

JAPANESE ASSET PRICES, YEN-DOLLAR EXCHANGE RATES AND THE CURRENCY CRISIS IN KOREA

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Japanese banks' lending to Korea was influenced by Japanese asset prices and yen-dollar exchange rates. Before the Korean currency crisis in 1997, Japanese asset prices declined and yen depreciated. This made the BIS ratio of Japanese banks lower and thus enforced Japanese banks to withdraw their lending from Korea to keep up with the BIS ratio of Japanese banks. Japanese banks led US and European banks in withdrawing their lending from Korea. The Japanese banks' suspension of rollover to Korea directly caused the liquidity shortage and thus triggered the currency crisis in Korea.

JEL Classification: F31, F34

Keywords: Asset Prices, Yen-Dollar Exchange Rates, Currency Crisis, Japanese Banks' Lending

I. INTRODUCTION

There have been various explanations on the causes of the 1997 currency crisis in Korea. Some explained the crisis in relation to deterioration of economic fundamentals. But those efforts were only partially successful in explaining the cause of the crisis, since the macro fundamentals of pre-crisis Korea seemed to be relatively sound; chronic government deficits, which caused the Latin American economic crisis in the 1980s, were absent; real GDP growth rates were 8.9% in 1995 and 6.8% in 1996; and the Korean economy enjoyed high investments and high growth rate of income.

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Others noticed that sudden capital outflows, due to some unexpected shocks, prompted a banking and currency crisis. The issue then is what kind of shock occurred and what was the source of the shock. The shocks can be attributed either to sudden deterioration of the domestic real sector or to the change of external situations, such as an interest rate hike of a foreign country like the United States. In this paper we offer a model showing that capital outflow can also be triggered by bank loan providers abroad. The external shock could arise when the foreign lenders become subject to liquidity constraints so that they are enforced to withdraw or curtail overseas lending because of their own banking problems, for which the recipient country is not directly responsible. This aspect is to be explored in this paper.

This paper will investigate the possible causes of the currency crisis in Korea focusing on the lending behaviour of Japanese banks. The Japanese banks' lending behaviour has been discussed in various papers on the international transmission mechanism of shocks. However, there has not been any empirical explanation that Japanese banks' lending behaviour might be linked to the Korean currency crisis.

It is known that the one source for the Japanese banking problem is somewhat related with the collapse of Japanese asset markets. This paper will investigate how the collapse of the Japanese asset markets was related with the sudden capital outflows from Korea especially through the change of the Japanese banks' lending to Korea. Furthermore the weak yen against the dollar is presumed to be related with the behaviour of the Japanese bank lending. Therefore we will analyse the role of yen-dollar exchange rates as well as the Japanese asset prices in explaining the sudden capital outflows from Korea and the outbreak of currency crisis in Korea.

It is through the change in the BIS ratio of Japanese banks that Japanese asset prices and yen-dollar exchange rates influence the Japanese banks' lending behaviour. The basic idea of this paper is simple. When Japanese asset prices collapse and the yen depreciates, the BIS ratio of Japanese banks decreases. At that juncture, Japanese banks were forced to withdraw their lending from Korea, which directly caused the currency crisis in Korea. The mechanism by which Japanese banking problems had a serious impact on the creation of the Korean currency crisis will be analysed. This analysis offers a banking-side explanation on the causes of the currency crisis in Korea.

There have been many research papers on the cause of currency crisis. The first generation speculative attack theories attempted to explain the currency crisis in terms of the deterioration of economic fundamentals.¹ For example, Krugman (1979) argued that market participants launched speculative attacks in anticipation of an impending devaluation due to the deterioration of economic fundamentals, such as large government deficits. However, the first generation theories proved

¹ Krugman(1979), Flood and Garber(1984), Goldberg(1991).

to be insufficient to explain the European currency crisis in 1992, the Mexican peso crisis in 1994, and the Asian crisis in 1997 (Obstfeld and Rogoff 1995, Sachs, Tornell, and Velasco 1996, Corsetti, Pesenti, and Roubini 1998).

