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The Value of Relationship Banking during Financial Crises

Evidence from the Republic of Korea

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Relationship banking—with surviving banks—has a positive value during a systemic financial crisis. For many viable small and medium-size businesses in the Republic of Korea, relationship banking reduced liquidity constraints and thus diminished the probability of unwarranted bankruptcy during the country's financial crisis of 1997–98.

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Summary findings

A systemic financial crisis with monetary restriction is probably the most promising occasion for assessing whether and to what extent relationship banking is valuable to borrowers. Ferri, Kang, and Kim take this question to a unique database of credit bureau microeconomic information covering the pervasive financial crisis the Republic of Korea experienced in 1997–98.

The database includes all corporate borrowers surveyed by the Korean Credit Bureau, providing details on the structure of their borrowings and on their relationship with lending banks. The authors did not have access to the identity of the corporate borrower and their only nonfinancial control variable was the borrower's Standard Industrial Classification (SIC). This restriction limited their analysis to smaller borrowers, keeping their sample focused on small and medium-size enterprises, which were likely to rely on banks for external financing. Their findings:

- Outstanding loans plunge more for firms with weaker pre-crisis relationship banking.

- The drop in credit lines—arguably a proxy identifying shifts in the loan supply—is larger for firms relying less on strong relationship banking.

- More intense pre-crisis relationship banking reduces the probability that a previously nondelinquent firm would build (increase) its loans in arrears in 1998, the year of the sharpest liquidity constraints.

- All things equal, this probability depends on whether firms were borrowing from one (or more) of the five banks foreclosed in June 1998, showing that it might be particularly difficult for borrowers to replace distressed lending banks during a financial crisis.

The authors' findings support the hypothesis that relationship banking—with surviving banks—has a positive value during a systemic financial crisis. They argue that for many viable small and medium-size businesses in Korea, relationship banking reduced liquidity constraints and thus diminished the probability of unwarranted bankruptcy.

This paper—a product of Finance, Development Research Group—is part of a larger effort in the group to study the role of relationship banking. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Agnes Yaptenco, room MC3-446, telephone 202-473-1823, fax 202-522-1155, email address ayaptenco@worldbank.org. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The authors may be contacted at gioferri@tiscalinet.it, tkang@worldbank.org, or kimij@snu.ac.kr. February 2001. (43 pages)

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***The Value of Relationship Banking During Financial Crises:
Evidence from the Republic of Korea***

by

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1 Introduction

The impact of relationship banking has spawned a vivid debate over the recent years as the theory of financial intermediation has come to rely on information asymmetries and the associated agency problems between lenders and borrowers, potentially leading to credit constraints for borrowers (Bhattacharya and Thakor, 1993). On one side, some authors hold that relationship banking –based on close bank-firm customer relationships– helps overcome such information asymmetries, thus benefiting lenders while reducing for borrowers both credit rationing and the cost of credit (Diamond, 1984 and 1989; Boot and Thakor, 1994). On the opposite side, others stress the perils of relationship banking: i) it can create misallocation due to soft-budget constraints, as borrowers –expecting to be better able to renegotiate their loans ex post with a relationship lender– have little ex ante incentive to boost their effort (Bolton and Scharfstein, 1996); ii) it may generate lender’s rent extraction from the borrower –because the latter is informationally captured by the former – and, thus, not necessarily bring about the previously envisaged reduction in credit constraints for borrowers (Sharpe, 1990; Rajan, 1992; Weinstein and Yafeh, 1999). Although evidence has been offered supporting alternatively the former or the latter view, the state of the art is still unsatisfactory, calling for new efforts to test empirically the impact of relationship banking (Boot, 2000).

The aim of this paper is to shed new light on this debate. Our contribution is based on: (i) a unique event and (ii) a very special database. First, the unique event is the experience of Korea during 1997-98, when the sharp exchange rate collapse and the associated circumstances triggered a severe monetary tightening and a pervasive financial crisis with extensive distress in both the corporate and banking sectors. Indeed, a systemic financial crisis seems the most promising event to assess whether and to what extent relationship banking is valuable to

borrowers. Under such circumstances of generalized liquidity constraints, relationship banking may secure access to external finance for firms and, thus, help them better weather the crisis. Nevertheless, relationship banking might turn from good to bad if it happens to associate borrowers with distressed lenders, namely that firms suffer from accessing to credit when their banks –firms’ relationship lenders– are experiencing difficulties (Diamond, 2000; Kang and Stulz, 1997).

Second, the very special database comprises credit bureau micro-information covering the period of the event. Specifically, our database includes all corporate borrowers compiled by the Korean Credit Bureau, for which we observe the following information: (i) total loans outstanding; (ii) amount of collateral; (iii) loans in arrears; (iv) number of lending banks and amount of loans outstanding with each of them; (v) credit lines; (vi) SIC industrial code; (vii) whether the firm was borrowing from one (or more) of the five banks foreclosed in June 1998.

Although its details on credit relations make our database ideal to evaluate the impact of relationship banking, we still face some shortcomings. In the first place, the Korean Credit Bureau does not collect information on bank lending rates. Accordingly, we cannot assess the impact of relationship banking in terms of the cost of credit and we can only focus on variables associated with the availability of credit. Secondly, given our data, we can only measure relationship banking along one of its two dimensions –namely the intensity of the relationship in terms of the concentration of the loans supplied to the firm– while we cannot observe the other dimension –the length of the relationship. Thirdly, because of comprehensible restrictions, we don’t have access to the identity of the corporate borrower. Thus, we have no way to control for balance sheet and profit/loss accounts information on borrowers and the only available control variable is the firm’s SIC industrial code. In the light of this restriction, we limit our analysis

only to those firms whose total loans outstanding lie below one billion Korean Won (approximately \$830,000 at the post-crisis exchange rate) to exclude from the sample medium-large sized firms with likely access to financial markets and keep the sample focused on a more homogeneous set of small- and medium-sized enterprises (SMEs).

Our econometric analysis tests whether proxies for the intensity of relationship banking turn out to be determinants of the availability of credit for firms in our sample during the crisis. Specifically, we estimate three equations on the determinants of: (i) the changes in loans outstanding; (ii) the changes in credit limits granted by banks –arguably a proxy identifying shifts in the loan supply– to borrowing firms; (iii) the probability that a previously non-delinquent firm will build (increase her) loans in arrears in 1998, the year of the sharpest liquidity constraints.

We reach four main findings. First, outstanding loans plunge more for firms with weaker pre-crisis relationship banking. Second, also the drop in credit lines is larger for firms relying less on strong relationship banking. Third, more intense pre-crisis relationship banking reduces the probability that a previously non-delinquent firm will build (increase her) loans in arrears in 1998, the year of the sharpest liquidity constraints. Fourth, *ceteris paribus*, the aforementioned probability depends on whether firms were borrowing from one (or more) of the five banks foreclosed in June 1998, testifying that it may be particularly difficult for borrowers to substitute distressed lending banks during a financial crisis.

Overall, our findings support the hypothesis that relationship banking –with surviving banks– has a positive value during a systemic financial crisis, reducing liquidity constraints for borrowers, although we cannot exclude –since we don't observe lending rates– that it also implies rent extraction. We argue that for many viable Korean SMEs relationship banking

reduced the extent of liquidity constraints and, thus, diminished the probability of unwarranted bankruptcy.

The rest of the paper is organized as follows. Section 2 discusses in more detail why we expect that relationship banking is most valuable to borrowers during financial crises. Section 3 provides a quick refresher on the main features of the Korean financial crisis. Section 4 describes the data we use, documents the variables employed and presents the results of the regressions. Section 5 concludes.

