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Do Foreign Bank Operations Provide a Stabilizing Influence in Korea?

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Abstract

This paper examines Korean data (1994-2001) to determine if foreign banks behave differently than domestic banks and if that behavior provides a stabilizing influence on the Korean banking system and economy. Moreover, this paper also considers the effect, if any, of the Asian financial crisis on foreign and domestic bank behavior. Foreign banks' financial ratios differ from Korean banks with two notable exceptions: provisions for loan losses and loan growth. Before the Asian financial crisis, all banks' loans generally were unresponsive to Korean market conditions. Once the crisis began, foreign banks reduce total lending. Foreign banks increase and Korean banks decrease won-denominated loans when Korean GDP growth increases and when Korean interest rates increase. Finally, foreign banks' lending is sensitive to changes in home-country conditions.

Journal of Economic Literature Classification: E44, G21, O16, O53

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1. Introduction

Whether private credit via foreign banks provides a source of stability or volatility in emerging markets is an important policy issue. Some analysts argue that foreign credit to countries with developing financial markets can provide “deepening” for capital markets, and diversify credit risk thereby reducing the incidence of financial crisis and the severity of a crisis when it does occur. If foreign bank operations are less sensitive to host-market conditions than the local banking firms, then foreign banks can offer a source of stability.

The operations of private foreign banks, however, can increase the volatility of financial markets in emerging countries. Goldberg (2001) concludes that large U.S. banks’ claims on foreign markets are sensitive to U.S. cyclical conditions. In this case, the host country enjoys a more diversified supply of credit when foreign banks operate there, but these loans can fluctuate without any change in the host country’s macroeconomic conditions or government policy.¹

This study considers lending behavior of foreign and domestic banks during the Asian financial crisis to determine whether foreign bank operations helped to stabilize financial markets in Korea.² We ask whether fluctuations in bank lending reflect changes in economic conditions in both Korea and the parent firm’s country. We apply basic portfolio theory to bank behavior. Foreign banks expand loans in whichever country they expect will yield the higher real rate of return adjusted for risk. Therefore, the volume of bank loans in Korea depends on the real rate of return on investments in Korea versus the home-country market of the foreign bank. These expected returns are functions of the real interest rates and real GDP growth rates in Korea versus the home country.

1 More detailed discussions of the pros and cons of foreign bank operations within a domestic economy occur in Berger, DeYoung, Genay, and Udell (2001), Claessens, Demirgüç-Kunt, and Huizinga (2001), Dages, Goldberg, and Kinney (2000), Demirgüç-Kunt, Levin, and Min (1998), Jeon and Miller (2001) and Levine (1996).

2 Discussions of the Asian financial crisis appear in Ito and Krueger (2001) and Pesenti and Tille (2000).

The paper unfolds as follows. Section 2 discusses the development of Korean banking industry after the entry of foreign banks. Section 3 describes the data set and compares the financial ratios among foreign banks, and nationwide and regional Korean banks. Section 4 presents the empirical model. Section 5 discusses the empirical results, considering differences in stabilizing influences among these banks before and after the Asian crisis. Section 6 describes the conclusions.

2. The Korean Banking Sector and the Asian Financial Crisis

The Korean banking system includes three classes of institutions – nationwide, regional, and foreign banks. Nationwide banks were designed to help the central government to maintain control of the financial system and target lending to favored sectors of the economy. Regional banks exist in Korea to encourage regional economic development and they can only conduct business in their own provinces and operate a branch office in Seoul. The first foreign bank entered the Korean market in 1967. Foreign banks were attracted to Korea because they received more favorable treatment than Korean banks in some activities. Deregulation in the 1980s reduced this preferential treatment, but other restrictions on foreign bank operations were reduced, thus creating a more level playing field for Korean and foreign banks.

Events in the 1980s fundamentally changed the Korean banking industry: ownership of the nationwide banks was transferred from the public to the private sector, new private banks were created, and deregulation expanded the range of services offered by private commercial banks. The government, however, remained a potent force because it still controlled interest rates on certain types of loans and deposits and channeled loans to favored industries and firms in accordance to its plan for economic development.³

Although Korea experienced relatively high economic growth and low inflation in the early

³ Bank of Korea (1994, 1998), Gilbert and Wilson (1998), and Jeon and Miller (2001) provide more detailed information.

1990s, some weaknesses existed in the financial sector: low international reserves, and poor government regulation and supervision of the banking system. When several *chaebols* (e.g. Kia, Hanbo, Haitai, and Sammi) went bankrupt and other *chaebols* defaulted on syndicated loans, foreign lenders began to reevaluate their positions in Korea. Foreign sources of funds quickly decreased. As financial conditions in banking sector deteriorated, the Korean government began searching for potential merger partners.

Did foreign bank operations promote stability or volatility during this crisis? Supporters of foreign bank entry argue that these banks provide an important channel for foreign capital inflows to finance domestic activities. If these foreign funds complement rather than substitute for domestic sources of funds, then a net expansion of available funds that supports higher economic growth occurs. Foreign banks can also increase competition in domestic markets that can improve the efficiency of domestic bank operations, lower the cost of providing financial services, reduce interest rates charged on loans, and increase the interest paid on deposits thereby stimulating domestic saving and investment. Foreign banks can also promote improvements in government regulation and supervision of the financial system by importing business practices forged by more stringent home country regulations.

Opponents of foreign bank entry suggest that the presence of foreign banks increases the volatility of domestic financial markets. The foreign capital channel provided by foreign banks not only encourages an *inflow* of capital in good times but also expedites a rapid *outflow* of foreign capital when a financial crisis occurs. In addition, if foreign banks appear more stable than domestic institutions, they may attract the “best” domestic borrowers (higher-profit and lower-risk borrowers), putting domestic banks in the more precarious position of lending to less credit-worthy borrowers. Also, foreign banks can introduce unfamiliar business practices that domestic regulators may find

difficult to evaluate and supervise. Rather than improving the regulatory or supervisory process, foreign banks can create complex problems for the domestic government.

