THE LIQUIDITY ROLE OF A BANK IN BANK AND NON-BANK CONGLOMERATES: EVIDENCE FROM TAIWAN

Chien-An Wang*, Chung-Hua Shen**

Abstract

This paper studies the roles of a bank in a conglomerate, roles which are best investigated during a bad period. We examine two hypotheses using Taiwan's unique bank loan transaction data. Firstly, our extended liquidity constrained hypothesis which argues that during a bad period, investments of firms in a non-bank group are more severely constrained than they are during a normal period cannot be rejected. The same argument, however, does not hold true for firms in a bank group. Secondly, our extended liquidity insurance hypothesis which argues that during a bad period, firms can obtain funds only when they are in a bank group with a financially related core business is also accepted. When they are in a bank group with a core business unrelated to finance, the hypothesis is not expected to hold.

Key words: Extended Liquidity Constrained Hypothesis, Extended Liquidity Insurance Hypothesis, Bank Group.
JEL Classification: G21, G32.

I. Introduction

The number of studies pertaining to the role a bank plays in a conglomerate recently has been intensified. In earlier studies, the presence of a bank in a group[1] has, for the most part, been deemed as beneficial. For example, the main bank in a Japanese keiretsu can provide liquidity to its group affiliates, making them less vulnerable to economic shocks and financial constraints. Moreover, it is simply for firms in a group to obtain cheaper funding sources. Only recently, however, have researchers begun to challenge such notions, contending that including a bank in a group involves additional costs. As a case in point, a group may choose to maximize stability rather than profits, which means that their bank may not provide either liquidity or cheaper funding to distressed firms (See Ferris, Kim and Kitsabunnarat, 2003; Claessens, Fan and Lang, 2002). Pre-announced benefits may not in fact be realized. The question as to the precise role of a bank in a conglomerate, therefore, has yet to be resolved. Understanding the functions of a bank in a group can provide useful insight vis-à-vis business strategies for conglomerates.

The goal of this paper is to investigate the liquidity role of banks; this is best understood in conglomerate when Taiwan business group data during a bad period are used. We propose two hypotheses to examine this issue. First, we especially consider the 1997 Asian crisis into the conventional "*liquidity constrained hypothesis*" for firms in a *bank group* and firms in a *non-bank group*. The hypothesis asserts the view that during a normal period, member firms with a positive net present value (NPV) should not be financially constrained because their affiliated banks can provide them with liquidity whenever required. The rationale for this is that a close banking relationship can reduce the likelihood of having asymmetric information and hence, a firm with a positive NPV can obtain funds from outsiders (see Fazzari, Hubbard and Petersen, 1988; Hoshi, Kashyap and Scharfstein, 1991 and the literature review in the next section). There are, however, opposing views in this regard (see next section). This paper contending that the liquidity role of a bank is

* National Chi-Nan University, Taiwan.
** National Chengchi University, Taiwan.

[1] Throughout this paper, "group" and "conglomerate" are used interchangeably; also, "group firm" and "group affiliate" are used interchangeably.

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strengthened during a bad period and hence, firms in a *bank group* during Asian crisis should not be liquidity constrained while firms in a *non-bank group* will. We simply refer it to the "*extended liquidity constrained hypothesis*".

The role of a bank during a crisis period can also be examined by adopting the "*liquidity insurance hypothesis*", which describes the role of a bank when a firm in the same group suddenly confronts the risk of liquidity. The hypothesis asserts that an affiliated bank is able to guarantee the provision of liquidity to those firms which are considered to be worth rescuing. Tilly (1989) advocated this hypothesis by arguing that banks typically cut loans in a plunging economy because of firms' worsening balance sheets and a decreased net value of collateral. See also Abegglen and Stalk (1985) and Suzuki and Wright's (1985) for the similar argument. The difference in our approach to testing this hypothesis consists in the fact that we further divide *bank groups* into *non-financial core bank groups* and *financial core bank groups* based on their core business though both of them contain a bank. The core business of the former is not related to finance whereas that of the latter is[1]. Because previous studies have seldom classified *bank groups* on the basis of their core businesses, their results may not be robust. This core business argument is referred to as the "*extended liquidity insurance hypothesis*". We find that banks in *non-financial core bank groups* tended to rescue distressed firms during the 1997 Asian crisis, while those in *financial core bank groups* did not.

Our methodology of answering this question differs slightly from those in the literature. Because the investigation of this topic is best to have individual loan transaction data, which is typically not available in most countries, past studies have been based on firms' financial ratios to indirectly examine the similar issues (Ferris et al., 2003; Claessens et al., 2002). We overcome this problem by collecting Taiwan's bank loan transaction data laboriously, including loan contracts between firms and banks, such as loan rates, loan amounts, collateral, borrowers' and lenders' names, and so on. As such, we have a grip on the borrowing rates and amounts from member banks in the same group (hereafter *member bank*, MB) and from non-member banks in a different group (hereafter *non-member bank*), which allows us to directly test our hypothesis. This means that this study, unlike others, is a more direct evaluation of the hypothesis.

The next section briefly surveys the *extended liquidity constrained hypothesis* and *extended liquidity insurance hypothesis*. The third section introduces the business groups and data sources. Section IV lays out the model specifications, and Section V reports the estimated results. The last section presents some concluding remarks.

II. Hypotheses: The Role of a Bank in Conglomerates

Liquidity, or internal funds, is more attractive as a source of corporate investment given the information asymmetry between borrowers and lenders as well as incentive problems arising from the dilution of ownership stake due to external financing for the managers controlling the firms. With closer monitoring by main banks, Japanese firms might be expected to be little constrained in their investments. In other words, the investment of firms with a main bank might be less sensitive to firm liquidity. Several studies on the Japanese MB find them to have a significant role in mitigating liquidity constraints for corporate investment. Investment was found to be less sensitive to liquidity (or long-term debt) for firms with a MB or stronger links to a MB in terms of the level or stability of MB loan share, and MB ownership share (Hoshi et al., 1991; Mori, 1994). Sheard (1985) makes an indirect test of the same question, finding that the speed of employment adjustment in a financial crisis tends to be slower for firms with a strong MB relationship (in terms of ownership and loan shares of MB, etc.). This is seen as the result of their being less liquidity constrained. Hayashi (1982), however, finds no evidence that MB ties mitigate the firm's liquidity constraints. For German firms, Elston and Albach (1995) find some evidence that firms with significant bank ownership stakes had no liquidity constraints in the 1980s, unlike firms without a

[1] In Taiwan, a financial business group always contains a member bank.

bank block holder. However, Fohlin (1998) finds that German firms with bank attachments, or even long-term bank relationships, were not associated with any significant reduction in their liquidity sensitivity of investment or rate of investment for the period from 1903 to 1913, the formative years of universal banking. For publicly traded U.S. firms, Houston and James (1996) find that firms relying on a single bank were significantly more cash flow constrained in the period from 1980 to 1993. The investment sensitivity to liquidity increased monotonically in the ratio of bank debt to total debt outstanding, an indication that they faced higher costs of external financing. They also held larger stocks of liquid assets and had lower dividend payout rates. On the other hand, Weinstein and Yafeh (1998) also find that MB clients had significantly better access to capital prior to 1980 than other firms, an advantage which largely disappeared following the financial liberalization in the early 1980s.