The second generation theories on currency crisis emphasize the role of expectations of market participants in bringing about the currency crisis. They explain that the currency crisis is likely to occur when economic fundamentals lie in a critical zone with medium foreign reserves, etc. Whether a currency crisis occurs or not depends primarily on how market participants view future exchange rates movement. If market participants' expectations of a sharp devaluation are dominant, then devaluation occurs. If market participants, on the other hand, expect that the exchange rate will be stable, then devaluation will not occur. Therefore, in the second generation models, currency crisis is a self-fulfilling² process and multiple equilibria are possible.

Recently, some economists paid attention to the role of financial institutions in developing currency crisis. For example, Goldfajn and Valdes(1997) emphasized the role of banks in triggering a crisis. According to their explanation, the amount of capital movement is often magnified by the existence of financial institutions. When a sudden capital outflow occurs for some reasons such as high interest rates abroad or a worsening profitability of domestic firms, banking crisis and currency crisis come together. They, however, could not recognize that capital outflow can be triggered by the withdrawal of foreign banks' lending through the change in BIS ratio.

In recent papers, Peek and Rosengren(1997, 1998, 1999, 2000) made a very important contribution in explaining the lending behavior of Japanese banks. They found that when international transmissions were made through banking sectors, the declining asset prices in Japan lowered the BIS ratio of Japanese banks and Japanese banks were especially forced to withdraw their overseas lending. This resulted in a reduction of their US bank branch lending operations and ultimately influenced the commercial construction activity in the US. Furthermore, they commented on the role of the yen-dollar exchange rates, as well as the asset prices in Japan, while they were explaining the lending behavior of Japanese banks in the Southeast Asian countries. However, they could not develop their ideas in explaining the outbreak of the currency crisis in Korea and East Asian countries empirically.

In this paper, an explanation about the currency crisis in Korea will be made by analysing the lending behaviour of Japanese banks, in connection with the plunging prices of Japanese stocks and real estate and falling yen value.

² Diamond and Dybvig(1983) explained bank runs using this kind of self-fulfilling element. Banks usually transform short-run liabilities into long-run assets. If depositors withdraw their deposits at the same time, anticipating the insolvency of banks, then banks can actually become insolvent. On the other hand, if depositors do not withdraw their deposits, then banks can avoid insolvency.

II. HOW DO JAPANESE ASSET PRICES AND YEN-DOLLAR EXCHANGE RATES AFFECT THE JAPANESE BANKS LENDING TO KOREA?

2.1. The Effect of Japanese Asset Prices and Yen-dollar Exchange Rates on the BIS Ratio

The Basle Accord was first introduced to Japan in 1988. The BIS ratio can be defined as capital divided by risk-weighted assets. The main purpose of setting the BIS ratio is to make banks financially sound so that more capital can be kept by banks for riskier assets. The first core capital ratio is defined as core capital (Tier 1 capital, which is primarily common stock and retained earnings in banks) to the risk weighted assets. Tier 1 capital must be at least four percent of the risk-weighted assets. Secondly, the total capital ratio is defined as total capital (Tier 1 capital plus supplemental capital or Tier 2 capital) to the risk-weighted assets. Tier 2 capital includes Tier 1 capital and subordinated debt and revaluation reserves (unrealized capital gains on equity holdings). Tier 2 capital must be at least eight percent of the risk-weighted assets. The ratios have four levels of capitalization i.e. adequacy-well-capitalized, adequately capitalized, under-capitalized, and significantly under-capitalized. Under a risk-based capital system, all balance-sheet assets are classified by the relevant degree of risk. Riskier assets are assigned higher weights. For example, the weight of assets, either fully guaranteed by the federal government or those that carry no apparent risk, such as cash, is 0% and the weight of assets, such as, commercial loans, etc. is 100% [Refer to Peek and Rosengren(1997, 1999)].