2 Why relationship banking is most valuable during financial crises

We will first provide a brief review of the arguments and evidence in favor and against relationship banking. Then we will concisely focus on the debate concerning a specific feature of bank-firm relationships –namely, the extent of multiple banking relationships– that will be particularly important in our empirical analysis. Finally, we will stretch the discussion on relationship banking to a situation of financial crisis.

It is well known that information asymmetries between the borrower and the lender – whereby the latter doesn't have full visibility on the quality of the former– may engender quantity constraints for the borrower faces in her access to bank finance (Stiglitz and Weiss, 1981). The main implication of relationship banking is exactly that –by establishing an intense relationship with the borrower– banks may be able to reduce the extent of such information asymmetries and, thus, diminish credit constraints for the borrower.

According to Boot (2000), relationship banking centers around two critical dimensions: the extraction of proprietary information from the borrower by the lender and the occurrence of multiple interactions between the two parties. As such, relationship banking may be defined as

“the provision of financial services by a financial intermediary that: i. invests in obtaining customer-specific information, often proprietary in nature; and ii. evaluates the profitability of these investments through multiple interactions with the same customer over time and/or across products”. This special status can facilitate a Pareto-improving exchange of information between the borrower and the bank. But relationship banking can also add value through several additional contractual welfare-improving enhancements: i) through flexibility and discretion, it can facilitate implicit long term contracting; ii) it may help controlling potential conflicts of interest; iii) it can improve the monitoring of collateral; iv) it may render feasible for the bank to make loans that would not be profitable from a short term perspective but may become profitable if the relationship with the borrower lasts long enough.

Nevertheless, there are also two main potential perils associated with relationship banking. First, misallocation may arise due to the soft-budget constraint problem. Since borrowers realize ex ante that it should be easy to renegotiate their loans ex post with the relationship lender, they have little ex ante incentive to boost their effort (Bolton and Scharfstein, 1996). Second, the lender extracts rent from the borrower because of the hold-up problem. As the borrower becomes informationally captured by the lender, the latter may be able apply unfair credit terms. In such a case, it could turn out that relationship banking does not necessarily bring about the previously envisaged reduction in credit constraints for borrowers (Sharpe, 1990; Rajan, 1992; Weinstein and Yafeh, 1999).

Many researchers have endeavored to assess empirically which of the two alternative views carries out to the data. For the sake of brevity, we will limit our review to some recent papers.

Various papers have analyzed the impact of relationship banking on small firm financing in several countries. Numerous studies on the United States have used data from the National Survey of Small Business Finance. Petersen and Rajan (1994) show that firms borrowing from fewer banks, enjoy easier access to bank credit and lower interest rates, while longer borrowing relationships enhance credit availability. Petersen and Rajan (1995) find that bank lending rates for younger firms are lower in less competitive markets, where –supposedly– relationship banking can more easily be sustained.¹¹ Berger and Udell (1995) show that long-standing bank relationships reduce for firms both the cost of bank borrowing and the associated collateral requirements –on previously negotiated credit lines. On US data drawn from the 1995 Credit, Banks and Small Business survey, Scott (2000) evinces that low account manager turnover and frequent social contact with the owner of the firm –by strengthening relationship banking– significantly benefit borrowers in terms of both credit availability and loan pricing. Referring to Japan, Weinstein and Yafeh (1999) find that strong links to borrowers permit main banks significant rent extraction through higher-than-average lending rates. Regarding Germany, Elsas, and Krahnert (1998) –using banks’ internal credit file data– concur with Harhoff, and Körting (1998) –using survey data– that the main impact of relationship banking is on credit availability rather than loan pricing. Using survey data for Italy, Angelini, Di Salvo, and Ferri (1998) find that relationship banking reduces credit rationing, but lending rates tend to increase with the length of the relationship. Finally, for Belgian firms, Degryse and Van Cayseele (2000) detect conflicting impacts of two different dimensions of relationship banking: loan rates increase with the duration of a bank-firm relationship, while the scope of a relationship –defined

as the purchase of other information-sensitive products from a bank— reduces loan rates substantially.

As it is clear by now, one may assess the intensity of relationship banking along several dimensions, all of which affecting bank/borrower incentives and the bank's ability to extract proprietary information: i) the duration of the bank-borrower relationship; ii) the scope of the relationship —whereby the borrower may acquire from a bank other information-sensitive products beside the loan; iii) the extent of multiple-bank —as opposed to main-bank— relationships. Considerable debate has emerged along this third dimension of relationship banking. On one hand, Detragiache, Garella, and Guiso (2000) propose a model in which relationship banks may be unable to continue funding profitable projects and multiple banking emerges as an optimal solution to reduce the probability of inefficient early liquidation; they also offer supporting empirical evidence.² On the other hand, various papers present empirical evidence according to which multiple banking may reduce the availability of credit to borrowers. Cole (1998) finds that a lender is less likely to grant credit to a firm if the firm deals with other financial counterparts. Angelini, Di Salvo, and Ferri (1998) show that, *ceteris paribus*, the reported intensity of credit rationing increases with the number of lending banks. Analyzing the duration of bank-firm relations in Portugal, Farinha, and Santos (2000) conclude that multiple banking emerges because of the unwillingness by the incumbent bank to increase its exposure to poor performing firms rather than because high-growth firms seek to protect themselves against the hold-up rents inherent to exclusive relationships.³

This brief review of the extant literature suffices to show how the belief that relationship banking adds value to the economy is widely, but not unanimously, accepted. Nevertheless,

even if we accept that relationship banking does add value, why should it be most valuable during financial crises?

The answer depends on the fact that during financial crises economies experience widespread distress. This implies that borrowers need financial assistance most exactly when the economy is plundered by pervasive lack of liquidity. If this financial assistance is denied, many viable firms might become insolvent and become bankrupt, with large potential depletion of corporate value (Andrade and Kaplan, 1998). What is then the link between relationship banking and distress? Luckily, here we have a rather general agreement that relationship banking may help deal with financial distress.

Analyzing the case of Japanese firms, Hoshi, Kashyap, and Scharfstein (1990) show that the costs borne to overcome episodes of financial distress are significantly lower for firms enjoying long-standing relationships with a main bank. Kawai, Hashimoto, and Izumida (1996) find that the main bank system reduces the firm's financial cost for Japanese firms in financial distress.⁴ Elsas and Krahnert (1998) reach analogous conclusions on German data: they unveil that housebanks provide liquidity insurance in situations of unexpected deterioration of borrower ratings. Building on the hypothesis that implicit contracts may characterize bank lending (Fried and Howitt, 1980), Berlin, and Mester (1998) find evidence that relationship banks smooth loan rates in response to exogenous shocks. They argue that loan rate smoothing is part of an optimal long-term contract between a bank and its borrower if it happens in response to interest rate shocks –but not in response to a credit risk.⁵ Examining micro-data on corporate borrowing in Italy during the episode of sharp monetary tightening in 1992 –aimed to resist the extant exchange rate crisis– Conigliani, Ferri, and Generale (1997) show that the intensity of lending rate increase and of credit constraints was higher the larger the number of lending banks.