Although Japanese firms with strong MB relationships seem to have been better assisted than those without such relationships during financial distress, how do Japanese firms in general compare with their American counterparts? Hall and Weinstein (2000) examine the investment behavior of U.S. and Japanese firms after the onset of financial distress. They find that financial distress causes R&D to fall in both countries by approximately the same amount, and that Japanese firms do not invest more than US firms after the onset of distress. Results for small and medium-sized Korean firms are provided by Ferri, Kang and Kim (2000). As expected, they find that, for firms with strong pre-crisis relationship banking, outstanding loans decreased less, the drops in credit lines were smaller after the crisis, and the chance of building (increasing) their loans in arrears in 1998 (the year of the sharpest liquidity constraints) was lower (for previously non-delinquent firms).

A. Extended Liquidity Constrained Hypothesis

In a perfect capital market, the level of investment should only be related to a project's NPV because internal and external funds are substitutable. Hence, Q should be the only determinant of investment. However, in the real world, the capital market is far from perfect, and it could be that a project with a positive NPV is not financed on account of asymmetric information. In this case, an independent firm, which does not belong to any business group, has to rely on its internal funds for a project. This problem of asymmetric information is mitigated in a bank-conglomerate since a bank has inside information on its associated firms' projects. Given this scenario, external and internal funds are substitutable for projects within a bank-conglomerate (See Hoshi et al., 1991). Past studies which have tested this hypothesis by investigating the coefficients of cash flow in an investment function have identified a significant cash flow coefficient, implying that proceeding with an investment relies on internal funds and suggesting that firms are either liquidity constrained, or not at all. In other words, independent firms are expected to have financial constraints, while group firms in a bank conglomerate are not.

Past empirical studies investigating liquidity constrained have examined the significance of the coefficients of cash flow in the regression of investment. Cash flow in group firms should be insignificant, unlike that in independent firms which should be significant. Finding which provides substantive evidence of this abound. Hoshi et al. (1991) used Japanese data and argued that because of the Japanese main bank system (*keiretsu*), group firms are well known by their banks, and thus the problem of asymmetric information is reduced to a minimum. Their results support the liquidity constrained hypothesis. Also using Japanese data, Kaplan and Minton (1994), Gibson (1995), Morck, Nakamura and Shivdasani (2000) have reached the same conclusion. Other studies, including those of Gorton and Schmid (2000), who have employed data from Germany, and Shen and Wang (2005), who have used data from Taiwan, have lent further support for the hypothesis.

Opposing evidence, albeit less abundant, also exists. Fohlin (1998), for one, has found that investment is more sensitive to internal liquidity for bank-networked firms than for independent firms and has, therefore, flatly rejected the hypothesis. Taking a slightly different approach, Ferris et al. (2003) have recently explored this issue and have shown a Korean *chaebol* in declining industries which continue to make capital expenditures, a managerial behavior they term *the over-investment hypothe-*

sis. They have regressed a firm's excess value on the proxy of over-investment and determined the coefficient to be significantly negative, thereby fully supporting their hypothesis. Though mixed results have been found when this has been tested, this hypothesis should be more acceptable during a crisis period because of a greater amount of severe asymmetric information.

B. Extended Liquidity Insurance Hypothesis

During a bad year, when a firm faces a greater risk of bankruptcy on account of liquidity risk, a bank in the same conglomerate is capable of functioning as an insurer. That is, a bank in a group can bail out its affiliated distressed firms, which is the basis of the *liquidity insurance hypothesis*.

As stated earlier, Tilly (1989) has advanced stressed this hypothesis by claiming that banks typically cut loans when the economy is in a downturn because of firms' worsening balance sheets and a decreased net value of collateral. It should follow then that banks in a group could provide liquidity to the affiliated distressed firms. Abegglen and Stalk (1985) cited the case of one automobile manufacturer, Mazda, and its bank conglomerate, the Sumitomo group, as an example. When Mazda was in financial distress during the 1970s, the managing director of the Sumitomo Bank assumed leadership of the firm and led it out of financial trouble. Nakatani (1984), a former head of the Sumitomo Bank, stated:

"…We are always prepared to help out when a member is in trouble. We won't allow any group member companies to go into business failures…"

Also, see Aoki (1990) who has taken a similar stance.

Still more evidence has been found. Suzuki and Wright's (1985) study, for instance, showed that in times of financial distress, Japanese companies with strong bank ties are more likely to avoid bankruptcy than are those without close ties[1]. Gibson (1995) sampled 1,355 Japanese firms to explore the same issue and found that on the grounds that severe credit rationing is expected in bad years, it is harder for firms without a main bank to pass through a period of financial distress. See also Petersen and Rajan (1994) and Berger and Udell (1995) who take a similar view.

This research distinguishes itself from others because here business groups are divided into *bank groups* and *non-bank groups*, where the former denote those business groups containing at least one bank as a member but the latter do not. A great deal of the literature has divided firms into group firms and independent firms (Hoshi et al., 1991), and then performed statistical tests on the argument of financial constraints. This has implicitly assumed that each business group has a member bank. We feel it is important to point out that while this is true for Japan and Germany, it is not necessarily so in many other countries. A Korean *chaebol* (a business group), for example, does not employ a main bank system and, thus, may not have a member bank (Bae, Kang and Lim, 2002). Similarly, two-thirds of Taiwan's business groups do not have a member bank. It can therefore justifiably be claimed that it is more likely for a business group not to have a member bank.

III. Data Sources and Basic Statistics

A. Bank and Non-Bank Conglomerates in Taiwan

The policy-makers in most countries have also tried to make the firewall between banks and firms more effective, and in particular, made restrictions on related-party loans more stringent. While the principle of an individual corporate ownership ceiling of 4% was maintained, exceptions have been introduced to allow larger ownership by investors who specialize in financial institutions. Regulations on bank ownership by industrial capitals (large business groups with diversified operation in non financial sectors) have been gradually strengthened to discourage chaebols from

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[1] Japan's case is more complicated than we first thought since banks in Japan can be debtors and equity holders at the same time. The concentration of debt and equity enables a bank to restructure a firm's liabilities without having to rely on the coordinating role of the bankruptcy courts.

trying to take control of banks in an effort to secure loans on easy terms. Industrial capitals are prohibited from purchasing more than 4% of the shares of a bank with borrowed money and are required to obtain permission from the government even when they want to purchase more than 4% with their own equity. On other hand, the ownership by a business group is common, particularly in Malaysia, but the major creditor bank rarely belongs to the same business group as the firm in any of the countries surveyed. In Indonesia, the major creditor banks are just as likely to be foreign controlled as to be controlled by business groups. As for unions, these are found in 80% of the Indonesian firms, 66% of the Korean firms, 40% of the Malaysian firms, and only 20% of the Thai firms.

The definition of a *business group* and its affiliates is an elusive concept since an academic definition may not always be fully consistent with the practical one. For example, there is no single definition when it comes to how many subsidiaries, assets, or other criteria are required for firms to be classified as a group. While a group affiliate is often defined as having a share of about 10%, 15% or 20% owned by other firms, in reality, it is not easy to identify the final controller because of actual pyramid holdings and cross-shareholdings. In light of this, here, we adopt the definition of a business group as reported in various issues of *Business Groups in Taiwan* (BGIT), published by the China Credit Information Service (CCIS)[1]. The CCIS defines a business group as one, which contains at least three firms. In an almost anecdotal way, this definition excludes some business groups which only contain two affiliates though their total assets are large and their brand names are extremely well-known in Taiwan society[2].