The Korean government's intervention into banking markets, however, did not limit itself to supervision and regulation. The government played a prominent role in allocating credit to "priority industries" as part of its economic development strategy. Banks granted "policy loans" to favored firms because the government directed them to do so. In some cases, the credit extended possessed little connection to the financial viability of the underwritten projects and contributed to loan quality problems experienced by Korean banks during the financial crisis.

Barth, Caprio, and Levine (2002) provide an interesting twist to the exiting literature. To wit, their paper, a part of a much larger research agenda using a new cross-country database on bank regulation and supervision, finds that banking crises positively correlate with limitations on foreign bank entry into domestic banking markets. Thus, merely reducing such limitations and easing the ability of foreign banks to enter the domestic banking market reduces the incidence of banking crises, even if foreign banks do not enter. In sum, their finding suggests that potential entry of foreign banks proves salutary on the stability of the domestic banking market.

3. Comparing Foreign, Nationwide, and Regional Banks: Financial Ratios

Annual balance sheet and income statement data for Korean and foreign banks come from Bank Management Statistics published by Financial Supervisory Services in 1999 and 2002.⁴ The data comprise 61 foreign banks representing 17 countries, 16 Korean nationwide banks, and 10 Korean

⁴ One caveat is that the banking data encompasses the usual limitations encountered in annual balance sheet accounts: 1) the monetary measures are aggregated over the course of one fiscal year and this may be too long to pick up significant variations; 2) fiscal year-end figures may not be representative due to various "window dressing techniques; and 3) firms end their fiscal years at different points during the calendar year. In addition, supervision by the Korean government can affect measures of banking performance. In Korea, loan losses get charged against earnings only when the bank and the government regulators are ready to recognize the losses. Regulators may be reluctant to reclassify active loans into the default category: reclassifications may damage fragile public confidence in financial markets or discourage potential merger partners for a troubled bank. Therefore, some banks' profits and loan portfolios may be less sensitive to changing

regional banks from 1994 to 2001. The breakdown of the sample by year and type appears in Table 1 as do the countries of origin for the foreign banks. All monetary figures are denominated in real won with 2001 as the base year. Some banks enter and/or exit the industry over the sample period so an unbalanced panel data set emerges with 558 observations (a panel of 696 observations with 138 missing values). In addition to the banking firms' data, we collect measures of macroeconomic and financial market conditions for both Korea and the foreign banks' home countries. As a proxy measure of the demand for loans in each country, we calculate the growth rate of real Gross Domestic Product (annual percentage rate in constant 1995 U.S. dollars) using data available from World Bank Development Indicators.

Recent financial crises prompted researchers to investigate the role of foreign banks in domestic economies. Crystal, Dages, and Goldberg (2002) compare the performance of foreign and domestic banks in Latin America over the 1995-2000 period. They employ two approaches – credit ratings and financial ratios. This section uses financial ratios to compare and contrast the performance of foreign and domestic banks in Korea over the 1994 to 2001 period, a period that includes the Asian financial crisis. Moreover, we also evaluate the performance of two classes of domestic banks – nationwide and regional banks.

Table 1 records the number of banks in each category over the sample period. The number of foreign banks stayed in the neighborhood of 50 through 1998, dropping to 42 in 2001. The number of nationwide Korean banks rose from 14 in 1994 to 16 in 1997 and fell to 9 as a result of the Asian financial crisis. Similarly, regional Korean banks held steady at 10 until the Asian financial crisis and then dropped to 6 in 1999, where it remained through 2001.

Table 2 reports the average values for various financial ratios – loans to assets (*lta*), liquid

market conditions during periods of financial crisis because of these regulatory practices.

assets⁵ to assets (*lqata*), the rate of growth of loans (*lgr*), loans to deposits (*ltd*), deposits to assets (*dta*), equity to assets (*eta*), provisions for loan losses to loans (*plltl*), return on assets (*roa*), return on equity (*roe*), foreign currency loans to loans (*fltll*), foreign currency deposits to deposits (*fdtd*), and foreign currency loans to foreign currency deposits (*fltfd*). The first nine financial ratios focus on the general characteristics of the banks' balance sheets and income statements. Crystal, Dages, and Goldberg (2002) employed similar variables in their study of Latin American banks. The remaining three financial ratios focus on the role of foreign currency loans and foreign currency deposits in the balance sheet of the banks.

The last three ratios deserve special discussion because although the loans and deposits enter the balance sheet in won, they actually represent foreign currency values. Thus, the won value changes in response to depreciations and appreciations in the won. If, on average, the won appreciates (depreciates), then the ratios of foreign currency loans to loans and foreign currency deposits to deposits decrease (increase). That is, changes in the won's value can lead to changes in a bank's equity position. If a bank holds more (less) foreign currency loans than foreign currency deposits, then an appreciating won causes foreign currency loans to fall more (less) than foreign currency deposits, reducing (increasing) the bank's equity. So, if the ratio of foreign currency loans to foreign currency deposits equals one, then changes in the value of the won do not affect the banks' equity position. When the foreign currency loan to foreign currency deposit ratio exceeds (falls below) one, then an appreciating won hurts (improves) bank equity while a depreciating won improves (hurts) bank equity.⁶

⁵ We define liquid assets to equal total assets minus total loans. Thus, the ratios for liquid assets to assets and loans to assets automatically sum to one.

⁶ Table 2 illustrates that, on average, Korean regional banks exhibit a ratio less than one, indicating that a depreciating (appreciating) won will reduce (increase) equity. Korean nationwide banks exhibit, on average, a ratio greater than one, indicating that an appreciating (depreciating) won reduces (increases) bank equity. Foreign banks, on average, exhibit a

The various ratios in Table 2 are average values across the foreign, nationwide, and regional banks for each year 1994 to 2001 and overall averages across 1994 to 2001. We also perform t-tests to see if the averages differ significantly from each other (not shown in the paper). We adopt the 5-percent level of significance in our discussion that follows.