Now we can derive the following model of the BIS ratio and analyse the changes of the ratio in relation to such shocks as changes in a real estate price, a stock price, and the yen-dollar exchange rate.

$$BIS = \frac{K(P_S, P_R)}{\sum_i w_i A(JP)_i + \sum_j w_j EX \cdot A(US)_j} \quad (1)$$

where K stands for capital; P_S , price of stock; P_R , price of real estate; $A(JP)$, assets denominated in yen; $A(US)$, assets denominated in US dollars; w_i (w_j), risk of the relevant assets; EX , yen-dollar exchange rate.

The Basle Accord set the stage for dramatic fluctuations in Japanese stock prices to have a substantial impact on Japanese bank capital. The Accord contains a provision that allows up to 45 percent of unrealised gains on equity holdings (also referred to as hidden reserves) to be included in bank capital. These unrealised capital gains can be included in Tier 2 capital, so long as Tier 1 capital accounts for at least 50 percent of the total capital.³ Therefore the

³ Refer to Peek and Rosengren(1999). Japanese banks held approximately 20 percent of Japanese common stock(French and Poterba (1991) and Prowse(1990)).

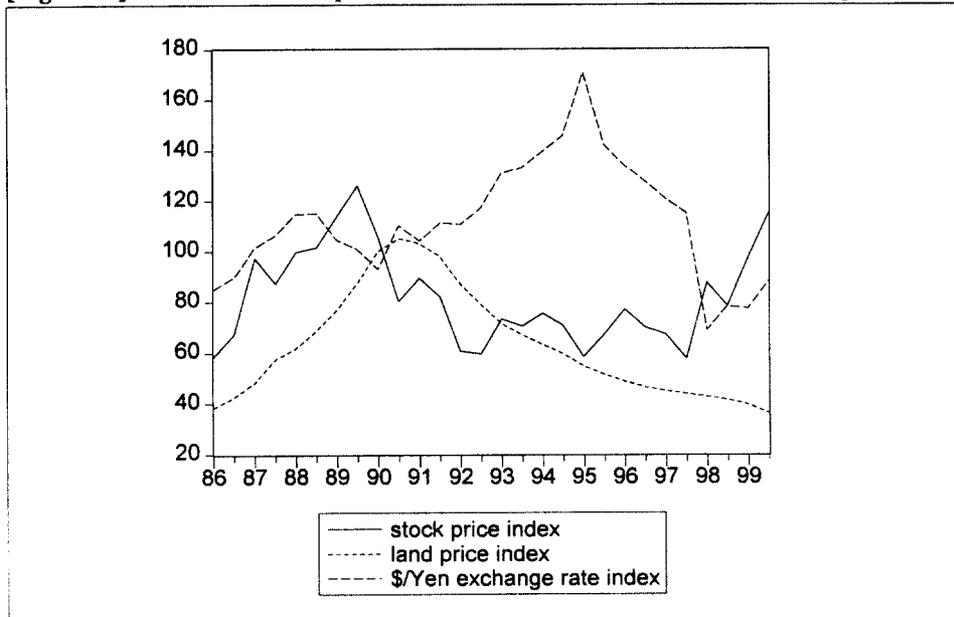
collapse of Japanese asset prices makes the nominator of the equation (1) smaller by incurring the capital losses, which means BIS ratio decreasing. In addition, when the price of real estates plunges, the risk of bank assets tends to increase because real estate serves as collateral for most bank loans in Japan. The higher risks, in turn, make the denominator of the equation (1) larger. In summary, when the prices of Japanese real estate and stocks decrease, the BIS ratio of Japanese banks decreases.

Next, as the Japanese yen depreciates against the US dollar, the assets denominated in US dollars will become greater when calculated in Japanese yen. The effect of the inflated value of the assets in dollar term is reflected by the enlarged $EX \cdot A(US)$ term in the equation (1). Therefore, the BIS ratio will decrease. To increase the BIS ratio again, high risk assets, such as, commercial loans, etc. should be withdrawn and put into safer assets, such as cash.