Our sample selection is based on the BGIT classification with modifications. First, a conglomerate is defined as a *bank group* provided that it owns at least a 5% share of a bank's equity; otherwise, it is a *non-bank group*. The cutoff of 5% is based on statutes in the Taiwan Bank Law that stipulates that the same person or entity is not allowed to hold more than a 5% share of a bank's equity[3]. Next, to avoid any possible effects derived from regulations, i.e., non-market factors, we exclude state-owned and political party-owned (such as business groups owned by the previous ruling party, the Kuomintang) business groups and the group of the public utility industries from our sample. Third, a subsidiary is selected only if it has belonged to the same conglomerate for the whole sample period used here, i.e., 1994-2001. Last, only listed and non-listed companies with financial information being available to the public are adopted owing to data availability. The listed companies include those listed on the Taiwan Security Exchange Corporation (the TSEC) and in the Over-the-Counter Market (the OTC)[4].

Table 1 lists the 15 bank conglomerates with their group names, their affiliated bank names, the percentage of shares held by the final ultimate ownership, their core businesses, other non-financially and financially related businesses, and the characteristics of the group business. With regard to final ownership, the calculation of which is based on La Porta et al. (1999) and Claessens et al. (2000), three numbers are reported. The first and second are, respectively, the direct and indirect controlling rights by the ultimate controlling shareholder. The third number in parentheses is the total ownerships of controlling right. While La Porta et al. (1999) have suggested using 20% as the threshold to decide final ownership, Yeh and Woidtke (2005), Shen and Wang (1999) have advanced the notion that 15% may be more appropriate for Taiwan. As shown in the table, the percent of shares held are mostly above 15%. The core businesses reported by the CCIS are mainly determined from interviews and questionnaires.

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[1] The CCIS is a government-supported company, which is mainly engaged in the collection of borrowers' credit information.

[2] For example, the Lian-Bon Bank Group only contains the Lian-Bon Bank and *Freedom Newspaper*, and the Won-Tai Bank Group only contains Won-Tai Bank and Prince Automobile. While both groups are well-known in Taiwan, neither is included because only two firms are in each group.

[3] The same article also states that: persons or entities with "inter-related relations" who previously served as directors, supervisors, or managers, and the judicial persons or other organizations in which such bank personnel served as representatives or managers are treated as the same person. The statute, however, does not exclude the possibility of pyramid-holding or cross-shareholdings. Also, see Shen (1998).

[4] In Taiwan, this type of company is not listed on the TSEC but is still required to release its financial statements to the public.

Table 2 reports the 152 non-bank conglomerates, but because of space limitations, we do not report each group's affiliates. We present the core businesses of these groups by type of industry, i.e., equity securities (8), international trade (3), electronics (30) and traditional industry (111), where the number of groups in each industry is indicated in parentheses. Worth noting is that the traditional industrial groups account for two-thirds of the *non-bank groups*, and among these, only three are in the international trade industry.

The upper panel of Table 3 shows the number of firms included in the *bank* and *non-bank groups*. Within the *bank groups* (reported in the first column), 57 are listed companies, 151 publicly available financial information firms, and 89 fall into the remaining categories. Thus, the first two categories, which amount to 208 firms (=57+151), constitute our sample of firms making up the *bank groups*[1]. As concerns the *non-bank groups*, 295 are listed companies, 554 are publicly available financial information firms, and 108 are in the remaining categories. Thus, the first two categories, totaling 849 firms (=295+554), comprise our sample of firms in the *non-bank groups*. The panel at the bottom of Table 3 shows the subsidiary distribution across the same five industries. In the *bank groups*, 25, 28, 41, 52, and 69 firms belong to the banking and insurance, equity securities, international trade, electronic and the traditional industries, respectively. As for the *non-bank group*s, the number of firms in these five industries is respectively 9, 23, 94, 295 and 401.

B. Loan Transaction Data

Once we have the above required information to distinguish the *bank groups* and *non-bank groups*, we collect the loan transaction data. In Taiwan, like in many countries, listed companies are required to send their balance sheets and income statements to the local authority (the TSEC in this case). When sending these publicly available financial statements, however, companies in Taiwan are also obligated to send a long-format financial statement to describe how each item in the two publicly available financial statements is compiled[2]. This long format financial statement, though it is not directly available to the public, can be obtained simply by applying for permission to xerox a copy. A long-format financial statement records all borrowing transaction data the company has made, including loan rates, loan amounts, loan maturity and sometimes the value of its collateral. The names of lenders (i.e., banks) are also available. See Shen (2002) for details about these data. Based on this loan contract information, as well as on that of the groups and their affiliates, the evaluation of the two hypotheses is on a direct basis. Furthermore, since the borrowers and banks are known, we collect the data on the assets of firms and banks from the *Taiwan Economic Journal*, (hereafter, the TEJ), a private data vending company in Taiwan.

Table 4 presents the summary statistics of the terms of the loan contracts for each of the *bank groups* and *non-bank groups*. To investigate the borrowing conditions between firms and banks when they are in the same group and when they are not in the same group, we further divide both borrowing conditions on the basis of firms borrowing from affiliated banks and those that borrow from non-affiliated banks. It is not surprising that the number of loan contracts for the *non-bank groups* is three times that for the *bank groups* given that the former include much more firms. The average borrowing rate of firms in the *bank groups* is 7.65% and in the *non-bank groups* it is 7.95%. It is interesting to note that the borrowing rate from affiliated banks (7.71%) is modestly higher than the rate from non-member banks (7.58%), but this difference is not significant. This finding has also been reported in recent studies by Wang and Shen (2004). To explain, the severe relationship-lending restrictions in the Taiwan Bank Law, Articles 32 and 33, explicitly stipulate that the lending rates of banks to the same group's firms should not be less than that of other firms with an equivalent credit history (which is an equal based principle for relationship-lending). Also, any lending amount to a firm in the same group that exceeds 100 million must be approved by the bank's board of director[3]. Accordingly, although a member bank may be willing to provide cheaper funds, the law, to a certain extent, excludes this possibility.

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[1] We use only the first two categories because of the availability of data.
[2] The long-format financial statement in Chinese means "detailed" financial statement, see Shen (2002) for details.
[3] See Shen (1998) for the description of Articles 32 and 33 of the Taiwan Bank Law.

Similarly, among the three categories in Table 4, the smallest borrowing amount is from a bank in the same group, whereas the largest is from a bank in a *non-bank group*. The average borrowing maturity is 2.95 years for a *non-bank group*, followed by 3.37 years for *bank group* borrowing from a member bank and 3.42 years for the *bank group* affiliates borrowing from non-member banks.

Weinstein and Yafeh (1995) find that the lending interest rate spread was significantly negatively affected by the MB (the largest short-term lender) loan ratio in total debt during the 1982-1995 period for exchange-listed Japanese firms. However, the finding applied mainly to medium-sized companies, not for large firms. Based on the US National Survey of Small Business Finance, Petersen and Rajan (1994) find that the interest rates charged are little affected by the length of relationship or multiple services; while multiple banks are associated with a significantly higher rate. Relying on the same data set, Berger and Udell (1995) focus exclusively on lending under lines of credit, which represents more "relationship-driven" loans. They find that borrowers with longer banking relationship pay lower interest rates and are less likely to pledge collateral. Weinstein and Yafeh (1998), however, observe that Japanese MBs extracted significant rents through higher-than-average lending rates before the liberalization of the financial markets in the 1980s. Angelini, Di Salvo and Ferri (1998) also find that lending rates tend to increase with the length of the bank-firm relationship in Italy. In Germany, relationship banking is found to have no major impact on loan pricing (Elsas and Krahnen, 1998; Harhoff and Körting, 1998).