We first compare the financial ratios for nationwide and regional Korean banks. That is, we consider in what ways they mirror each other and in what ways they differ from each other. In a number of areas, nationwide and regional banks possess similar financial ratios. Where they do differ, the regional banks generally take, on average, a more conservative approach to their operation. For example, deposits to assets (*dta*), foreign currency loans to total loans (*flt*), and foreign currency deposits to total deposits (*fdtd*) differ significantly between nationwide and regional banks. Regional banks show higher deposits to assets (*dta*), but lower foreign currency loans to total loans (*flt*) and foreign currency deposits to total deposits (*fdtd*). Furthermore, loans to deposits (*ltd*), except from 1998 to 2001, and foreign currency loans to foreign currency deposits (*fltfd*), except in 1999 and 2000, also differ significantly. Regional banks show lower ratios for both of these financial ratios. But significant differences between those ratios disappear after the Asian financial crisis.

The remaining financial ratios generally do not differ significantly between nationwide and regional banks. For example, return on assets and return on equity only differ significantly between nationwide and regional banks for the return on assets in 1998. Also provisions for loan losses to loans (*plltl*) only differ significantly in 1994 and 2001. Liquid assets to assets (*lqata*) and loans to assets, mirror images of each other, differ significantly from each other in 1995. Further, equity to assets differs significantly only in 1995, 1996, and 1997. Finally, the loan growth rate differs significantly in 1997, 1999 and 2001.

ratio much larger than one, indicating that a depreciating (appreciating) won increases (decreases) bank equity.

In sum, Korean nationwide and regional banks exhibit similar characteristics in a number of financial ratios. When they differ, moreover, the regional banks exhibit more conservative, prudent operation. The foregoing discussion merely sets the stage for the discussion of the similarities and differences between the financial ratios of foreign and domestic banks in Korea.

Foreign banks diverge significantly from domestic Korean banks in most of the financial ratios.⁷ Foreign banks differ significantly from domestic banks in every year for the following financial ratios: loans to assets (*lta*), liquid assets to assets (*lqata*), deposits to assets (*dta*), equity to assets (*eta*), and foreign currency loans to loans (*flt*). Foreign banks also vary from domestic banks in the following ratios: loans to deposits except in 2000 and 2001, return on assets except in 2001, and foreign currency loans to foreign currency deposits except in 2001. Foreign banks fund a much smaller portion of their assets with deposits than domestic banks. Moreover, foreign banks fund a much larger fraction of their assets with equity (i.e. a much higher equity to asset ratio than domestic banks). Nonetheless, foreign banks use sources of funding other than deposits and equity more intensively than domestic banks. Since foreign banks have a smaller ratio of deposits to assets, they also exhibit a higher ratio of loans to deposits. Foreign banks also show a higher (lower) reliance on liquid assets (loans) to assets than domestic banks. Finally, foreign banks exhibit more willingness to use foreign currency loans and deposits, possessing higher ratios of foreign currency loans to loans (*flt*) and foreign currency loans to foreign currency deposits (*fltfd*). The foreign currency deposit to deposits ratio differs significantly between foreign and domestic banks in 1995 and 1998 to 2001.

Over the sample period, foreign banks exhibit a higher return on assets and equity than domestic banks. That is, foreign banks earned a higher rate of return than domestic banks before,

⁷ The discussion in the text generally compares the foreign ratio to the ratio of the domestic Korean banks – nationwide and regional. We do discuss differences between foreign banks and nationwide or regional banks where that information provides some additional insight. Generally speaking, comparing the foreign banks to the domestic banks proves

during, and immediately after the Asian financial crisis. But a couple of financial ratios do not differ significantly between foreign and domestic banks. The provisions for loan losses to loans and the growth rate of loans do not differ significantly between foreign and domestic banks, except for the growth rate of loans in 1995.⁸

So far, we compare the differences in means between foreign, Korean nationwide, and Korean regional banks on a variable-by-variable basis. Cluster analysis allows us to examine differences in a multivariate framework. Moreover, the grouping of banks emanating from the cluster need not restrict groups to only Korean nationwide banks, Korean regional banks, or foreign banks.⁹ Rather, the cluster procedure will group banks irrespective of their legal designation based entirely on the balance sheet variables included in the analysis. We implement a hierarchical agglomerative weighted-average linkage cluster analysis using the Euclidean distance measure.¹⁰ We apply the cluster analysis for 1994 and 1996 – two years that precede the Asian financial crisis – and 1998 and 2000 – two years that follow that crisis.

We cannot include all balance sheet variables reported in Table 3, since that will introduce several singularities. Moreover, we do not want the groups to form based on some elements of the banks balance sheet that do not represent important balance sheet information. Thus, we restrict the cluster analysis to three important balance sheet variables – loans to assets, deposits to assets, and equity to assets. Nevertheless, we observe good clustering with the use of these three balance sheet ratios. We employ the Caliński and Harabasz (1974) pseudo-F and the Duda and Hart (1973)

sufficient to our task.

⁸ Table 2 reports that the provisions for loan losses to loans for foreign banks average 0.4246 in 1997. That observation incorporates an outlier, Credit Suisse First Boston, which entered the market in 1997. This bank began operations with a provisions for loan losses ratio of 20. Eliminating that observation lowers the average to 0.0167.

⁹ Ursacki and Vertinsky (1991) perform a cluster analysis on foreign banks in Korea during the mid-1980s.

¹⁰ All statistical analyses use STATA 8.

psuedo-t-squared values to determine the number of groups. Those two statistics generally, but not always, give the same answer for the number of groups. We examine 7, 6, 6, and 8 groups for 1994, 1996, 1998, and 2000, respectively.