2.2. The Trend of Japanese Asset Prices, Yen-Dollar Exchange Rates and Japanese Banks' Lending

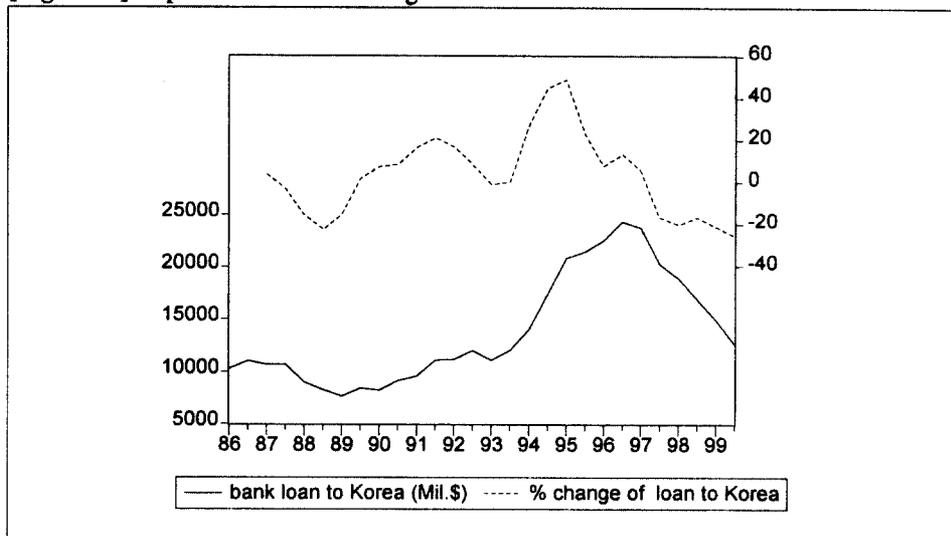
Figure 1 shows the trend of Japanese asset prices and dollar-yen exchange rates. Japanese asset prices experienced a dramatic fall beginning in early 1990. From a peak at the end of 1989, stock prices plunged 53% in just three years. After 1993, the Japanese stock market stopped falling, but continued to stagger

[Figure 1] The Trend of Japanese Asset Prices and Dollar/Yen Exchange Rates



Note: stock and land prices, and \$/yen exchange rates are indexed (1990=100)

Source: BIS <<http://www.bis.org>>, The Japan Real Estate Institute, Korea National Statistical Office

[Figure 2] Japanese banks' lending to Korea

until the Asian crisis erupted in 1997. The real estate market of Japan also collapsed. Since its peak in 1991, land prices of commercial area crashed more than 70% by the eve of the 1997 Asian crisis. On average urban land prices declined by 56% from 1991 to 1997. The collapse of the asset market is believed to have aggravated the BIS ratios of Japanese banks through a declining value of collateral and capital equity loss. Therefore, the collapse of the asset market could have been an influential factor that limited the ability of Japanese banks to expand their overseas loan activities to Korea.

However, there was a counter-factor that helped Japanese banks continue to expand lending abroad, i.e. the appreciating yen. Since the early 1990s, the value of the yen against the US dollar had upsurged and peaked at the end of 1995 before it turned downward. As is shown in the equation (1), the higher the yen value becomes, the higher the BIS ratio is. The value of the yen skyrocketed by as much as 84%, beginning in late 1990 and ending in 1995. The strong yen during the first half of 1990s more than countervailed the impact of collapsing asset prices. This made it possible for Japanese banks to continue to increase their loans to Korea [see Figure 2]. But the growth rate of lending to Korea significantly slowed down after 1995 as the yen began to depreciate.

From the first half of 1996, Japanese banks were under pressure to withdraw loans in Korea, due to the fact of the continuing decline of the yen value. Tumbled asset prices combined to badly aggravate the BIS ratios. We argue that two factors a weak yen and the collapse of asset markets in Japan caused a massive withdrawal of Japanese bank loans from Korea and ignited the currency and banking crisis in Korea.

