads, the coefficient value is -0.5637 (the p value is 0.0311). The coefficient value is -0.5207 (the p value is 0.0474) for that variable in model (3) and the coefficient values for the interaction with the credit risk are -0.5637 (the p value is 0.0311), 0.5546 (the p value is 0.0508) in model (2) and in model (3), which suggests that the higher level of intimacy of the banking relationship deserves lower borrowing costs, but for the borrower with high credit risk the borrowing costs will increase.

27. Transactional lending focuses more on public and objective information such as financial statements, assets, operating ability and credit ratings and pays less attention to banking relationships.

28. Model (1) in Tables 5 and 6 display a finding concerning the impact of the level of intimacy of banking relationships on loan spreads, the former one being insignificant but the latter one being significant. The possible reason may be attributed to the empirical period of model (1) in Table 5 only containing 2008, while the empirical period of model (1) in Table 6 covers 2006 to 2008. The banking industry was pervasively affected by the financial crisis in 2008, and the more conservative lending policy was more focused on the credit ratings and financial statements while tending to ignore the banking relationships.

29. By comparing the total assets of the sample borrowers we found that the maximum of the total assets was 212.091 billion and the minimum was 0.050 billion, with the standard deviation reaching up to 60.377 billion. As to the credit rating for TCRI, this was found to display a standard deviation of 1.75.

30.We used the original method to perform the robustness test, which measures the level of intimacy of the banking relationships by dividing the creditor banks into the biggest, main and non-main. For space considerations and because there was nothing special in the empirical test, we have omitted this discussion from the article.

31. The empirical results differ from "the advantage of small banks" presented by Berger-Udell (2002), which indicated that the agent problem is not serious since the small banks have simple organizational structures.

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