The cluster analysis provides one interesting conclusion for our purposes. In each year except one, one of the clusters involved only Korean banks – nationwide and regional. The only exception occurred in 1998 when Citibank appears in the group with all the Korean banks. Other groups in each year included different combinations of the foreign banks, but never included Korean banks.¹¹

In general, we observe many more differences between foreign and domestic banks in Korea over our sample period than between nationwide and regional domestic banks. What explains the difference in performance between foreign and domestic banks? We now turn to address this question with our regression analysis in the next section.

4. The Empirical Model

While a review of the sample data reveals differences among Korean and foreign bank operations, it does not address how lending was affected by changes in financial and macroeconomic conditions. In this section, econometric analysis determines the sensitivity of bank lending to market conditions and whether differences exist in behavior across different ownership groups -- Korean nationwide, Korean regional, and foreign banks -- as well as across the pre- and post-Asian financial crisis.

The theoretical foundation for the regression model employs basic portfolio theory. Lending by foreign banks in Korea depends on the expected real rate of return on investments in Korea relative to the expected real rate of return in the home country of the parent bank. The expected rate of return in a country depends, we assume, on the real rate of interest and the real GDP growth rate.

¹¹ Citibank entered Korea in 1967 with corporate finance services and opened its first branch office in Pusan in 1977. It began consumer finance services and entered private banking services for the first time in Korea in 1989. It currently operates 12 branch offices in major cities including Seoul and Pusan. Finally, it was selected as the best foreign bank in

A higher real interest rate increases the expected return, holding risk constant, and higher GDP growth decreases the risk of default and thereby increases expected returns, given the real interest rate. The basic model for foreign banks is given as follows:

$$Loans_t^i = \alpha_0 + \alpha_1 r_t^K + \alpha_2 r_t^H + \alpha_3 dlny_t^K + \alpha_4 dlny_t^H + \alpha_5 A_t^i + \varepsilon_t, \quad (1)$$

where $Loans_t^i$ equal the quantity of loans, either total loans, won loans, or foreign currency loans, for bank i in period t ; r_t^K and r_t^H equal the Korean and home-country interest rate spread over the LIBOR (hereafter, spread); $dlny_t^K$ and $dlny_t^H$ equal the Korean and home-country growth rate of real GDP (where d represents a differencing operator); and A_t^i equals the size (measured in total assets) of bank i in period t .¹² The constant term is allowed to vary across bank and time period. For Korean banks, the model is given as follows:

$$Loans_t^i = \beta_0 + \beta_1 r_t^K + \beta_2 dlny_t^K + \beta_3 A_t^i + \varepsilon_t. \quad (2)$$

Tables 3 to 6 present the estimated equations using total loans, won loans, and foreign currency loans as the dependent variables. Moreover, we also introduce an Asian financial crisis dummy variable, taking a value of zero from 1994 to 1996 and a value of one from 1997 to 2001. The examination of the data's mean values (see Table 2) suggests substantial differences in behavior across Korean nationwide banks, Korean regional banks, and foreign banks as well as across the pre- and post-Asian financial crisis. Bank-specific characteristics (e.g. management philosophy, foreign vs. domestic ownership, U.S. vs. Japanese ownership, location of branch offices) affect bank-lending behavior. Under these conditions, ordinary least squares estimation may yield biased and inconsistent coefficient estimates. We employ the fixed- and random-effects model with the bank

Korea in 1998.

¹² Since the matched pairs of Korean interest rate to LIBOR and home-country interest rate to LIBOR each include the expected inflation premium, the spreads reflect both nominal and real interest rate differences of the Korean and home-country interest rates over LIBOR.

panel data to produce unbiased and consistent parameter estimates. For each regression, we run fixed- and random-effects specifications and perform a Hausman test to select the most-appropriate specification. The results discussed below use the chosen specification – fixed or random effects.

5. The Empirical Results

Foreign Banks

Table 3 reveals that foreign banks' total loan activity significantly responds to the scale variable (total assets) used in the model, but nothing else, prior to the Asian financial crisis. This behavior changes once the crisis begins. Total lending decreases overall, given the significantly negative crisis dummy variable. Foreign banks lend more in Korea as the rate of income growth rises in Korea and the home country, as the Korean interest rate premium increases, and the home-country interest rate premium decreases. The response to interest rate changes and the Korean growth rate adhere to the predictions of portfolio allocation theory, but the home-country growth rate does not. Rising income growth in the home country may influence foreign bank total lending in two contrary ways: 1) decreasing the risk of repayment in the home country causes foreign banks to lend more in the home countries and less in Korea; and 2) increasing deposits in the home country may increase the supply of home-country currency to a bank's foreign subsidiaries in Korea. Some support emerges for the supply argument in the foreign currency loan regressions. Before the crisis, foreign banks increase foreign currency lending in Korea, when home-country income growth increases, but after the crisis home-country growth does not influence lending. Perhaps the greater expected risk of lending in Korea causes foreign banks to shift loans away from Korea and toward less risky areas.

Foreign banks' won loans before the crisis significantly react to income growth in the home country (negative) and to total assets (positive). During and after the crisis, home-country growth does not significantly affect won loan activity. Instead, won loans react to changes in the Korean

markets: increases in Korean income growth and Korean interest rates associate with an expansion of won loans by foreign banks. This suggests that foreign banks acquire won deposits and issue won loans to service the local needs of their customers and these loans respond to Korean market conditions.

Foreign currency loans by foreign banks prior to the Asian crisis positively correlate with income growth in the home country and negatively correlate with the interest rate in the home country and the Korean rate of income growth. The Korean interest rate and total assets are insignificant. Foreign banks change behavior after the crisis. They issue fewer loans, holding all other variables constant (a negative adjustment to the constant). Foreign currency loans now respond positively to Korean market conditions (both income growth and interest rate variables) and negatively to the interest rate premium in the home country. The home-country income growth variable is now insignificant. Post-crisis behavior for foreign currency loans follows quite closely the predictions of portfolio theory: a higher expected risk-adjusted rate of return in Korea and a lower expected rate of return in the home country drive an increase in foreign currency lending by subsidiaries in Korea.