While there is general consensus that relationship banking should be most valuable during financial crises, we need to make an important caveat. Specifically, as Berlin, and Mester (1998) also show, loan rate smoothing –and, we can add, the provision of liquidity insurance more in general– reduces bank profits. This means that financial crises may impose a greater burden on relationship banks than on arm’s length banks. If one considers that such a burden is compounded with the accrual of increasing losses triggered by the crisis, this entails that the stability of (some) relationship banks may be at risk. In other words, there is a limit to the intertemporal smoothing and liquidity insurance offered by relationship banks. And, in some cases, relationship banks may become distressed. Should such occurrence materialize, borrowers would be hit by the curse of relationship banking rather than enjoying its benefits. In practice, distressed relationship banks would be recalling their loans and their borrowers might be the least prepared to deal with such a situation. It may, in fact, be rather difficult for borrowers to substitute distressed relationship banks exactly at the time of a financial crisis.⁶ Accordingly, it will be important to control for the various cases of suspended banks in our empirical analysis.

3 A quick refresher of the Korean financial crisis

The Korean crisis –together with the other episodes of East Asian crises– has been studied not only extensively but also from many different perspectives.⁷ It is generally held that loss of confidence in the Korean economy led to market reactions which went well beyond what was justified by Korean imbalances. This over-reaction by markets led to the unprecedented currency crisis. A twin banking crisis unfolded as heavy losses mounted on the large unhedged foreign currency debt, as asset markets (stocks, real estate, and bonds) deteriorated, and as domestic interest rates increased rapidly – in response to swift monetary restriction aimed at restoring market confidence.

The value of the Korean won in terms of U.S. dollar plummeted by more than 90 percent between July and December of 1997: from 889.1 to 1695.0 Won/US\$ (Figure 1). A sharp drop was also evident in the stock market: between August 1997 and August 1998 the composite stock price index fell precipitously by 55% (Figure 1). Tight monetary policy –aimed to keep the domestic currency from plunging in the midst of the crisis– raised market interest rates sharply. The overnight inter-bank rate (call rate) rose from 11.4 percent in July 1997 to 25.3 percent in January 1998. Long-term rates on risk-free Government bonds –National housing bonds (type 1) with 5 year maturity– also raised up to 16.5 percent from 11.2 percent for the same period (Figure 2). Figure 3 presents the evidence that bank-dependent borrowers –mostly SMEs– were disproportionately hit by the credit crunch as could be expected on the basis of the bank-lending channel hypothesis.

Altogether, the plummeting exchange rate, the sharp decline in the stock market and the marked rise in interest rates had the very distinct effect of weakening both the banking system and the corporate sector, as these factors damaged banks' and firms' balance sheets. For instance, with a fast growing foreign currency debt,⁸ an unexpected devaluation of the Korean Won resulted in a declining net worth of firms and banks because of their widespread holding of unhedged liabilities in foreign currency. In turn, deteriorating balance sheets increased adverse selection and moral hazard problems, which could lead to precipitous financial instability during the Korean crisis (Hahm and Mishkin, 1999). A sharp decline in the stock market, in fact, reduces the market valuation of firms' net worth, and can thus increase adverse selection and moral hazard problems (Bernanke and Gertler, 1989). Adverse selection is only made worse by higher interest rates that increase the likelihood that the bank is lending to higher-risk borrowers

(Stiglitz and Weiss, 1981). Thereby a rise in interest rates directly decreases banks' net worth by cutting down the present value of their assets.

It becomes harder for banks to screen out good from bad borrowers when the decline in the net worth decreases the value of firm's collateral and increases firms' incentives to make risky investments especially in an environment of prevailing uncertainty spawned by information asymmetries. Furthermore capital shortages in the banking sector, already stricken by a huge amount of non-performing loans, were likely to be further exacerbated after the stiffening of capital adequacy standards enacted by national regulators immediately upon the inception of the crisis in December of 1997. Recent research suggests that this type of regulatory-induced capital crunch caused poorly capitalized banks to contract their loans markedly during the crisis period in Korea (Ferri and Kang, 1999).

Figure 1: Trend of Exchange rates and Stock Price Index

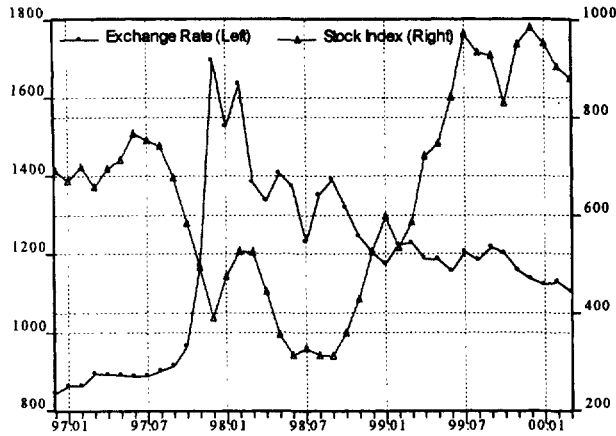


Figure 2: Trend of Overnight Call rate and Government bonds rate

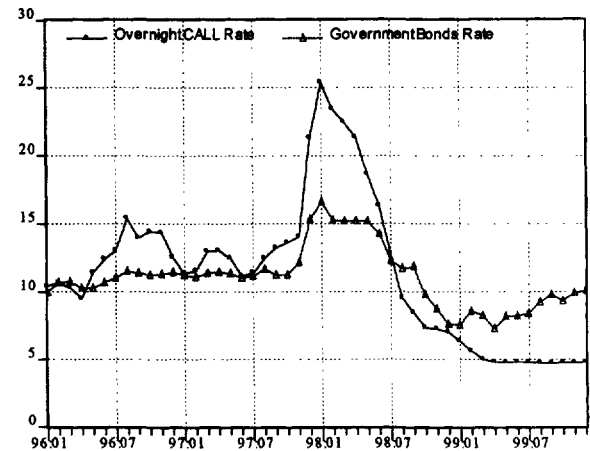


Figure 3: Growth Rates of Industrial Production For All Industries and for SMEs

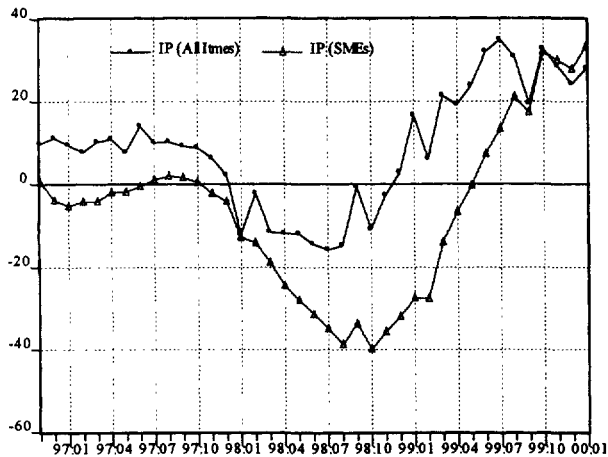
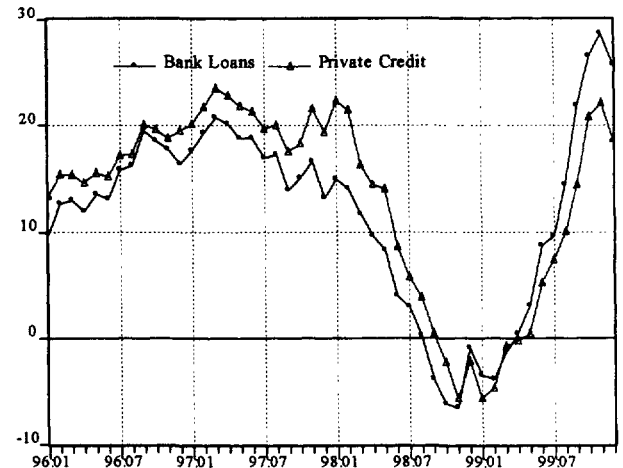


Figure 4: Growth Rates of Banks' Private Credit and Loans



The widely-recognized perception was that a deterioration in banks' balance sheets was likely to be an important factor triggering the financial crisis. Because of this, the Korean government pushed strongly its policy of closing down financial institutions no longer viable, owing largely to their accumulation of non-performing loans, while inducing an early normalization of those still viable through the injection of public funds under the condition of

intensive self-rescue efforts. The number of resolutions of financial institutions –in the form of closing-down and M&A during 1998-1999 (Table 1)– judged non-viable stood at 335.