IV. Econometric Model

Table 5 defines all variables in the two econometric models of our two hypotheses.

A. *Extended Liquidity Constrained Hypothesis*

Our first model, which is borrowed from Hoshi et al. (1991), is employed to examine the *extended liquidity constrained hypothesis*, which simultaneously takes both normal and bad times into account. That is:

$$\begin{aligned}\frac{I_{i,t}^{(j)}}{K_{i,t-1}^{(j)}} &= a_0^{(j)} + a_1^{(j)} Q_{i,t+1}^{(j)} + a_2^{(j)} \frac{Liq_{i,t-1}^{(j)}}{K_{i,t-1}^{(j)}} + a_3^{(j)} \frac{PD_{i,t}^{(j)}}{K_{i,t-1}^{(j)}} + a_4^{(j)} \frac{PD_{i,t-1}^{(j)}}{K_{i,t-2}} + a_5^{(j)} D_{Asia} \\ &+ a_6^{(j)} \left(\frac{Liq_{i,t-1}^{(j)}}{K_{i,t-1}^{(j)}} \times D_{Asia} \right) + \varepsilon_t, \quad i = 1,...,N \text{ and } t = 1,...,T\end{aligned}, \tag{1}$$

where j = 1, for the bank groups;

= 2, for the non-bank groups;

subscript i denotes the i-th firms; t denotes the t-th period; and I denotes the flow amounts of gross investment and is calculated as the changing amounts of gross investment. Specifically, I is measured as the change in the level of expenditures on plant, property, and equipment. When firms in the *bank groups* are employed, j=1; otherwise, it is equal to 2.

Variable Q denotes Tobin's Q. Here, our Q is the average Q[1], which is measured as the ratio of the market value of the outstanding stocks divided by the book value of total assets taken to the replacement costs in the next period (Q_{t+1}). Term Q_{t+1} controls future investment opportunities. *PD* represents the firm's production and stands for the proxy of the income effects from investment,

[1] Some have argued that marginal Q should be used instead of the average Q; see the discussion by Hayashi (1982). In reviewing such studies, the variety and complexity of the procedures used to estimate q are striking. Perfect and Kenneth (1994) have presented a good summary of different methods and their deficiencies. In this paper, the common method described by Lang and Litzenberger (1989) is used.

where production is defined as "sales plus change in the final inventory of goods". This is the accelerator effect in the literature pertaining to empirical investments despite the absence of any compelling theory behind it. Term *K* denotes the capital, which is equal to long-term debt plus equity and serves as a scale variable.

Term Liq is the index of liquidity, which is typically proxied by a corporate operating cash flow (*OCF*) (see Hoshi et al., 1991; Gibson, 1995). However, Houston and James (2001) have suggested using corporate cash and its equivalents (*CASH*) as an alternative measure. This cash and its equivalents are the sum of cash holdings and short-term securities, the latter of which are readily convertible into cash. Following much of the relevant literature, all variables are deflated by capital *K* to adjust for heteroscedasticity.

Equation (1) is the *extended liquidity constrained hypothesis* because it contains periods of normal time and bad time simultaneously. First, during a normal time, if the hypothesis holds true, then firms in the *bank groups* are not liquidity constrained but should bee constrained in the non-bank groups. This strongly suggests that $a_2^{(1)} = 0$ and $a_2^{(2)} > 0$.

During a bad time, a dummy variable, D_{Asia} (year dummy) is created here, and it is zero in a pre-financial crisis period (1991-1996) and unity in a post-financial crisis period (1997-2000); that is,

$$D_{Asia} = \begin{cases} 1 & after\,1997; \\ 0 & before\,1997; \end{cases}$$

where subscript *N* denotes the number of firms. When the sample in *bank groups* is used, *N* is 208, but when firm data of *non-bank groups* are used, *N* = 849.[1] Our *extended liquidity constrained hypothesis* argues that during a bad time, firms which are in a group without banks are further liquidity constrained because they cannot obtain funds from the equity market, either. Thus, it should be expected that the coefficient of $liq/K \times D_{Asia}$, i.e., $a_6^{(2)} > 0$ since combining this term with *liq/K* yields $(a_2^{(2)} + a_6^{(2)})$ *liq/K* during the Asian crisis. A positive $a_6^{(2)}$ should suggest a larger sensitivity to cash flow during a bad time for a *non-bank group*. By contrast, it is expected that $(a_2^{(1)} + a_6^{(1)})$ should be insensitive to cash flow for a *bank group*, suggesting $a_6^{(1)} = 0$.

B. Extended Liquidity Insurance Hypothesis

Our second model, which is borrowed from Ferris et al. (2003), examines the role of banks but only during a bad time. Unlike the model with the whole sample used as discussed in the previous subsection, this model only uses firm data from the bank groups. The sample in our bank groups is further divided into two sub-groups based on the source of loans. In equation (2), when j = 1, it denotes that the loans are borrowed from banks in the same group; otherwise when *j* = 2, the loans are borrowed from banks in a different group. That is:

$$\frac{Loan\ Amount_i^{(j)}}{Total\ Debt_i^{(j)}} = b_0^{(j)} + b_1^{(j)} Rate_i^{(j)} + b_2^{(j)} Maturity_i^{(j)} + b_3^{(j)} Asset_{i,F}^{(j)} + b_4^{(j)} Asset_{i,B}^{(j)} + b_5^{(j)} D_{Asia}^{(j)} + b_6^{(j)} D_{i,Core}^{(j)} + b_7^{(j)} D_{i,Coll}^{(j)} + b_8^{(j)} D_{i,New}^{(j)} + \varepsilon_t, \quad (2)$$

Where *j* = 1, loans from banks in the same group;

= 2, loans from banks in a different group

[1] Our estimation methods are the OLS, and the fixed effect and random effect of the panel data model. Equation (1) is estimated using the firms of the *bank groups* first and then using the firms of the *non-bank groups*.

and subscript *i* denotes the *i*-th loan contract from the *bank group*s. *Loan Amount* is the amount of a loan a firm borrows from either a bank in the same group (j = 1) or a bank in a different group (j = 2). *Total Debt* is a firm's total debt. *Rate* and *Maturity* denote the loan rate and loan period, respectively. $Asset_F$ and $Asset_B$ are the total assets of the firms and banks respectively. Other dummy variables are considered so as to exclude possible missing variable misspecifications. Dummy variable D_{Asia} is the Asian crisis dummy, as defined in equation (1). D_{Core} is the core dummy, which is equal to unity if the core business of the group is financial business, and zero, otherwise. D_{Coll} is the dummy of the collateral conditions when the borrowing takes place and is equal to unity when the loan has collateral, and zero, otherwise. D_{New} is the dummy which denotes unity if the loan is from a bank established after 1992; otherwise, it is zero[1]. This specification is not a part of panel data model because a firm may borrow more than once in a short period but none during other periods. The equation is estimated using the OLS.