The Chow tests indicate that across all three loan categories foreign banks' lending behavior changes once the Asian financial crisis starts. In general, foreign banks loan less, holding all other variables constant, and loan volume reacts more to home-country conditions.

Korean Banks

In Table 4, Korean banks (both nationwide and regional) display some of the same lending patterns that foreign banks show. Like foreign banks, total loans significantly respond only to total assets prior to the Asian crisis. Korean banks' lending, however, proves more sensitive to changes in total assets, since the coefficients for total assets are much larger for Korean banks (e.g. 0.57 versus 0.22).

After the crisis begins, Korean banks' total loans increase when Korean income growth and Korean interest rates increase. Unlike foreign banks, no overall reduction in total lending activity occurs (an insignificant dummy variable for the constant term).

Looking at total loans, however, hides some important differences in Korean banks' lending activity. Won loans, like total loans, do not react to changes in Korean market conditions prior to the Asian crisis. Korean banks, however, increase total won lending (positive dummy variable for the constant term) after the crisis begins and won lending increases in response to decreases in the domestic income growth rate and the domestic interest rate. These results suggest that Korean banks provide a counter cyclical influence during and after the financial crisis: they provide more loans when domestic economic conditions worsen and fewer loans when economic conditions improve.

Information problems in loan markets can explain the negative effect of the Korean interest rate on won lending. As interest rates rise, particularly during a financial crisis, lenders recognize an adverse selection problem among their loan applicants: those most likely to borrow at high real rates are also the most likely to default. Thus, lending activity falls as the interest rate rises.

Foreign currency loans, however, respond differently at Korean banks than at foreign banks to the same stimuli. Like the other loan categories, only total assets influence foreign currency loans prior to the crisis. After the crisis and contrary to won loans, foreign currency loans increase with increases in Korean income growth and interest rates, which match the predictions of portfolio theory. Also in contrast to the experience of won loans, foreign currency lending decreases during the financial crisis, holding all other influences constant (negative dummy variable for the constant term). Korean banks may face difficulty acquiring foreign currency for lending purposes as financial capital leave Korea and the won's value falls relative to widely-traded international currencies.

The Chow tests indicate that Korean banks' lending behavior for total loans and foreign

currency loans changes once the Asian financial crisis starts, but no difference exists for won loans.

Regional Versus Nationwide Banks

Tables 5 and 6 present regression results for Korean nationwide and regional banks. Before the crisis, total loans respond to total assets for both nationwide and regional banks, although the coefficient for nationwide banks is twice as large. In addition, regional banks' total lending significantly reacts to Korean income growth (negative) and the Korean interest rate (negative). After the crisis starts, nationwide banks increase lending when Korean income growth increases and Korean interest rates rise, while regional banks reduce total loans in response to the same market conditions.

Before the crisis, nationwide and regional banks' won loans respond only to total assets. After the crisis begins, nationwide banks increase won lending, holding all other variables constant, while regional banks do not. Both nationwide and regional banks issue fewer won loans as domestic income growth and interest rates increase after the crisis begins, indicating that both types of banks play a role in stabilizing the Korean economy. Nationwide and regional banks also exhibit similar behavior with regard to foreign currency loans: each type of bank reduces total lending after the crisis begins, although nationwide banks reduce overall lending by a much larger amount (coefficients of -83988 versus -1,661). Each type of domestic bank also increases foreign currency lending in response to higher domestic income growth and interest rates.

The Chow tests indicate that Korean banks' lending behavior for total loans and foreign currency loans changes once the Asian financial crisis starts, but no difference exists for won loans. In general, nationwide banks grant more won loans and fewer foreign currency loans, holding all other variables constant, while regional banks simply reduce foreign currency loan volume.

Comparison with Goldberg's Results

Goldberg's (2001) study of foreign lending by U.S. banks offers a useful comparison. In general, she finds that local market conditions (i.e., the interest rate and GDP growth) produce little effect on bank lending worldwide; but when limiting her analysis to lending in Asian countries, she discovers that local GDP growth generates a negative effect on lending. Our study also finds that foreign bank lending (foreign currency loans) decreases when an increase in Korean income growth occurs before the Asian financial crisis. After the crisis, however, foreign banks lend more in Korea across all three loan categories, as the Korean income growth rate increases. The Korean interest rate spread does not significantly influence foreign banks' foreign currency lending before the crisis, but generates a positive influence afterward. Goldberg finds no significant effect for the local interest rate in the Asian sample.

Goldberg's results for total lending by U.S. banks operating in Asia reveal that the home-country interest rate and GDP growth rate possess a significant and negative effect on lending. Our results for foreign currency lending by foreign banks confirm Goldberg's findings for the home-country interest rate spread, which is significantly negative both before and after the Asian financial crisis. We get differing results for the home-country income growth rate: it exerts a positive influence before the Asian financial crisis and no effect after the crisis.

Using total lending by foreign banks as the dependent variable produces results for Korea fundamentally different from Goldberg's findings for Asia. Our home-country spread possesses a significantly negative effect after the Asian financial crisis, but an insignificant effect before (Goldberg finds a significantly negative effect). The home-country income growth possesses a significantly positive effect after the Asian financial crisis, but an insignificant effect before (Goldberg finds a significantly negative effect). Korean income growth possesses a significantly positive effect after the Asian financial crisis, but an insignificant effect before (Goldberg finds an

insignificant effect). Finally, the Korean spread possesses a significantly positive effect after the Asian financial crisis, but an insignificant effect before (Goldberg finds an insignificant effect).¹³

6. Conclusions

An analysis of financial ratios suggests that foreign bank operations differ significantly from Korean-owned banks. Foreign banks rely more heavily on non-deposit sources of funds, are more likely to make foreign currency loans, and earn higher returns on assets and equity. Higher rates of return may suggest that foreign banks operate more efficiently than domestic banks, reflecting lower-cost operations or improved investment and lending practices that improve earnings. Korean banks, facing relatively new bank regulations and less government direction in lending, experience more difficulty prospering in the liberalized financial system.