Table 1: Changes in the number of financial institutions during 1998-99

	Number of Institutions at the end of 1997 ¹⁾	1998			1999			Number of Institutions at the end of 1999 ¹⁾
		Exit ²⁾	Merger	Newly established	Exit ²⁾	Merger	Newly established	
• Banks	33 ³⁾	5	3	-	-	2	-	23
• Merchant Banking Corporations	30	16	-	-	1	3	-	10
• Securities companies	36	6	-	1	-	-	1	32
• Investment Trust Companies	31	7	-	-	-	1	-	23
• Insurance companies	45	4	1	-	-	-	-	40
• Mutual Savings and Finance companies	231	22	2	4	21	10	6	186
• Credit Unions	1,666	69	14	9	103	45	-	1,444
Total	2,072	129	20	14	125	61	7	1,785

Source: *Quarterly Review*, The Bank of Korea. (March, 2000).

1) Excluding bridge financial institutions and branches of foreign banks.

2) Including revocation of license, bankruptcy, liquidation.

3) Commercial banks (26) and Specialized banks (7).

Since securities markets in Korea are not as deep as in other major countries (particularly in market-based financial systems: Table2), corporate dependence on indirect financing such as bank borrowing is particularly high in Korea (Table 3). In principle, thus, one can guess that relationship banking may be more important in Korea than in other countries with more developed financial markets. In this regards, one could easily expect that both the massive exit of distressed financial institutions and the weakening of banking sectors' balance sheets engender pervasive and inexorable liquidity constraint for the corporate sector in the form of a severe drop in credit (Figure 4).

Table 2: Size of Stock Markets

Countries	Number of listed firms	(during 1997)			(Billion dollars)
		Stock market capitalization	Transaction volume	Capital increase During 1997	
US	9,091	12,884.5	10,600.8	222.1	
UK	2,513	1,996.2	1,989.5	22.3	
Germany	2,696	825.2	1,067.7	8.9	
Japan	3,140	2,216.7	1,117.9	9.5	
Korea	776	41.9	170.8	3.2	

Source: "Stock", Korea Stock Exchange (July, 1998).

Table 3: Corporate Financing Structure (Manufacturing Industry)

	(per cent)											
	1979-1983	1984-1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Internal Funds	26.7	43.7	46.4	31.3	33.5	42.1	51.4	41.9	44.2	34.0	22.0	22.0
External Funds	73.3	56.3	53.6	68.7	66.5	57.9	48.6	58.1	55.8	66.0	78.0	78.0
• Direct Financing	13.8	14.0	14.4	15.6	14.8	10.4	17.9	11.9	9.1	16.8	11.7	4.0
1. Stocks	7.1	8.4	7.2	5.4	3.8	4.9	6.0	3.6	3.2	3.5	1.6	1.6
2. Bonds	6.7	5.6	7.2	10.2	11.0	5.6	12.0	8.3	5.8	13.3	10.1	2.4
• Indirect Financing	29.6	20.5	20.4	31.8	30.4	36.2	17.8	19.5	27.7	37.9	52.0	59.6
Bank Borrowing	19.7	16.4	16.0	24.2	19.4	23.7	13.0	14.6	19.6	26.9	39.5	39.5

Source: "Financial Statement Analysis", The Bank of Korea (various issues).

4 The empirical analysis

4.1 Sample selection

We use data compiled by the Credit Information Department (CID) in Korea Bankers Association (the Korean Credit Bureau). Credit information for those firms borrowing from any bank is pooled into the CID and can be shared by all member banks. Thus *Bank A* can monitor the lending information of *Bank B* for a specific *firm j*. Member banks must file credit information on borrowing firms with the CID in the event of making loans greater than .5 billion

won (approximately \$415,000 at the post-crisis exchange rate). Once the initial loan is reported, the CID maintains the credit record even in case the outstanding level falls below .5 billion won.

Table 4: Distribution of loans by size class

		(Million won)
	Cumulative number of firms	Average Loan Size (end of 1995- end of 1999)
Up to 1/10th	1,530 th	429.2
Up to 2/10th	3,060 th	661.6
Up to 3/10th	4,590 th	906.4
Up to 4/10th	6,122 th	1,204.8
Up to 5/10th	7,653 th	1,604.8 (Median)
Up to 6/10th	9,183 th	2,130.6
Up to 7/10th	10,713 th	2,923.8
Up to 8/10th	12,244 th	4,467.0
		* 7,326 (Mean)
Up to 9/10th	13,774 th	9,346.0
Up to 10/10th	15,305 th	5,573,076

Starting with 39,523 non-financial firms included in the CID database, we reduced the sample to 15,305 firms by excluding those firms for which no information on lending was available and by limiting the analysis to the firms continuously present in the records between December 1995 and December 1999. In addition, in order to focus on small-sized-loan borrowers –most of which are presumably SMEs– we dropped large loans and kept only those firms whose total loans were below 1 billion won (approximately \$830,000 at the post-crisis exchange rate) up to 3/10th from the bottom. Thus the total number of observations dropped from 15,305 to 4,590 firms (Table 4).

Research on the number of firms' banking relations finds that SMEs generally hold only one relationship and that the average number of relationship increases with the firm's size.⁹ Table 5 –displaying the average values during the period of 1995 through 1999, according to a breakdown by classes of loan size, the number of borrowers in each class, the number of lending

banks, and the Herfindahl index¹⁰ confirms that these patterns apply to Korean firms too. Small-total-loans firms of the bottom 30th percentile more often than not borrow from only one bank –their median number of lending banks is 1.5– in contrast to large-total-loans firms of the top 30th percentile borrowing from 4 banks –their median number of lending banks is 3.7. In addition, small-total-loans firms exhibit a high concentration of their borrowing among lending banks –with a Herfindahl of 0.8– again in contrast to large-total-loans firms –with a Herfindahl of 0.5. This proves, therefore, that the intensity of relationship banking is generally greater for small-total-loans firms.

As it happens, borrowing from multiple lenders and, thus, having a low concentration of loans among lenders is more common for firms in larger loan size classes. But the link between loan size class and our two proxies of relationship banking is not a mechanic one, as shown by the ample variability within each loan size class. For instance, some of the firms in the smallest total loan size class borrow from 4 banks and have a Herfindahl of 0.31, well below the average for the largest total loan size class. At the same time, some of the of the firms in largest total loan size class have a Herfindahl of 0.09, well below the average for the smallest total loan size class. Thus, the intensity of relationship banking is, at least partly, a choice variable of each firm that is affected by other considerations besides its borrowing needs. Accordingly, if we find that the impact of monetary policy shocks differs according to the intensity of relationship banking, this doesn't depend on firm size only.