The liquidity insurance hypothesis is consistent with the profit stability hypothesis, as presented by Ferris et al. (2003). They have reported that a business group tends to smooth the profits of its firms, thus implying that the loan amounts from banks in the same group are expected to have increased during the Asian crisis. The extended liquidity insurance hypothesis here is similar to their hypothesis but has two extensions. First, besides borrowing from banks in the same group, the case of borrowing from banks in the different groups is also considered here. Banks in different groups do not necessarily provide liquidity to a distressed group firm, which implies that coefficient of $b_5^{(1)} = 0$ and the coefficient of $b_5^{(2)} > 0$.

Next, the core business of a bank group is considered. While the above testing is straightforward, it may ignore the core role of a bank in a conglomerate. It is contended that the role of a bank may be reversed depending on the business strategy (i.e., the core business) of the *bank group*. If the core business of a *bank group* is related to financial services, i.e., it is a financial conglomerate, banks in the group may not rescue distressed firms since taking action may actually hurt the total wealth of the group more than if no action were taken. Even worse, a bank may cut the loans it provides to protect its profits if the distressed firms have little chance of surviving. By testing the coefficient on D_{core}, this *reversed financial insurance hypothesis* is investigated in that its core business is related to finance; that is: $b_6^{(1)} \leq 0$ and $b_6^{(2)} = 0$

V. Empirical Results

A. Extended Liquidity Constrained Hypothesis

Table 6 presents the estimated results of equation (1) using the fixed effect panel data model. The proxies of the liquidity variable are either *OCF/K* or *Cash/K*. With regard to the former, the coefficient of the *OCF/K* employing the *bank group* sample is significantly negative at the 10% level, thus supporting *the over-investment hypothesis*. This evidence parallels that in Ferris et al. (2003) in the case of Korea. Probably because of a surplus cash fund in a *bank group*, investments are undertaken even if its firms' internal funds are decreasing. By contrast, the *extended liquidity constrained hypothesis* is supported for a *non-bank group* since the coefficient of interest is significantly positive at the 10% level. That is, asymmetric information indeed exists for a *non-bank group*. When *Cash/K* is employed as the proxy, the estimated results change but only minimally. The coefficients of *Cash/K* are insignificant and positively significant for the *bank group*s and *non-bank group*s, respectively. Overall, this confirms the liquidity role of a bank in a *bank group*.

[1] Taiwan bank deregulation started in 1991 to allow for the setup of *de nova* banks. Hence, "new banks" denotes banks that have been established since 1991; by contrast, "old banks" are those which were established before 1991.

As for the *extended liquidity constrained hypothesis*, the estimated coefficients of $(Liq/K)\times D_{Asia}$ are negative ($a_6^{(1)} = -0.894$) and positive ($a_6^{(1)} = 0.997$) for the *bank group*s and *non-bank group*s, respectively. Both are significant at the 10% level, which demonstrates that the *extended liquidity constrained hypothesis* is found to have gained support during the Asian crisis. For example, in the *OCF/K* case, when D_{Asia} =1, the coefficient $(a_2^{(1)} + a_6^{(1)})$ is only 0.250 for the *bank groups*; contrast this with the coefficient $(a_2^{(2)} + a_6^{(2)})$ of 1.712 for the *non-bank group*s. The firms for *non-bank group*s may hold more cash for the future need of liquidity. In the *Cash/K* case, the two added coefficients are 0.003 and 1.255, respectively.

B. Extended Liquidity Insurance Hypothesis

Table 7 shows the estimated results from using equation (2). Three specifications are shown depending on whether D_{Core}, $Asset_B$ or $Asset_F$ and D_{New} are used. As for loans borrowed from non-member banks, the coefficients of D_{Asia}, i.e., $b_5^{(2)}$, are overwhelmingly significantly negative regardless of the specifications, suggesting that borrowing from non-member banks is likely to have been reduced during the Asian crisis. In contrast, borrowing from member banks seems to have increased or not to have changed since the coefficient of interest here, $b_5^{(1)}$, is either significantly positive or insignificantly different from zero. Thus, member banks evidently did not offer more funds to their affiliates during the Asian crisis. The contrasting results of the two groups confirm the role of liquidity insurance.

Recall that the role of a bank as a liquidity insurer may be reversed when the core business of a *bank group* is a financial service. This reversed role is tested by investigating the coefficient of $D_{Core} \times D_{Asia}$. Factoring out D_{Asia}, the coefficient ($b_5^{(j)} + b_7^{(j)} D_{Core}$) of D_{Asia} is obtained. The coefficient of $b_7^{(1)}$ is found to be either insignificantly positive or significantly negative. That is, when the core activity of a *bank group* is a finance-related business, i.e., D_{Core} =1, the member banks most likely reduced the amount of their loans to their affiliates during the Asian crisis. Thus, *the liquidity insurance hypothesis* indeed holds true for those bank groups when their core businesses are not related to the financial sector. Conversely, *the inverse liquidity insurance hypothesis* is supported when the core business is related to the financial sector.

The estimated results of other variables are equally interesting. First, the coefficients of $Asset_F$ are overwhelmingly positive, indicative that the loan amount ratio is positively affected by the asset value of borrowing firms. Second, as the coefficients of *Rate* are significantly negative, the higher the loan rates are, the lower is the loan amount ratio expected to be. Third, it is evident that loan maturity does not affect the loan amount. Finally, evidently it is not crucial whether banks are new or old as far as lending amounts go.

C. Further Discussion: An International Comparison

Most of banks around the world belonged to either the government or to conglomerates and were forced to make loans on easy terms to firms that had good connections with powerful politicians or bureaucrats or to affiliated firms under the control of the same dominant shareholder. In Asia, many banks in Indonesia and Thailand were used to channel their depositors' funds to their dominant shareholders or to affiliated firms[1]. Banks in Malaysia performed better, because only a few banks belonged to conglomerates and because financial regulation was more effective. In particu-

[1] In Indonesia, banks were dominated by the state and private banks controlled by businesses and politicians, leading to collusion and corruption between political elite and big businesses. In Thailand, family-controlled banks were heavily involved in connected lending, even though the state and bureaucrats were less involved in the banking and big businesses.

lar, prohibitions on loans to related parties were enforced more strictly. In Korea, big businesses were for the most part prohibited from owning and controlling the major banks. The traditional banking theory predicts that banks with a stable long-term relationship with their corporate clients are considered to have an important corporate governance role, particularly when the firms face deteriorations in their performance. However, the term "relationship banking" or "relationship-based banking" is often used to mean "connection-based banking", which constitutes the core of the "crony capitalism" that many allege brought about the Asian crisis of 1997. Given poor governance in the banks, which themselves are under the control of families or the government, connection-based lending rather than relationship banking has been prevalent.

On the other hand, relationship banking of theory in this paper is held to be most valuable in times of financial distress for borrowing firms. Among Japanese firms that experienced financial distress but recovered thereafter, firms in industrial groups (which thus had close financial relationships with their affiliated banks, suppliers, and customers) invested more and sold more after the onset of distress than non-group firms during 1978-1985. Similar results were found for non-group firms that nevertheless had strong ties to a MB with a high ratio of MB loans to total loans (Hoshi et al., 1991; Okazaki and Horiuchi, 1990). Hall and Weinstein (2000) find that firms with a large share of bank loans from the top lender received more loans from that lender and all lenders in times of financial distress during 1983-1992. What is important is not the MB relationship, but concentrated debt-holding that mitigates the free-rider problem and facilitates the MB's role as a coordinator of the creditors.