Some evidence emerges that foreign banks provide stability to the Korean banking system. Compared to Korean banks, foreign banks hold more equity and liquid assets, indicating that foreign banks possess a lower probability to fail when Korean economic and financial market conditions worsen. Foreign banks also rely more heavily on foreign currency deposits as a source of funds. This allows foreign banks to expand loans when Korean conditions worsen, thereby providing a stabilizing influence in loan markets. Alternative evidence indicates, however, that foreign banks do not use these external sources of funds to expand loans, since their loan growth equals that of Korean banks. Foreign banks do not differ from Korean banks in another important measure of stability: provisions for loan losses.

Do foreign banks stabilize the Korean economy? Our regression results indicate that foreign

¹³ When Goldberg limits the sample to “large banks only” (total assets greater than \$250 million), no independent variables prove significant for the Asian country regressions. Readers should use caution when comparing these results because the studies start with different data. Goldberg’s sample only includes U.S. banks, nearly half of these are small banks (total assets below \$50 million), and Korean market lending was excluded from the data used to estimate the Asian market regression equations. Our study includes banks from 17 foreign countries, most are large banks in their home country, and we examine only lending in Korean markets.

banks reduce total lending once the financial crisis begins, holding all other variables constant. This reduction in total lending reflects a decrease in foreign currency loans, since the constant term for won-denominated loans does not change. A comparison of constant terms shows that Korean banks do not reduce total loans in the post-crisis period, but Korean banks do change the composition of their loan portfolio: increasing won-denominated loans while reducing foreign currency loans.

The Korean interest rate spread does not significantly affect any category of loan for any type of bank prior to the Asian financial crisis. In addition, the Korean income growth rate generally does not influence bank lending (income growth is significant in only two of twelve loan equations). Thus, before the crisis, all banks generally do not respond to Korean economic conditions.

A different behavioral pattern emerges after the financial crisis: both the Korean interest rate and growth rate significantly influence won-denominated lending. In addition, changing Korean economic conditions elicit differing responses from domestic and foreign banks. When Korean income growth rises, foreign banks increase won-denominated loans while Korean banks decrease them. When the Korean interest rate rises relative to the LIBOR rate, foreign banks increase won-denominated loans while Korean banks decrease them. Those results suggest that after the financial crisis begins, foreign bank lending in the local currency proves pro-cyclical (decreasing lending when growth decreases and interest rates fall) while Korean bank lending proves counter-cyclical.

Foreign bank lending also reacts to changing conditions in the home-country economy. The regression results for Korea suggest that foreign currency lending responds to external markets. The home-country interest rate spread exerts a negative influence on foreign currency lending by foreign banks before, during, and after the Asian financial crisis. The home-country income growth rate only affects lending (positively) in foreign currency prior to the financial crisis. Shifting focus to total loans after the crisis began, foreign banks lend more in Korea when the home-country interest rate

decreases and home-country income growth rises.

Lending by foreign banks responds to the opportunity cost of lending in Korea (as measured by the home-country interest rate spread). This may reflect increasing financial market integration across countries and Korea's pursuit of financial liberalization policies. Whether foreign bank operations would contribute to financial market stability in Korea depends on the degree of financial market integration between Korea and the home country, i.e. how closely correlated are rates of return in the respective countries' financial markets.

Income growth in the home country leads to increased lending (foreign currency) before the financial crisis, but not after the crisis. This suggests that foreign bank lending can stabilize the Korean financial markets only if growth rates of income in the two economies are negatively correlated or uncorrelated. It also suggests that foreign banks supply more foreign currency loans in pre-crisis Korea for a given home-country growth rate, than in post-crisis Korea. This may provide evidence that foreign banks promote capital outflows (or at least reduce capital inflows) during periods of financial crisis.

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Table 1: Number of Banks by Type and Country of Origin

	Number of Foreign and Domestic Banks by Bank Type		
Year	Foreign Banks	Korean Nationwide Banks	Korean Regional Banks
1994	52	14	10
1995	52	15	10
1996	49	15	10
1997	53	16	10
1998	51	13	8
1999	46	11	6
2000	43	11	6
2001	42	9	6
Number of Foreign Banks by Country of Origin			
Country of Origin	Number of Banks	Country of Origin	Number of Banks
United States	15	Switzerland	2
Japan	14	Germany	1
France	6	Hong Kong	1
Canada	4	India	1
Singapore	4	Iran	1
United Kingdom	3	Jordan	1
Australia	2	Pakistan	1
China	2	Philippines	1
Netherlands	2		

Note: The identification of foreign banks by country of origin includes all banks over the entire sample for a total of 61 foreign banks. A number of foreign banks entered or exited from the Korean market over the sample period.