2.3. Empirical Evidence

Based on the model explained above, an empirical estimation model is formed in (2).

$$\begin{aligned} \text{Japanese Loan to Korea} = & \text{constant} + \beta_1 \cdot (\text{Japanese stock price}) + \beta_2 \cdot (\text{Japanese} \\ & \text{land price}) + \beta_3 \cdot (\text{Dollar/yen exchange rate}) + \beta_4 \cdot (\text{Korean current account}) \\ & + \beta_5 \cdot (\text{Loan by domestic banks}) \end{aligned} \quad (2)$$

It is obvious from our model that the expected signs of β_1 , β_2 , and β_3 are positive. The sign of β_4 is expected to be negative, because current account deficit could be financed by foreign liabilities. That is, the bigger current account deficit is, the higher demand for international borrowing is expected. The right hand side variable Loan by domestic banks is also included in the equation to control the domestic factors affecting the demand for borrowing. The sign of β_5 is expected to be positive. The purpose of this section is to empirically confirm the argument that Japanese loans to Korea were significantly affected by Japanese asset prices and the value of yen.

Before going to the estimation process of (2), we conducted a unit root test for all the variables. As Table A-1 in Appendix shows, all the variables used in the analysis turned out to be non-stationary variables.

Semi-annual data during the 1987-97 period are used in the following empirical analysis. The Japanese bank loan is measured by the change of outstanding amount of loan from the same period of previous year, and is measured in US dollars. Land values are measured by the land value index for the six largest cities in Japan. We followed the cointegration test method suggested by Engel and Granger (1987). We used dynamic ordinary least squares method in estimating the equations in Table 1. Equation (1) in Table 1 includes all the explanatory variables that our hypothesis considers appropriate to explain the lending behaviour of Japanese banks. Equation (2) excludes statistically insignificant variable, stock price. Comparison of the two equations shows no significant difference in the estimated coefficients. This indicates the robustness of the estimation results. It proved that residuals of regression analysis are stationary both according to ADF and Phillips-Perron test. Therefore the regression equation (2) can be viewed as a cointegration regression. This implies that all the variables in the equation have long run equilibrium relations.

Results from both equation (1) and (2) in Table 1 strongly suggest that the value of the yen played a key role in determining Japanese bank loans to Korea: the coefficients on the dollar/yen rate are significant at 1% significance level and have an expected sign (+). This means that the stronger the yen is, the more Japanese banks will lend. It explains the rapid expansion of Japanese loans to Korea during the 1994-95 period, when the value of the yen shot up

[Table 1] Determinants of Japanese Banks' Lending to Korea:
(1987:1 to 1997:2, Dollar Denominated Loans)

Dependent Var. / Independent Var.	Loan by Japanese Banks (1)	Loan by Japanese Banks (1-1)	Loan by Japanese Banks (2)	Loan by Japanese Banks (2-1)	
Constant	-20878.24*** (0.00)	-25357.70*** (0.00)	-20806.56** (0.00)	-24793.07** (0.00)	
Stock Price	0.73 (0.98)	5.61 (0.85)			
Land Price	89.69** (0.03)	106.31** (0.02)	90.08** (0.03)	107.43** (0.02)	
\$/Yen Exchange Rate	95.35*** (0.01)	108.56*** (0.00)	94.92*** (0.00)	105.38*** (0.00)	
Korean Current Account	-0.17* (0.08)		-0.17* (0.07)		
Loan by Korean Banks	0.002 (0.11)	0.0003*** (0.009)	0.0002* (0.09)	0.0003*** (0.005)	
Adj. R-squares	0.75	0.70	0.76	0.72	
D.W statistic	1.96	1.67	1.96	1.64	
Prob. (F-test)	0.00	0.00	0.00	0.00	
Unit root test on the residual	ADF	-4.36(0)***	-3.71(0)***	-4.24(0)***	-3.59(0)***
	Phillips-Perron	-4.36(0)***	-3.79(2)***	-4.29(2)***	-3.67(2)***

Note: * significant at 1% level, ** significant at the 5% level, *** significant at the 10% level

enormously.