VI. Conclusions

This paper discusses the roles of a bank in bank and non-bank conglomerates, roles which are best investigated during a bad period. What we examine are two hypotheses using Taiwan's unique bank loan transaction data.

On the basis of the above review of empirical evidence, what can be said about the behavior of relationship banks or the merits and demerits of relationship banking? Evidence on the positive role of relationship banking seems to be fairly strong in at least three aspects. It gives client firms better access to credit, alleviating liquidity constraints in investment activity; it reduces the costs of financial distress as the banks can provide better care to troubled firms, often intervening in their management; and it tends to reduce the business risk of the firms. Firms with a close banking relationship generally do better in financial crisis, though they are affected more severely when their own relationship banks fall into serious distress. Evidence on the extraction of monopoly rents by relationship banks from client firms is mixed, although this tendency seems to be rather evident for Japanese main banks. In spite of the increased availability of credit, firms with a close banking relationship tend to grow more slowly than other firms, as the banks discourage risky projects. Finally, the evidence on corporate efficiency and profits is rather negative.

First, our *extended liquidity constrained hypothesis* cannot be rejected. The hypothesis argues that during a bad period, investments of firms in a *non-bank group* are more severely financial constrained than they are during a normal period. Our study fully confirms this. Firms in a *bank group*, however, are not financial constrained in either a normal or a bad period. Besides this, during a normal time, firms in a *bank group* are prone to be over-invest, meaning that they invest even though their cash flow is lacking. This is probably attributed to the fact that they have full confidence that they can obtain funds.

Second, our *extended liquidity insurance hypothesis* is also unambiguously supported. This hypothesis claims that the core business of *bank groups* may affect the attitude toward rescuing distressed firms. Our empirical results show that *the liquidity insurance hypothesis* indeed holds true for those bank groups whose core businesses are not related to the financial sector. Conversely, *the inverse liquidity insurance hypothesis* is supported when the core business is related to the financial sector.

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Table 1

Bank Business Groups

This table shows the detailed information of 15 bank business groups. Column 1 and Column 2 list the names of the bank groups and their member bank, respectively. Column 3 lists the structure of the ownership by the controlling shareholders and their related firms. Column 4 shows the names of the core business (A), other non-financially related firms (B), other financially related firms (C), and the characteristics of the group's business (D). The information of Column 4 is from the CCIS's records. CCIS classifies three types of the business strategy of the groups: diversification, focus on financially related industry, and Double-focus on the general industries and financially related industry.

Group's Name	Member Bank Name (TSEC code)	Largest Share Held by A: Person B: Person and Related Firms C: A+ B	A: Core Business B: Other Non-Financially Related Firms C: Other Financially Related Firms D: The Characteristics of the Group's Business
1. Yuen-Foong Group	International Bank of Taipei (2808)	A: 2.38 B: 18.05 C: 20.43	A: Yuen-Foong Paper Co. B: China Color Printing, Union Paper, Yuen-Foong-Yu Paper MFG, Shin-Foong Chemical Industry, Taiwan Hopax Chemicals MFG, Perk Crown Paper, Ray Foong, Shen's Art Printing, Hsin-Yi Recreation, Shin-Yti, Boardteck Electronics, Prime View International C: None D: Diversification
2. China-Trust Group	China Trust Commercial Bank (2815)	A: 8.14 B: 16.28 C: 24.42	A: China Trust Commercial Bank B: United Advertising, China Synthetic Rubber, Grand Pacific Petrochemicals, Chie-Ho Engineering and Development, Wyse Technology Taiwan, Trace Storage Technology, KG Telecommunications, Ho- -Hsin Land Consulting, Giga Media C: Grand Pacific Securities Investment Trust, China Securities, China Life Insurance, China Trust Investment D: Focus
3. President Group	Grand Commercial Bank (2828)	4.17 11.57 C. 15.74	A: President Enterprises Co. B: President Chain Store, Prince Housing and Development, Universal Cement, Tainan Spinning, Nanlien International, Ton-Yi Industrial, Test Union, Mospec Semi-conductor, President Pharmaceuticals C: President Securities, Nan-Fan Investment D: Diversification
4. Wal-Sin Li-Hwa Group	Dah-An Commercial Bank (2829)	2.25 14.81 17.06	A: Wal-Sin Li-Hwa Co. B: Wal-Sin Technology, Lih-Hwa Truck, Wha-Yo Electronic Materials, Winbond Electronics, Hannstar Board, Integral Chemical, Wal-Sin Advanced Electronics, Kolin Construction and Development, Wal-Sin Li-Hwa Holding C: Han-Yo Investment and Development D: Diversification
5. Re-Bar Group	The Chinese Bank (2831)	2.12 18.52 20.64	A: China Re-Bar B: Far-Eastern Silo Shipping, Re-Bar Construction Development, Chia Hsin Food and Synthetic Fiber, Eastern Broadcasting, Eastern Multimedia C: Union Insurance, Chinese Bills Finance, D: Diversification
6. Cathay Group	Cathay United Bank (2835)	4.94 8.87 13.81	A: Cathay Life Insurance, Cathay Construction B: San-Ching Engineering, Cathay General Hospital C: Tong-Tai Insurance D: Double-focus

Table 1 (continued)

7. Ruentex Group	Sino-Pac Bank (2839)	5.93 14.28 20.21	A: Ruentex Construction and Development B: Ruentex Industries, Ruentex Construction and Engineering, Kwang-Hua Development and Investment, Ruentex Cement, Ruentex Leaning, Rt-Mart International C: Fu-Hua Securities, Fun-Hwa Investment Trust, Kwang-Hua Securities Investment Consultants, Kwang-Hua Securities Investments and Trust, Sino-Pac Securities, Ruentex Investment, D: Diversification
8. Fu-Bon Group	Fu-Bon Commercial Bank (2842)	2.65 14.87 17.52	A: Fu-Bon Insurance B: Fu-Bon Construction Management, Formosa Land Development C: Fu-Bon Futures, Fu-Bon Securities, Fu-Bon Life Insurance, Fu-Bon Securities Investment Trust, Fu-Bon Securities Finance, Fu-Bon Development and Investment, Fu-Bon Bills Finance D: Focus
9. Shin-Kong Group	Tai-Shin International Bank (2844)	1.63 11.71 13.34	A: Shin-Kong Co., Ltd. B: Shin-Kong Spinning, Shin-Hai Gas, Shin-Kong Synthetic Fibers, Shin-Kong Construction and Development, Taiwan SOGO C: Shin-Kong Insurance, Shin-Kong Leasing, Taiwan Securities, Taiwan Securities Investment Trust Shin-Kong Security, Shin-Kong Life Insurance D: Focus
10. Far-East Group	Far-Eastern International Bank (2845)	4.45 13.88 18.33	A: Far-Eastern Construction B: Far-Eastern Development Stores, Oriental Union Chemical, Far-Eastern Textile, Asia Cement, U-Ming Marine Transport, Far-Eastern Dupont C: Oriental Securities, Yuang-Ding Investments D: Diversification
11. Hua-Eng Group	Cheng-Shin Commercial Bank (2846)	1.10 9.54 10.64	A: Hwa-Eng Wire and Cable B: First Copper and Iron Industrial, Hua-Well Electronic C: None D: Diversification
12. En-Tie Group	En-Tie Commercial Bank (2849)	3.29 15.01 18.30	A: Hung-Tai Construction B: Hung-Sheng Construction, Cooperative Construction C: Hung-Fu Life Insurance D: Diversification
13. Ever-Fortune Group	Pan-Asia Commercial Bank (5810)	3.87 9.85 13.72	A: Ever-Fortune Industrial B: Ever-Fortune Recreation, Chang-Sheng Contractor, Chang-Shun Construction, Chen-Hsin Construction, Hung-Yi Construction and Development, Everpower Co., Chang-Cheong Construction and Development, Yi-Deh Environment Protection Technology C: Chang-Sheng Investment, Chia-Yi Securities, Pan Asia International Development, Pan Asia Commodity D: Diversification
14. Jih-Sun Group	Jih-Sun Commercial Bank (Baodao Commercial Bank, 5817)	1.03 4.92 5.95	A: Jih-Sun Securities B: Network Securities Investment C: Jih-Sun International Leasing and Finance, Jih-Sun Securities Investment Trust, Jih-Sun Securities Investment Consulting, Jih-Sun Futures, Jih-Sun Securities International Holdings, Jih-Sun Securitues Service D: Focus
15. Chin-Fon Group	28976 Chin-Fon Commercial Bank (2897)	2.41 8.73 11.14	A: San-Yang Industry B: Fong-Ta Trading, United Chinese Leasing, San-Yang Construction, Nan-Yang Industries, Chao-Yang Electronic Components, Hi-Chung Co., Chin-Fon Semiconductor and Technology C: King-Hoe Securities, San-Yang Investment D: Diversification