Table 2: Financial Ratios by Bank Type and Year

		Foreign	Nationwide	Regional		Foreign	Nationwide	Regional		Foreign	Nationwide	Regional
1994	lta	0.37	0.57	0.55	dta	0.09	0.59	0.69	ROE	6.67	5.45	5.74
1995		0.31	0.56	0.53		0.08	0.60	0.67		9.25	3.01	4.88
1996		0.29	0.54	0.50		0.06	0.59	0.65		9.74	3.67	4.40
1997		0.24	0.55	0.52		0.05	0.58	0.62		23.02	-15.04	-20.51
1998		0.22	0.49	0.50		0.05	0.60	0.63		18.97	-55.80	-175.45
1999		0.18	0.46	0.46		0.06	0.64	0.72		7.96	-65.58	-1.61
2000		0.17	0.48	0.51		0.06	0.66	0.75		13.57	-27.37	-48.61
2001		0.13	0.48	0.49		0.07	0.66	0.75		11.17	16.85	9.36
Mean		0.24	0.52	0.51		0.07	0.62	0.69		12.54	-16.85	-27.72
1994	lqata	0.63	0.43	0.46	eta	0.22	0.12	0.14	flt	0.28	0.22	0.03
1995		0.69	0.44	0.47		0.21	0.10	0.13		0.27	0.23	0.04
1996		0.71	0.46	0.50		0.20	0.09	0.11		0.35	0.25	0.05
1997		0.76	0.45	0.48		0.21	0.07	0.10		0.44	0.27	0.05
1998		0.79	0.51	0.50		0.27	0.07	0.07		0.55	0.26	0.07
1999		0.82	0.54	0.54		0.26	0.07	0.05		0.50	0.19	0.04
2000		0.84	0.53	0.49		0.22	0.06	0.05		0.42	0.13	0.02
2001		0.87	0.52	0.51		0.20	0.06	0.05		0.37	0.09	0.01
Mean		0.76	0.48	0.50		0.22	0.08	0.09		0.40	0.21	0.04
1994	lgr	N/A	N/A	N/A	plltl	0.02	0.02	0.01	fdtd	0.11	0.22	0.06
1995		10.32	23.75	22.03		0.01	0.01	0.02		0.08	0.20	0.06
1996		28.17	18.22	16.37		0.01	0.01	0.01		0.10	0.20	0.07
1997		33.63	30.98	20.22		0.43	0.02	0.04		0.18	0.21	0.07
1998		8.38	6.99	8.51		-0.19	0.04	0.04		0.32	0.26	0.10
1999		68.04	24.34	1.36		0.06	0.03	0.02		0.38	0.15	0.03
2000		31.31	21.32	21.18		0.02	0.04	0.04		0.34	0.09	0.02
2001		8.54	12.60	3.56		-0.03	0.03	0.01		0.43	0.06	0.01
Mean		26.91	19.74	13.32		0.04	0.02	0.02		0.24	0.17	0.05
1994	ltd	7.42	0.97	0.79	ROA	1.23	0.62	0.81	fltfd	41.17	0.97	0.58
1995		11.88	0.94	0.79		1.39	0.27	0.55		73.59	1.09	0.51
1996		17.47	0.94	0.78		1.56	0.31	0.40		144.48	1.19	0.55
1997		15.50	0.97	0.83		3.74	-1.03	-2.13		86.04	1.39	0.61
1998		13.05	0.81	0.79		2.43	-3.60	-7.53		27.69	0.85	0.52
1999		12.90	0.73	0.64		0.92	-1.89	-0.09		23.14	1.24	0.64
2000		20.51	0.72	0.67		1.18	-0.62	-1.26		13.91	1.25	0.56
2001		19.19	0.73	0.66		0.80	0.77	0.26		7.41	1.30	1.17
Mean		14.74	0.85	0.74		1.66	-0.65	-1.12		52.18	1.16	0.64

Note: The numbers are averages for the various financial ratios in each year or for the whole sample (Mean). The financial ratios are as follows: – loans to assets (*lta*), liquid assets to assets (*lqata*), the rate of growth of loans (*lgr*), loans to deposits (*ltd*), deposits to assets (*dta*), equity to assets (*eta*), provisions for loan losses to loans (*plltl*), return on assets (*roa*), return on equity (*roe*), foreign currency loans to loans (*flt*), foreign currency deposits to deposits (*fdtd*), and foreign currency loans to foreign currency deposits (*fltfd*). We also perform t-tests on the equality of means (not shown in this table). These tests are available upon request.

Table 3: Foreign Banks

	Loans	Won Loans	Foreign Currency Loans
Model	Random effects	Fixed effects	Fixed effects
D^A	-3,280** (-2.07)	-2,150 (-1.42)	-1,550** (-2.42)
dl_{ny}^K_t	-17.7 (-0.17)	45.4 (0.44)	-101** (-2.36)
D^A*dl_{ny}^K_t	135 (1.22)	41.4 (0.40)	126* (2.87)
dl_{ny}^H_t	-42.3 (-0.87)	-92.1† (-1.89)	36.8† (1.80)
D^A*dl_{ny}^H_t	118** (2.13)	150* (2.88)	-47.1** (-2.15)
r^K_t	133 (0.46)	215 (0.76)	-99.2 (-0.84)
D^A* r^K_t	247 (0.83)	26.6 (0.09)	231† (1.92)
r^H_t	54.4 (1.05)	33.0 (0.46)	-51.4† (-1.72)
D^A* r^H_t	-150* (-3.15)	-71.9 (-1.58)	-47.7** (-2.49)
Aⁱ_t	0.22* (6.34)	0.14* (3.81)	-0.01 (-0.71)
D^A* Aⁱ_t	0.06† (1.76)	0.08* (2.62)	0.03† (1.86)
Constant	32.0 (0.02)	-633 (-0.43)	1460** (2.38)
Chow Test^a	54.0 [0.00]	9.22 [0.00]	5.42 [0.00]
Hausman Test^b	2.77 [0.986] RE	49.6 [0.000] FE	29.8 [0.001] FE
Significance Test [H₀: Coefficient of Variable + Coefficient of (D^A*Variable) = 0]^c			
dl_{ny}^K_t	18.4 [0.000]	11.53 [0.001]	5.42 [0.021]
dl_{ny}^H_t	3.42 [0.064]	1.88 [0.172]	0.33 [0.566]
r^K_t	35.1 [0.000]	16.12 [0.000]	27.1 [0.000]
r^H_t	5.04 [0.025]	0.39 [0.531]	14.4 [0.000]
Aⁱ_t	1,130 [0.000]	636 [0.000]	15.2 [0.000]

Table 3: Foreign Banks (continued)

Notes: The variables are defined as follows: r_t^K and r_t^H equal the Korean and home-country interest rate spread over the LIBOR, $dlny_t^K$ and $dlny_t^H$ equal the Korean and home-country growth rate of real GDP, and A_t^i equals the size (measured in total assets) of bank i in period t . T-values are in parentheses for individual coefficients. Significance levels appear in brackets for the Chow test, the Hausman, test, and all the significance tests at the end of the table.