Table 5. Loan size, number of lending banks, and Herfindahl index
(average values 1995-1999)

Range	Loan Size		Number of Lending Banks			Herfindahl Index (H)			
	Mean	Median	Mean	Median	Max	Mean	Median	Min	Max
1 th – 1,530 th	254.1	265.3	1.3	1.2	4.0	0.8	0.8	.308	1
1,531 th – 3,060 th	551.5	552.8	1.6	1.6	4.2	0.78	0.79	.282	1
3,061 th – 4,590 th	780.2	777.9	1.9	1.8	5.0	0.8	0.8	.204	1
4,591 th – 6,122 th	1,048.8	1,395.1	2.1	2.0	7.0	0.7	0.7	.224	1
6,123 th – 7,653 th	1,395.1	1,391.0	2.3	2.2	5.4	0.7	0.7	.238	1
7,654 th – 9,183 th	1,849.1	1,835.7	2.5	2.4	6.4	0.7	0.6	.254	1
9,184 th – 10,713 th	2,494.8	2,485.4	2.8	2.6	7.6	0.6	0.6	.200	1
10,714 th – 12,244 th	3,601.5	3,312.0	3.1	3.0	9.6	0.6	0.6	.172	1
12,245 th – 13,774 th	6,275.8	5,944.6	3.6	3.4	9.8	0.6	0.5	.170	1
13,775 th – 15,305 th	54,992.0	18,680.0	5.1	4.6	18.8	0.5	0.5	.090	1

1) Loan size is denominated as million Korean Won.

4.2 Variable Selection and Summary Statistics

We use the following variables: (i) total loans outstanding; (ii) amount of collateral; (iii) loans in arrears; (iv) credit limits outstanding; (v) number of lending banks; (vi) Herfindahl index –as defined above– to measure the concentration of the firm’s borrowing among lending banks; (vii) whether the firm was borrowing from one (or more) of the five banks foreclosed in June 1998. Finally, we follow Petersen and Rajan (1994) in including 18 SIC industrial codes to control for industry-specific effects.¹¹

Table 6 presents a detailed description of the variables employed in our econometric analysis. Specifically, the focus of our exercise is on credit availability measures in 1997 –when the crisis started– and in 1998 –when the crisis peaked.

Most of the variables need little explanation. Provided firms in the sample are relatively homogeneous in size, total loans outstanding proxy their degree of indebtedness. Thus the changes in firm’s total loans (*DTL9697*, *DTL9798*) offer an indication of the changes in their availability of credit. The existence of loans in arrears (and their extent) may be associated with situations of corporate distress (and with the extent of distress) and may, thus, reduce the supply of credit. So we expect a negative association between the “*Delinquency Dummy*” and the change in total loans.

Given its loans outstanding, a larger amount of collateral offered by a firm can be interpreted as signaling a higher capacity to repay the loans. We expect therefore that the availability of credit increases with the amount of collateral. The size of and changes in the credit limits outstanding (*DCL9697*, *DCL9798*) –given total loans outstanding– may be an important factor positively associated with the availability of credit to the firm. This stems from two distinct reasons. First, credit limits outstanding indicate the degree to which a firm can rely on pre-committed credit lines, which reduce the risk of incurring into liquidity shortages.¹² Second, as argued by Ferri and Kang (1999), since Korean banks’ credit lines are offered at no charge –i.e. there is no commitment fee– the undrawn part of the line may be thought of as an option with zero price for the borrower. Thus, the borrower is rationed in the amount of her credit limit, which is solely determined by the bank. As such, outstanding credit limits provide a measure of the availability of credit to the borrower because they are supply-determined.

Next, we come to our proxies for the intensity of relationship banking¹³. Given the amount of loans outstanding, we can think of two distinct proxies. First, we consider the number of lending banks: we include it in log form to account for its likely non-linear impact (*LNUMB96*, *LNUMB97*). As described above, the extent of multiple banking is bound to weaken relationship banking. Thus, a negative (positive) link between the number of lending banks and the availability of credit will signify that relationship banking has a virtuous (vicious) effect reducing (increasing) liquidity constraints. Second, given the number of banks a firm borrows from, we consider how such borrowing is distributed among lending banks. In case the firm's borrowing were always uniformly distributed across lending banks, this additional dimension would add no information. However, it is possible that some firms –though making recourse to multiple banking– concentrate the bulk of their borrowing at a single bank. In such case, the firm could *de facto* be a “relationship borrower” even though it would be labeled as a “non-relationship borrower” if we looked at the number of lending banks only. Thus, we include a variable defined as the product of the number of lending banks with the Herfindahl index (*LNumb*H96*, *LNumb*H97*) identifying the degree of concentration of the firm's borrowing among those banks. Our expectation is that this variable should have the opposite sign to that obtained for the number of lending banks.

Furthermore, in determining whether the extent of relationship banking decreases liquidity constraints, we should be extremely careful to control for those “relationship borrowers” that happened to be associated with banks that were hit by distress and were closed. In such case, these borrowers might be hit by the “curse” of relationship banking in that it could be extremely difficult for them to obtain liquidity support from banks they had no previous acquaintance with, especially during the financial crisis. Accordingly, our expectation is that

credit availability will worsen particularly for firms borrowing from those banks that were foreclosed in 1998 (for which $Exit = 1$). As a consequence of this, it is possible that some of these firms became unable to service their debt, thus cumulating arrears on their loans in 1998. In addition, we consider two ramifications of the effects for borrowers associated with foreclosed banks: i) whether these borrowers had a high collateralization of their loans ($Exit * Collateral$); ii) whether these borrowers had a high concentration of their borrowing among lending banks ($Exit * H$). Our expectation is that: i) having a high collateralization at foreclosed banks should definitely be detrimental to firms, and ii) the impact of $Exit * H$ should be detrimental for sure if the firm concentrated its borrowing exclusively at foreclosed banks, but could even be beneficial if the firm was also borrowing from other surviving banks. As to the first, in the crisis it may be impossible for customers to re-deploy their collateral that is locked in with foreclosed banks: to the extent that some of these customers were heavily dependent on collateral, they might be worse off vis-à-vis borrowers less dependent on collateral. As to the second, a higher H is a “curse” for a firm exclusively relying on foreclosed lenders, but might not be so if the firm was also a “relationship borrower” with other surviving banks, which could actually be more forthcoming to help it avoid distress.

Table 6: Variable description

Variable	Definition
• DTL9697, DTL9798	Growth in log of total loans during 1996-1997 and 1997-1998.
• DWK9697, DWK9798	Growth in log of working capital loans during 1996-1997 and 1997-1998.
• LL95, LL96	Log of total loans in 1995 and 1996.
• LNUMB96, LNUMB97	Log of number of banks from which a firm borrowed in the year of 1996 and 1997
• LNumb*H96, LNumb*H97	Interaction term of LNUMB*H (where, H = Herfindahl Index)
• Delinquency Dummy 1996, 1997	Delinquency Dummy takes a value 1 when a firm has loans in arrears
• Collateral Dummy 1996, 1997	Collateral Dummy takes a value 1 if the ratio of collateral to total loans is beyond the 75 th percent value.
• DCL9697, DCL9798	Changes in the credit limit during the year of 1996-97 and 1997-98.
• Exit	Takes a value 1 if a firm maintained lending relationship with those 5 banks which were foreclosed during the financial crisis (June 1998).
• Exit*H97, Exit*H98	Interaction term of Exit dummy and the Herfindahl index for the year of 1997 and 1998.
• ARR9897L	Takes a value 1 if a firm was non-delinquent in 1997 and became delinquent in 1998
• ARR9897D	Takes a value 1 if firm's delinquency ratio rose during 1997 and 1998
• Exit*Collateral Dummy 1997	Interaction term of <i>Exit</i> and <i>Collateral Dummy of 1997</i>

Table 7 contains descriptive statistics of the variables used later in the regressions. A few remarks concerning the variables are in order. First, the extent of credit contraction during 1998 is demonstrated by the noticeable reduction of total lending during that year (*DTL9798*). Second, the fact that also banks' credit lines (*DCL9798*) –arguably a proxy identifying shifts in the loan supply (Ferri and Kang 1999)– dropped sizably is consistent with the hypothesis that a supply contraction materialized. Third, the fact that the delinquency dummy reaches its highest mean value for 1998 (0.258) confirms the build up of non-performing loans and loans in arrears. Fourth, we find that the mean value for collateral raises from 0.612 to 0.712 from 1996 to 1998.