Japanese land prices also turned out to be a significant factor in affecting the lending behaviour of Japanese banks at 5% significance level. The significant and positive coefficient of the land price variable implies that plunging land prices restrained the Japanese banks from lending to Korea. The implications are that from the early 1990s the Japanese banks might not lend as much as they otherwise wanted to do. The effect of the super-strong yen that lasted until the second half of 1995, dominated that of falling land prices. Japanese banks could have begun withdrawing loans from Korea much earlier than 1996, if it had not

been for the strong yen. It suggests that the termination of a strong yen, along with the staggering land prices, prompted Japanese banks to withdraw loans, which triggered the 1997 currency crisis in Korea[see Figure 3].

Stock prices turned out to be insignificant.⁴ This can be explained by multicollinearity with Japanese land prices. Asset bubbles tend to come together. Korea's current account had a negative effect on Japanese banks' lending to Korea at 10% significance level. The current account deficit, which reflects Korea's demand for foreign liabilities, was financed by foreign borrowing abroad. The Korean banks' loan variables had positive effects on the Japanese banks' lending at 10% significance in equation (2). This implies that both domestic and Japanese banks were subject to the same loan demand shocks.

As there may be multicollinearity between dollar/yen rate and current account in Korea, we omitted current account in the regressions (1) and (2). The results are reported in equations (1-1) and (2-1). The results are very similar to (1) and (2). The coefficients of loan by Korean banks got more significant than in equations (1) and (2). Japanese land prices and dollar/yen rates are still significant even after the current account in Korea is omitted.

III. HOW CAN THE CURRENCY CRISIS IN KOREA BE EXPLAINED BY THE JAPANESE BANKS' LENDING BEHAVIOUR?

3.1. Sudden Capital Outflows and the Currency Crisis in Korea

It was discovered from previous sessions that the combined forces of both the depreciating yen and falling land prices resulted in the withdrawal of Japanese banks' lending to Korea in 1997. In this section we explain how the movement of capital account in Korea is related to the Japanese banks lending activities.

Because of capital liberalization in the early 1990's, capital began to flow massively into Asian countries, including Korea. The capital and financial account in Korea amounted to 23.3 billion dollars in 1996 and it suddenly decreased to 1.3 billion dollars in 1997, as noted in Table 2. The sudden reversal of capital outflow resulted in a liquidity shortage in Korea and caused the outbreak of the currency and bank ing crisis.⁵

⁴ The BIS data on Japanese bank lending is measured in US dollar terms. Table 1 used the original BIS data. We transformed this original data into yen terms by multiplying yen/dollar exchange rates. Refer to Figure A-1 in Appendix. Table A-2 lists the regression results with the transformed data. The stock price instead of land price turned out to be significant in Table A-2. But the switch does not refute our hypothesis that the Japanese asset market played an important role in lending practice of the Japanese banks.

⁵ Refer to Choi(2001) regarding a detailed account of the development and causes of the currency crisis in Korea. Goldfajn and Valdés(1997) referred to the worsening profitability of firms and an increase in the international interest rates as two main factors of capital outflow. In the Korean case, however, a sudden withdrawal of lending by Japanese banks was a more dominant factor than the worsening profitability of domestic firms in causing the exodus of foreign capital.