Table 2

Non-Bank Business Groups

This table lists the names of 152 non-bank business groups by CCIS's records. The CCIS always lists the name of the core business to represent the name of the business group. Number in the parentheses denotes the number of business groups in the classified industry.

Tier 1: Core Business: Finance Industries (Sub-Total=8) Grand Cathay Securities, Yuan Ta Securities, Entrust Securities, Asia Securities, Taiwan International Securities, Concord Securities, First Taiwan, Capital Investment, Polaris Securities
Tier 2: Core Business: International Trading Industries (Sub-Total=3) Mercuries and Associates, Sino-Japan (Enterprise Bank of Hualien), Collins
Tier 3: Core Business: Electronic Industries (Sub-Total=30) Umax Data Systems, Tatung, First International Computer, CTX Opto-Electronics, CMC Magnetics, U-lead Systems, Advanced Semiconductor Engineering (ASE), Tekcon Electronics, Taiwan Semiconductor Manufacturing, Taiwan Communication System, Taiwan Semiconductor Life on Electronics, ACER, Kinpo, Chi Mei, Gvc, Mosel Vitelic, Enlight, Yageo, Asustek, Avermedia, ADI, Green-point, Quanta Computer, Aurora, Action Electronics, Tsann Kuen, United Microelectronics, Hon Hai Precision Industry
Tier 4: Core Business: Traditional Industries (Sub-Total=111) Pacific Electric Wire and Cable, Rexon Industrial, Lealea, Vidar-Sms, Ta Chen Stain Less Pipe, Great Wall, Taya Electric Wire and Cable, Tah Tong Textiles, Continental Engineering Group, Ta Jung Transportation, Mountain Group, Falcon Cycle-Parts, China Unique Garments MFG, Ctci, Chung Shing Textiles, China Steel, China Man-Made Fiber, Fu Tsu Construction, Jen Ho (Chih Lien Industrial), Lio Ho, Pacific Construction, Radium Construction, Tidehold Development, Taiwan Cement, Taiwan Spinning, Formosa Plastics, Tai Roun, USI Far East Group, Taiwan Pineapple, Ever-Light Chemical Industrial, Taiwan Glasses, Taiwan Pulp and Paper, Taiwan Tea, Giant Manufacturing, Cheng Long, Cheng Shin Robber, Yung Tay Engineering, Yung Shin Pharmaceuticals, Lily Textile, Shihlin Electric, Kwang Yang Motor, Roo Hsing Garment, An Feng Steel, Nien Hsing Textile, Hong Ho, Hong Chou, Hung Tai, Hung Kuo, Horng Chung, Chia Heir, Vedan, Ve Woong, Wei Chuan, Ho Cheng, Teco Electric and Machinery, Tung Ho Steel, Southeast Cement, Tuntex International Dynamics, Chou Chin, King Car, Chang Ku Building, Chang Chun, Evergreen Group, Nan Pao Resins Chemical, Nam Yeh, Y.H. and T. Woidtke Chemical Industrial, Core Pacific, Kenda Rubber Ind., Maywufa, Chun Yu, Chun Yuan Steel Industry, Nice Enterprise, Anderson, Taisun, Test-rite, Hotai, New Sun, Ability Enterprise, Coldsun Development and Construction, Kou Feng, Worthy, Chief Construction, Pharos, Fu Sheng, Audix, China Airlines, Hualon, Yangming Marine, Shung Ye Mortors, SDI Corporation, Fortune Motors, Ideal Bike, Ching Yeh, S&T Copper Industrial, Shin Yih Fiber Industrial, Sampo, Wabhai Lines and Shihlin Paper, Chicony, Yulon Mortors, Tah Hsin Industrial, Chi Industrial, Chi Hsin Cement, Fui Industrial, Falcon Machine Tools, Fusel Industrial Products, Vector Machinery Works, Men Yi, Far East Machinery, Ever-top Wire Cable, Sinnon, Corner, Long Bon Development, Yieh Long Enterprise, UB Office Systems, Lian Hwa Foods, Lien Hwa Industry, Fong Kuo, Holmsgreen, Feng Hsin,Les Enphants, Pou Chen, Bao Chen Construction, Taiwan Sakura

Table 3

Basic Characteristics: Bank Groups and Non-Bank Groups

This table shows the number of firms in each industry for bank groups and non-bank groups. The industry is classified to six groups: Banking and Insurance (6), Securities (7), International Trading (8), Electronics (New Economy, 9), Traditional (Old Economy, 10), and Investment or Holding Companies (11)

	Bank Groups	Non-Bank Groups	Total
(1) Number of Groups	15	152	167
(2) Number of Firms Listed on the TSEC or OTC	57	295	352
(3) Number of Firms Publicly Issuing	151	554	705
(4) Number of Firms Not in (2) or (3)	89	108	182
Total Number of Firms (5)=(2)+(3)+(4) =(6)+(7)+(8)+(9)+(10)+(11)	297	1,109	1,406
Number of Firms in Each Industry			
(6) Banking and Insurance	25	9	34
(7) Securities	28	23	51
(8) International Trading	41	94	135
(9) Electronics (New Economy)	52	295	347
(10) Traditional (Old Economy)	69	401	470
(11) Investment or Holding Companies	82	287	369

Table 4

Borrowing Terms: Bank Groups and Non-Bank Groups

Column 1 and Column 2 compare the borrowing terms of bank groups from their member banks and the non-member banks. Column 3 shows the borrowing terms of non-bank groups.