This seems to imply that banks reinforced their standard debt contracts by increasing collateral requirement to cope with adverse selection and moral hazard problems, presumably heightened during the crisis.

Table 7: Summary statistics

Variable	No. of Observations	Mean	Median	Std. Dev.	Min.	Max.
DTL9697	4,589	-.186	-.032	1.128	-7.715	5.860
DTL9798	4,589	-.485	-.209	1.165	-6.976	8.323
DWK9697	4,310	-.182	-.030	1.125	-7.595	5.525
DWK9798	4,194	-.509	-.211	1.165	-6.788	8.259
LL95	4,589	6.121	6.396	1.103	0	8.261
LL96	4,589	6.137	6.396	1.034	0	8.276
NUMB96	4,589	1.824	2	.965	1	8
NUMB97	4,589	1.856	2	1.008	1	9
LNUMB96	4,589	.478	.693	.485	0	2.079
LNUMB97	4,589	.491	.693	.492	0	2.197
LNUMB98	4,589	.325	0	.436	0	1.792
LNumb*H96	4,589	.295	.353	.296	0	1.317
LNumb*H97	4,589	.292	.354	.288	0	1.261
LNumb*H98	4,589	.196	0	.261	0	1.223
Delinquency Dummy 1996	4,589	.217	0	.413	0	1
Delinquency Dummy 1997	4,589	.216	0	.412	0	1
Delinquency Dummy 1998	4,589	.258	0	.437	0	1
Collateral Dummy 1996	4,589	.612	1	.487	0	1
Collateral Dummy 1997	4,589	.589	1	.491	0	1
Collateral Dummy 1998	4,589	.712	1	.452	0	1
DCL9697	3,114	-.047	0	.914	-5.523	4.517
DCL9798	3,143	-.217	0	.829	-5.967	6.477
Exit*H97	4,589	.0781	0	.225	0	1
Exit*H98	4,589	.0966	0	.272	0	1
ARR9897L	4,589	.084	0	.278	0	1
ARR9897D	4,589	.137	0	.344	0	1
Exit*Collateral Dummy 1997	4,589	.0784	0	.268	0	1

4.3 *Empirical analysis and main results*

This Section has three main aims. First, we test whether pre-existing relationship banking links helped firms to weather the financial crisis and to safeguard themselves against being liquidity constrained. Second, we ascertain whether the reduction in the loan supply – arguably proxied by changes in lines of credit which are recognized as being more supply-driven – is larger for firms relying less on strong relationship banking. Third, we examine whether pre-existing relationship banking links reduced the likelihood for previously non-delinquent firms to build up loans in arrears in 1998, the very year firms experienced a severe credit crunch. As exposed above, in any of these specifications we control for customers of foreclosed banks.

4.3.1 Relationship banking and the availability of credit: cross section evidence

We need to start with a caveat. In our cross sectional estimations, the problem associated with focussing on the changes in loans during the crisis period is that we can not still be sure whether a supply-driven effect is effectively identified. Namely, a firm experiencing a reduction in loans could have issued bonds instead and the real cause of the loan contraction would be demand reduction rather than supply reduction. Nevertheless, this problem is mitigated by the fact that we have dropped large loan firms and kept only small loan firms. While we cannot rule out that some of the small loan firms are in effect large firms with little leverage, we posit that the large majority of the firms kept in our sample are bound to be SMEs with little access to financial markets. Thus, we can argue that, by examining the pattern of the changes in total loans (*DTL9697*, *DTL9798*), we are effectively identifying a supply-driven effect.

Our results are exposed in Table 8. We document that the intensity of pre-existing relationship banking –measured by the log of number of lending banks (*LNUMB*)– is negatively

associated with the availability of credit. Two observations are in point. First, this result is consistent with the potential benefits of relationship banking stated above and with the theory of Thakor (1996) and Bulow and Shoven (1978) in the sense that the private information generated by banks about firm with multiple sources of finance is less valuable to each bank.¹⁴ Second, the fact that the coefficient of *LNUMB* becomes larger in the estimate for 1998 is consistent with the hypothesis that relationship banking becomes even more valuable as the crisis deepens.

Clearly, our evidence that intense relationship banking for SMEs has value during the financial crisis still holds after controlling for firm characteristics such as whether they are delinquent, the extent of their collateral, and the size of their credit limits outstanding. The negative coefficient of the pre-existing delinquency status –proxied by the dummy variable that takes value one when the firm has loans in arrears– correlates with the influence of the degree of corporate distress on firm’s credit availability in the next period. The coefficient of the collateral dummy variable doubles and becomes significant for 1998: deepened information asymmetries in the financial crisis may require firms to post more collateral. The fact that contemporaneous changes in credit limits (*DCL*) are very important determinants of *DTL* confirms that supply shifts affect the availability of loans. The result that *DCL* becomes even more important for 1998 testifies that firms’ reliance on pre-committed credit lines raised in the crisis period.

Table 8: Cross section regressions

The dependent variable: The changes in the log of total loans (DTL9697, DTL9798)

Explanatory Variables	DTL9697 (1)	DTL9798 (2)
No. of Observations	3,114	3,143
Constant	1.198 (4.98)***	1.039 (3.79)***
LL(t-2)	-.138 (-8.77)***	-.171 (-8.53)***
LNUMB(t-1)	-.139 (-1.98)**	-.219 (-2.86)***
Lnumb*H(t-1)	-.233 (-2.01)**	-.197 (-1.56)
Delinquency(t-1)	-.419 (-9.98)***	-.301 (-6.66)***
Collateral(t-1)	.052 (1.57)	.111 (2.99)***
Changes in Credit Limit(t)	.305 (17.32)***	.460 (21.14)***
Exit*H(t)	.187 (2.60)**	-.138 (-2.02)**
R-squared	.1886	.2202

1) *, **, and *** indicate statistical significance respectively at the 0.10, 0.05, and 0.01 levels. t-statistics appear in parentheses.

2) 18 industry dummies in accordance with two-digit SIC codes are included, but are not reported.

3) We have also examined the growth in log of working capital loans during 1996-1997 (DWK9697) and 1997-1998 (DWK9798) as a dependent variable but we don't see any major difference.

The switching sign of the variable *Exit*H* from positive to negative between 1997 and 1998 proves the consequences of the “curse” of relationship banking. Namely, this result gives us two indications. First, those firms concentrating –high *H*– their borrowing at any of the five banks foreclosed in 1998 enjoyed favorable treatment in credit availability before the financial crisis. Second, however, these very same firms fell into liquidity constraint during the crisis, confirming that it was particularly difficult for them to substitute distressed lending banks during the financial crisis.

Finally, the cross section regressions do not confirm the expected impact of the interaction term –product of the number of lending banks with the Herfindahl index ($LNumb*H96$, $LNumb*H97$)– which is either insignificant (for 1998) or significant (for 1997) but with a sign opposite to the predicted one. As we will see below, as expected, this variable is a significant positive determinant of *DCL* and we cannot exclude that the unexpected sign of $LNumb*H$ here depends on including it together with *DCL*.