- * coefficient significantly different from zero at the 1-percent level.
- ** coefficient significantly different from zero at the 5-percent level.
- † coefficient significantly different from zero at the 10-percent level.

- a The Chow test determines whether the coefficients of all independent variables taken as a group differ between the pre-Asian crisis period and the Asian crisis period. F-values appear for fixed-effect models and chi-squared statistics, for the random-effects models.
- b The Hausman test determines whether the fixed- or random-effects models are the appropriate specification. The statistic is distributed as a chi-squared. The test outcome is reported as FE (fixed effects) or RE (random effects). Only the appropriate specification is reported in the table.
- c The significance tests at the end of the table determine whether the coefficients during the Asian financial crisis differ significantly from zero. F-statistics are reported for the fixed-effect models and chi-squared statistics, for the random-effects models.

Table 4: Korean Domestic Banks

	Loans	Won Loans	Foreign Currency Loans
Model	Random effects	Random effects	Random effects
D^A	-16,800 (-0.61)	64,000** (2.15)	-61,700** (-2.38)
dl_{ny}^K_t	887 (0.48)	2,370 (1.19)	-752 (-0.43)
D^A*dl_{ny}^K_t	174 (0.09)	-3,870† (-1.88)	3,080† (1.72)
r^K_t	1,940 (0.37)	5,460 (0.98)	-1,470 (-0.30)
D^A* r^K_t	1,660 (0.31)	-10,100† (-1.77)	9,070† (1.82)
Aⁱ_t	0.57* (30.29)	0.46* (16.47)	0.14* (6.51)
D^A* Aⁱ_t	-0.03 (-1.49)	-0.02 (-0.87)	-0.05** (-2.38)
Constant	-14,400 (-0.55)	-39,700 (-1.40)	9,940 (0.40)
Chow Test^a	25.1 [0.00]	6.06 [0.19]	29.3 [0.00]
Hausman Test^b	4.77 [0.445] RE	3.10 [0.685] RE	8.09 [0.151] RE
Significance Test [H₀: Coefficient of Variable + Coefficient of (D^A*Variable) = 0]^c			
dl_{ny}^K_t	4.37 [0.037]	7.41 [0.007]	23.7 [0.000]
r^K_t	8.57 [0.003]	11.6 [0.001]	41.8 [0.000]
Aⁱ_t	4,890 [0.000]	1,240 [0.000]	97.9 [0.000]

Notes: See Notes for Table 3.

Table 5: Korean Domestic Nationwide Banks

	Loans	Won Loans	Foreign Currency Loans
Model	Fixed effects	Random effects	Random effects
D^A	-23,800 (-0.58)	92,200† (1.86)	-119,000* (-3.14)
dl_{ny}^K_t	1,630 (0.61)	3,730 (1.16)	-2,070 (-0.85)
D^A*dl_{ny}^K_t	1.30 (0.00)	-5,840† (-1.76)	5,880** (2.32)
r^K_t	4,310 (0.58)	8,790 (0.98)	-4,730 (-0.69)
D^A* r^K_t	1,300 (0.17)	-15,300 (-1.65)	17,000** (2.40)
Aⁱ_t	0.60* (13.93)	0.46* (11.34)	0.13* (4.11)
D^A* Aⁱ_t	-0.03 (-1.03)	-0.01 (-0.24)	-0.02 (-0.76)
Constant	-30,100 (-0.76)	-64,400 (-1.37)	35,200 (0.98)
Chow Test^a	5.25 [0.00]	6.06 [0.19]	26.1 [0.00]
Hausman Test^b	21.2 [0.001] FE	1.60 [0.901] RE	3.20 [0.670] RE
Significance Test [H₀: Coefficient of Variable + Coefficient of (D^A*Variable) = 0]^c			
dl_{ny}^K_t	4.66 [0.034]	5.47 [0.019]	30.5 [0.000]
r^K_t	8.12 [0.006]	7.94 [0.005]	49.0 [0.000]
Aⁱ_t	772 [0.000]	541 [0.000]	50.8 [0.000]

Notes: See Notes for Table 3.

Table 6: Korean Domestic Regional Banks

	Loans	Won Loans	Foreign Currency Loans
Model	Fixed effects	Fixed effects	Random effects
D^A	-6,390 (-1.06)	455 (0.08)	-4,560* (-3.16)
dl_{ny}^K_t	-7,61† (-1.77)	-400 (-0.93)	-154 (-1.59)
D^A*dl_{ny}^K_t	474 (1.17)	91.4 (0.23)	233** (2.40)
r^K_t	-2,040† (-1.83)	-1,200 (-1.08)	-374 (-1.43)
D^A* r^K_t	1,340 (1.29)	219 (0.21)	710* (2.74)
Aⁱ_t	0.30* (5.27)	0.32* (5.66)	0.01 (0.88)
D^A* Aⁱ_t	0.03 (0.85)	0.01 (0.38)	0.00 (0.48)
Constant	20,600** (2.65)	13,300† (1.71)	2,900† (1.84)
Chow Test^a	2.31 [0.07]	1.83 [0.137]	13.1 [0.011]
Hausman Test^b	280 [0.000] FE	87.1 [0.000] FE	6.74 [0.457] RE
Significance Test [H₀: Coefficient of Variable + Coefficient of (D^A*Variable) = 0]^c			
dl_{ny}^K_t	7.14 [0.010]	8.29 [0.006]	9.26 [0.002]
r^K_t	5.99 [0.018]	11.7 [0.001]	26.3 [0.000]
Aⁱ_t	109 [0.000]	114 [0.000]	4.92 [0.027]

Notes: See Notes for Table 3.