	Bank Group Member Banks	Bank Group Non-Member Banks	Non-Bank Groups
A. Number of Contracts	20,453	1,167	58,532
B. Borrowing Interest Rate (%)			
Mean	7.58	7.71	7.95
Standard deviation	1.19	1.17	1.76
Maximum	8.76	8.95	10.94
Minimum	3.00	4.12	3.00
C. Borrowing Amounts (NT$: Thousands)			
Mean	12,423	12,651	14,913
Standard deviation	23,519	29,144	31,042
Maximum	85,294	87,952	90,354
Minimum	10,067	9,135	7,016
D. Borrowing Maturity (Years)			
Mean	3.37	3.42	2.95
Standard deviation	3.17	2.65	3.05
Maximum	9.18	10.25	12.53
Minimum	1.00	1.00	1.00
E. Proportion of Loans with Collateral (%)			
Mean	52.45	37.09	59.14

Table 5

Definitions of the Variables

This table shows the definitions of variables in equation (1) and equation (2).

Proxy	Variables	Definition
I	Investment	Change in the amount of gross investment
K	Capital	Long-term debt plus equity (scaling variable)
Q	Tobin's Q ratio	Ratio of the market value of outstanding stocks divided by the book value of total assets taken to the replacement costs in the next period
Liq	Liquidity	Two proxies: OCF: Operating Cash Flow Cash: Corporate cash and its equivalents
PD	Production	Firm's sales revenues
DAsia	Asian crisis dummy	=1, before the Asian crisis (1991-1996) =0, after the Asian crisis (1997-2000)
Liq/K ×DAsia	Interaction term	
Amount	Loan amount	Total borrowing amount
Debt	Total debt	Total debt
DCore	Strategic development	Core business of the group =1, financial business =0, non-financial business
DColl	Collateral	=1, with collateral =0, without collateral

Table 5 (continued)

Proxy	Variables	Definition
Rate	Borrowing interest rate	Note: if floating interest rate is used, the average rate is adopted (=(max+min)/2)
Maturity	Borrowing maturity	Deadline-the starting day/365
$Asset_F$	Firms' assets	Total assets of borrowing firms
$Asset_B$	Banks' assets	Total assets of lending banks
D_{New}	Dummy of borrowing from a new bank	=1, borrowing from a new bank =0, otherwise

Table 6

The Regression Results of Hypothesis 1: Extended Liquidity Constrained Hypothesis

This table focuses on the fixed effects of the relation between the real investment and their liquidity for the bank groups (j=1) and non-bank groups (j=2). To conserve space, we do not report the similar results of the random effects. The definitions of dependent variables are as Table 5 shows. Q denotes Tobin's Q, which is measured as the ratio of the market value of the outstanding stocks divided by the book value of total assets taken to the replacement costs in the next period (t+1). Term Liq is the index of liquidity, which is typically proxied by a corporate operating cash flow (OCF), and the sum of cash holdings and short-term securities (CASH) as an alternative measure. PD represents the firm's production and is defined as "sales plus change in the final inventory of goods. Term K denotes the capital, which is equal to long-term debt plus equity and serves as a scale variable. The number in the parentheses is the t value. *** is significant at 1%, ** is significant at 5%, and * is significant at 10%.

	Fixed Effects			
Variables	Bank Groups (j=1)	Non-Bank Groups (j=2)	Bank Groups (j=1)	Non-Bank Groups (j=2)
Q_{t+1}	0.997 (1.476)	1.553** (1.971)	0.412 (1.003)	0.561 (1.001)
OCF_{t-1}/K_{t-1}	**-0.004*** **(-1.706)**	**0.692*** **(1.800)**	--	--
$CASH_{t-1}/K_{t-1}$	--	--	**0.924** **(1.025)**	**0.258*** **(1.651)**
PD_t/K_{t-1}	0.007 (1.036)	1.465* (1.692)	0.348 (1.367)	0.442 (1.395)
PD_{t-1}/K_{t-2}	-0.756 (-0.315)	-1.445 (-1.025)	1.782 (1.117)	0.666 (1.225)
$Liq/K \times D_{Asia}$	**0.254** **(0.000)**	**1.020** **(1.531)**	**-0.894**** **(-1.902)**	**0.997*** **(1.697)**
Adj-R^2	0.26	0.23	0.19	0.14
Sample Number	208	849	208	849

Table 7

The Regression Results of Hypothesis 2: Extended Liquidity Insurance Hypothesis

This table shows the OLS estimates of the relation between the loan amounts and the characteristics of the two business group. ***j* = 1** denotes loans from banks in the same group; ***j*= 2** denotes loans from the banks in a different group (non-member bank). The independent variable ***Loan Amount*** is the amount of a loan a firm borrows from either a bank in the same group (j = 1) or a bank in a different group (j = 2), and is scaled by firm's ***Total Debt***. The definitions of other dependent variables are as Table 5 shows. $\boldsymbol{D_{Asia}}$ is the Asian crisis dummy, which is equal to unity before the Asian crisis (1991-1996). $\boldsymbol{D_{Core}}$ is the core dummy, which is equal to unity if the core business of the group is financial business, and zero, otherwise. $\boldsymbol{D_{New}}$ is the dummy which denotes unity if the loan is from a bank established after 1992; otherwise, it is zero. $\boldsymbol{D_{coll}}$ is the dummy of the collateral conditions when the borrowing takes place and is equal to unity when the loan has collateral, and zero, otherwise. ***Rate*** and ***Maturity*** denote the loan rate and loan period, respectively. $\boldsymbol{Asset_F}$ and $\boldsymbol{Asset_B}$ are respectively the total assets of the firms and banks. The number in the parentheses is the t value. *** is significant at 1%, ** is significant at 5%, and * is significant at 10%.

	Model 1		Model 2		Model 3	
Variables	Member Bank (*j=1*)	Non-Member Bank (*j=2*)	Member Bank (*j=1*)	Non-Member Bank (*j=2*)	Member Bank (*j=1*)	Non- Member Bank (*j=2*)
Intercept	1.529* (1.757)	0.265 (0.984)	-1.158 (-1.447)	-0.075 (-0.802)	1.104 (1.391)	-1.691 (-1.005)
D_{Asia}	1.145* (1.702)	0.574 (1.541)	-0.238 (-1.456)	-1.758** (-2.015)	0.957* (1.671)	-1.445** (-1.996)
D_{Core}	**--**	**--**	**-1.381**** **(-1.965)**	**0.985** **(1.008)**	**-0.562**** **(-2.191)**	**1.425** **(0.957)**
D_{Core} * D_{Asia}	**0.764** **(1.238)**	**1.265** **(0.926)**	**-1.521*** **(-1.672)**	**0.463*** **(1.671)**	**-0.891*** **(-1.803)**	**-.536** **(-1.364)**
D_{Coll}	651* (1.662)	0.893 (1.274)	1.253*** (2.546)	1.154 (1.528)	-0.006 (-0.000)	1.624** (1.894)
Rate	-2.564 (-1.567)	0.457 (0.843)	-1.628* (-1.691)	0.056 (1.541)	1.008* (1.721)	1.315* (1.758)
Maturity	-1.268 (-0.067)	-1.587 (-1.268)	1.524 (1.339)	1.663 (0.843)	-1.335 (-1.560)	1.057 (0.697)
$Asset_F$	0.236 (1.598)	0.932 (1.897)**	-	-	-0.057 (-1.267)	0.367* (1.705)
$Asset_B$	-	-1.125 (-0.728)	-	-	-	-
D_{New}	-0.364 (-1.007)	0.645 (1.438)	-	-	-0.556 (-1.354)	1.629 (1.624)
Adj-R^2	0.24	0.23	0.21	0.26	0.19	0.17
Sample Number	1,167	20,453	1,167	20,453	1,167	20,453