4.3.2 Relationship banking and the availability of credit: panel supply-driven evidence

Although we focus on small loan firms only, changes in total loans might still be contaminated by demand-driven effects. Therefore, we further address the identification problem by adopting changes in lines of credit –a more supply-driven as well as relationship-driven variable¹⁵ rather than simple changes in the loans– as a dependent variable.

As sketched above, in Korea, credit lines are offered to qualified borrowers¹⁶ at no charge, i.e. there is no commitment fee. This is different from the U.S. but similar to other countries e.g. Italy. Borrowers pay the loan rate only on the part of the credit line which is actually drawn; the remaining part of the credit line bears no cost. The undrawn part of the line may be thought of as an option with zero price for the borrower (Conigliani *et al.* 1997, Ferri and Kang 1999). Given the lack of pecuniary cost in demanding larger credit lines, firms have an incentive to demand credit lines as large as they can, in a way to cushion unexpected liquidity shocks. Thus, it is largely the bank that determines the credit limit, thereby rationing the amount that would be demanded by each borrower. Given the lack of pecuniary cost for the undrawn part, it would also be particularly difficult to imagine that firms ask that their lines be reduced in a period of tight liquidity.¹⁷

In Table 9, we look for a general link between credit lines and the intensity of relationship banking, thereby analyzing this link over both crisis and non-crisis periods –from the end of 1995 to end of 1999. Accordingly, the natural method we choose to do this is a panel regression. Panel estimation also enables us to control for the pattern of macroeconomic variables such as inflation, market interest rates, and changes in industrial productions.

Most of the findings are fairly consistent with those of the cross section regressions. The negative sign of the variable *Lnumb* implies that the drop in credit lines is larger for firms relying less on relationship banking. The main difference with the cross section regression is that here the product term *LNumb*H* exhibits the expected positive sign, supporting our conjecture that some firms may *de facto* be “relationship borrowers” even though they have multiple borrowers, provided they concentrate the bulk of their borrowing at one or a very few banks.

The panel estimation confirms that firms borrowing from the five foreclosed banks benefited from easy access to credit before the crisis –the coefficient of *Exit* is +0.081– but this benign effect turned into a “curse” during the crisis –the coefficient of *Exit* Year 1998* is -0.175.

Table 9: Panel regression

(1995 12. – 1999. 12)

Dependent Variable: Changes in Credit Lines

No. of Observations	6,936
Constant	1.085 (3.91)***
Log of Total Loans (t-1)	-.153 (-11.04)***
Log of Credit Limit (t-1)	.013 (1.26)
Lnumb (t-1)	-.163 (-3.01)***
Lnumb*H (t-1)	.209 (2.35)**
Delinquency Dummy (t-1)	-.079 (-2.11)**
Collateral Dummy (t-1)	-.015 (-.68)
Exit	.081 (2.17)**
Exit * Year 1998	-.175 (-2.33)**
Inflation	.004 (3.52)***
Changes in Industrial Production	.001 (1.95)*
Change in Interest Rates	.001 (4.93)***
R-squared	Within = .0431 Between = .0156 Overall = .0294

1) 18 industry dummies in accordance with two-digit SIC codes are included, but are not reported.

2) * indicates statistical significance at the 0.10 level; ** indicates statistical significance at the 0.05 level; *** indicates statistical significance at 0.01 level. t-statistics appear in parentheses.

4.3.3 Relationship banking and the probability of being delinquent

We use a qualitative response model to estimate the probability that previously non-delinquent firms will build up loans in arrears in 1998 as a function of a vector of independent variables, X , and a vector of unknown parameters, θ . The specific model we use is:

$$\Pr(Y_i = 1) = F[H(X_i, \theta)] = \frac{1}{1 + e^{-H_i}}$$

where:

Y_i is the dependent variable; F is the probability function, which has a logistic functional form, giving rise to the logit model:

$$H_i = \theta_0 + \sum_{j=1}^M \theta_j x_{ij}$$

X_i is the vector of independent variables for the i -th individual firm; and θ is the vector of unknown parameters to be estimated.

We estimate two models. In the first model the dependent variable (*ARR9897L*) takes the value of one if a firm was non-delinquent in 1997 and became delinquent in 1998 and zero otherwise. In the second model, the dependent variable (*ARR9897D*) takes the value of one if firm's delinquency ratio rose during 1997 and 1998 and zero otherwise.

Table 10 comprises logit estimation results. A positive (negative) coefficient in the logit model indicates that an increase in the variable is associated with an increase (decrease) in the probability of firms' delinquency (increase in its delinquency ratio).

The positive coefficient of *Lnumb 1997* lends a strong support to the idea that more intense relationship banking reduces the probability that a previously non-delinquent firm will build (or

increase her) loans in arrears in 1998, the year of the sharpest liquidity constraints.¹⁸ By the same token, as the marginal significance of $Lnumb*H$ 1997 shows, we find some evidence that the probability was smaller for *de facto* “relationship borrowers” –firms concentrating their borrowing at one or only a few banks though entertaining multiple banking relationship.

The negative sign of the collateral dummy, as expected, shows the typical role collateral plays during the financial crisis to safeguard firms from distress. For those firms borrowing from one or more of the five banks foreclosed in June 1998, the probability of delinquency becomes higher especially when a firm’s ratio of collateral to total loans is beyond the 75th percentile in 1997. This implies that for a firm having its collateral already locked in at foreclosed banks it becomes more difficult to replace distressed banks at a time when banks require more collateral to cope with increased information asymmetries spawned by the financial crisis.

Finally, we find no evidence that those customers of foreclosed banks with high concentration of their borrowing became more likely delinquent. On the contrary, $Exit*H$ is a negative determinant of such probability. The tentative explanation we can offer runs as follows. To the extent that these customers were concentrating their borrowing also at other surviving banks, these banks might be more forwarding to assist them. Unfortunately, this is bound to remain a conjecture since our database doesn’t permit us to test such hypothesis.

Table 10: Logit regressions

Explanatory Variables	ARR9897L	ARR9897D
No. of Observation	4,579	4,579
Constant	-4.307 (-6.12)***	-2.684 (-4.72)***
Log of Total Loans in 1997	.194 (3.15)***	.043 (1.10)
Lnumb 1997	.905 (4.61)***	.876 (5.01)***
Lnumb*H 1997	-.124 (-.35)	-.544 (-1.75)*
Collateral Dummy 1997	-.473 (-4.06)***	-.840 (-8.87)***
Exit* Collateral Dummy 1997	.568 (1.91)*	.522 (2.09)**
Exit*H 1997	-.805 (-2.04)**	-.702 (-2.31)**
Pseudo R-squared	.0549	.0472

1) * indicates statistical significance at the 0.10 level; ** indicates statistical significance at the 0.05 level; *** indicates statistical significance at 0.01 level. z-statistics appear in parentheses.

5 Conclusions

Is relationship banking valuable in reducing borrowers' credit constraints? Does such a value increase during financial crises/monetary squeezes? This paper has focused on these two questions and the deep 1997-98 Korean crisis offered us a unique lab experiment to answer them.

Using a special database of credit bureau micro-information, we have provided substantive evidence that relationship banking does increase credit availability for SMEs and that such role is even more important during financial crises. Though we cannot exclude that relationship banking induces rent extraction on loan rates, its benefits for credit availability seem out of question.

Specifically, we have drawn four main conclusions. First, loans plunged more for firms with weaker pre-crisis relationship banking. Second, also the drop in credit lines –arguably a proxy identifying loan supply shifts– was larger for firms relying less on relationship banking. Third, more intense relationship banking reduced the probability of firms’ distress. Fourth, such probability depended on whether firms were borrowing from those banks foreclosed during the crisis, proving that it may be particularly difficult for borrowers to substitute distressed lending banks during a financial crisis. All in all, our findings suggest that relationship banking –with surviving banks– had a high value during the Korean systemic financial crisis, possibly staving off distress and bankruptcy for many viable SMEs.

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Appendix 1

Average Firm Size for each one of the 18 SIC groups (Million Korean Won, %)

Type of Business	Average Total Assets	Total Assets
<Non-Manufacturing>		
1. Agriculture, Forestry, and Fishing	16,133	1,274,507 (0.17)
2. Mining	10,721	2,455,171 (0.34)
3. Electricity, gas, and water supply	1,165,851	39,638,917 (5.58)
4. Construction	13,211	106,632,972 (15.03)
5. Wholesales and Retail trade	6,994	85,941,295 (12.11)
6. Hotel and Restaurant:	34,872	5,614,522 (0.79)
7. Transportation and Communication	24,107	46,309,716 (6.52)
8. Real Estate, Renting, and Business activity	10,206	14,809,616 (2.08)
9. Public Administration, Education, Health, and Social Services etc.	27,296	2,893,439 (0.40)
<Manufacturing>		
1. Food, beverage, and tobacco	30,044	26,619,070 (3.75)
2. Textile, leather	12,230	42,365,405 (5.97)
3. Wood, Pulp, paper, publishing, and printing	13,188	16,630,189 (2.34)
4. Refined petroleum, chemicals, Rubber, and plastic	43,523	79,822,061 (11.25)
5. Non-metalic minerals, Basic metals, and Fabricated metals	35,636	61,757,932 (8.70)
6. Machinery and Equipment	9,799	30,182,780 (4.25)
7. Electric and optical	33,013	69,658,090 (9.82)
8. Transport Equipment	70,855	72,272,616 (10.19)
9. Furniture etc.	7,039	4,364,323 (0.61)

Source: Financial Statement Analysis, Bank of Korea (1997)

¹ According to the model proposed by Boot and Thakor (2000), interbank competition erodes relationship banking while capital market competition may enhance it.

² Ongena and Smith (2000) investigate the determinants of multiple-bank relationships using a sample of firms across twenty European countries. Controlling for a variety of firm-specific characteristics, they find that multiple-banking is more widespread in countries with inefficient judicial systems and poor enforcement of creditor rights as well as in countries with less concentrated, but stable, banking systems and active public bond markets.

³ This interpretation is consistent with the results in Foglia, Laviola, and Marullo Reedtz (1998), that multiple banking relationships are associated with a higher riskiness of the borrowers.

⁴ Reeb and Kwok (2000) have recently challenged this common view. They stress, in fact, the potential shortcomings associated with lowering the costs of financial distress for firms associated with main banks. While a firm in financial distress without a mainbank may be forced to reduce investment or sell assets to a buyer who has a higher value, this disciplinary force is weakened for a firm with a mainbank. Thus, to firms with poor investment opportunities, the presence of mainbanks may actually induce an overinvestment problem and the reported empirical findings are consistent with this idea.

⁵ We may just note, in passing, that interest rate shocks are normally dominant during financial crises.

⁶ For instance, still on Japanese data, Yamori, and Murakami (1999) show that the failure of Hokkaido Takusyoku Bank significantly lowered the stock returns of its client firms.

⁷ See, among others: Cho (1999); Domaç, Ferri, and Kang (1999); Kim and Rhee (1999); Hahm and Mishkin (1999); Ferri and Kang (1999); Krugman (1998); Corsetti, Pesenti, and Roubini (1999); Furman and Stiglitz (1998); Caprio (1998).

⁸ Foreign Currency Denominated Debts in the Corporate Sector:

(trillion Korean won)

	1992	1993	1994	1995	1996	1997	1998
External Debt	15.82	16.99	21.73	28.81	42.85	75.52	54.00
Foreign Currency Loans at Domestic Financial Institutions	14.73	14.45	18.50	23.18	29.81	49.92	44.47
Total Foreign Currency Debts	30.55	31.44	40.23	51.99	72.66	129.4	98.47
		(2.9)	(27.9)	(29.2)	(39.7)	(78.0)	(-23.9)

Source: *Flow of Funds Account*, Bank of Korea. Figures in the parenthesis are the year-to-year growth rate.

⁹ Petersen and Rajan (1994) and Harhoff and Körting (1998) report that single relationships dominate among small US and German firms, which may not always be the case for small Italian firms (Detragiache, Garella, and Guiso, 2000). Ongena and Smith (1999) report that only a small fraction of large European firms have a single relationship.

¹⁰ The Herfindahl index –the index of concentration of lending relationships– is obtained as the sum of the squares of the incidence of the loans granted by each bank to the firm on the total indebtedness of the same firm.

$$H_j = \sum_{i=1}^m \left(\frac{L_{ij}}{\sum_{i=1}^m L_{ij}} \right)^2$$

where, j = firm j ($j=1, \dots, 15305$); i = bank i ($i=1, \dots, 18$: 11 Nation-wide commercials; 6 Locals; and 1 Specialized bank in business as of end of 1999). L_{ij} denotes the loan to firm j from the bank i .

¹¹ Korean banks often use SIC codes in evaluating borrower quality, and thus may impose a higher lending rate premium or even may not lend to firms in specific industries in the case of financial distress. For instance, the construction sector –with its biggest size in terms of total assets among the 18 sectors (see the appendix 1)– was frequently referred as being severely subject to bank’s credit squeeze during the crisis period.

¹² Morgan (1998) shows that those bank loans not made under a commitment slow after tight monetary policy, while loans under commitment accelerate or remain unchanged.

¹³ Several authors use the number of banks from which the firm borrows as a measure of the intensity of relationship banking (Petersen and Rajan, 1994; Cole, 1998).

¹⁴ Cole (1998) presents two reasons for this negative sign: i) free-rider problems inherent in the sharing of lending information reduces the incentive for banks to extend loans; ii) lower quality firms are forced to shop around in order to find a lender that will extend credit.

¹⁵ Lines of credit may more often be relationship-driven, whereas mortgages, equipment loans, motor vehicle loans, and other loans may more be transaction-driven (Berger and Udell, 1998).

¹⁶ Credit lines assigned to each firm are restricted as following lending categories: commercial bills discounted; overdraft loans; general loans; and trade bills discounted. Methods of determining credit limits in each lending items differ across banks. In general, the following variables are considered: i) duration of the bank-customer relationship; ii) average balance of deposits, commercial bills, and trade bills; iii) credit ratings of the borrower; iv) amount of collateral which could be posted with the actual credit drawn; v) borrowers' balance sheet conditions; and vi) loan officer's overall judgement.

¹⁷ To be sure, although credit lines are offered with no pecuniary cost and no collateral to qualified firms, the other firms have the line at no pecuniary cost but are required to post collateral. Accordingly, since posting collateral entails a cost, the conjecture that credit lines are strictly supply-determined might not hold for this second class of firms. In any case, even for this second class of firms, it seems reasonable to identify reductions in credit lines as the result of banks' autonomous decision. In fact, it is doubtful that even these firms will ask to have their credit lines curtailed at a time of stringent liquidity.

¹⁸ This result may appear to be ambiguous if banks have excessively "evergreened" their borrowers' credit. Loan rollovers keep borrowers afloat, thereby *de facto* non-performing loans do not show up in arrears. But as shown in section 3, Korean banks' willingness of fresh lending as well as renewed credit bottomed out in 1998 by the impending credit crunch. Thus the incentives of banks' "evergreening" was presumably low.

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