[Table 2] Foreign Borrowings by Korean Financial Institutions

(Billion dollars)

Classification	1990	1991	1992	1993	1994	1995	1996	1997
I. Current Account	-2.0	-8.3	-3.9	1.0	-3.9	-8.5	-23.0	-8.2
II. Capital and Financial Account (A+B)	2.6	6.4	6.6	2.7	10.3	16.8	23.3	1.3
Financial Account (1+2+3)	2.9	6.7	7.0	3.2	10.7	17.3	23.9	1.9
1. Direct Investment	-0.3	-0.3	-0.4	-0.8	-1.7	-1.8	-2.3	-1.6
2. Portfolio Investment	0.1	3.1	5.8	10.0	6.1	11.6	15.2	14.3
3. Other Investment (a-b)	3.1	4.0	1.6	-6.1	6.3	7.5	11.1	-10.8
a. Assets(-)	-2.4	-3.0	-3.3	-4.6	-7.4	-14.0	-13.5	-13.6
b. Liabilities(①+②)	5.5	7.0	4.9	-1.5	13.6	21.5	24.6	2.8
① Borrowings from Financial Institutions(③+④)	2.9	5.9	2.4	1.2	9.0	13.4	14.2	-14.8
③ Long-term Borrowings (Deposit Money Banks)	-0.1	3.7	1.2	0.1	2.0	1.6	1.5	2.5
(Deposit Money Banks)	-0.3	2.2	0.9	0.2	2.2	2.0	2.5	2.4
(Development Banks)	0.1	0.9	0.1	-0.1	0.0	-0.4	-0.9	0.0
(Investment Banks)	0.2	0.7	0.2	0.0	-0.2	-0.1	-0.1	0.1
④ Short-term Borrowings (Deposit Money Banks)	2.9	2.2	1.2	1.1	7.0	11.8	12.6	-17.3
(Deposit Money Banks)	2.4	1.8	0.7	0.4	5.4	8.5	7.2	-12.1
(Development Banks)	0.4	0.3	0.6	0.6	0.8	1.6	2.2	-2.9
(Merchant Banks)	0.1	0.0	-0.1	0.2	0.9	1.7	3.2	-2.3
② Other	2.6	1.1	2.5	-2.7	4.7	8.1	10.4	17.6
B. Capital Account	-0.3	-0.3	-0.4	-0.5	-0.4	-0.5	-0.6	-0.6
III. Reserves Assets Increase(-) Decrease	1.2	1.1	-3.7	-3.0	-4.7	-7.0	-1.4	-31.0

Source: Economic Statistics Department, The Bank of Korea

[Table 3] The Rollover Ratio of Foreign Borrowings in Korean Financial Institutions (Credit lines compared with the beginning of the year in seven commercial banks)

												(%)
97.1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	
115.4	94.2	109.0	94.9	100.6	106.3	89.1	79.2	85.8	86.5	58.8	32.2	

Source: International Department, The Bank of Korea

It is also noteworthy that in the case of Korea, massive capital inflow and outflow took place through financial institutions. As indicated in Table 2, borrowing from abroad through financial institutions, which were only 1.2 billion dollars in 1993, continued to increase to 14.2 billion dollars in 1996 when the current account deficit recorded 23.0 billion dollars. Furthermore, the massive capital inflow via financial institutions, were financed in the short-run and in dollar terms.

However, in 1997, financial institutions' borrowing from abroad turned into a net redemption of 14.8 billion dollars. This is because short-term foreign borrowing by Korean financial institutions, which were 12.6 billion dollars in 1996, turned into net 17.3 billion dollars redemption in 1997. This is mainly because foreign creditors refused to rollover the existing loans to domestic financial institutions and withdrew their lending. As shown in Table 3, the rollover ratio of foreign creditors in seven Korean commercial banks was 86.5 percent in October 1997, but the rollover ratio dropped abruptly to only 58.8 percent in November 1997. The banking and currency crisis were spontaneously triggered at the same time as capital stopped flowing in while capital dramatically flowed out.

3.2. Role of Japanese Banks' Lending in Triggering the Currency Crisis in Korea

From the comments made previously, it was found that sudden capital reversals in 1997 caused a shortage of liquidity. Especially with these events, Japanese banks orchestrated an outflow of capital from Korea. The withdrawal of Japanese banks' lending to Korea in 1997 can be attributed to a sudden depreciation of the yen value that began in 1996.⁶

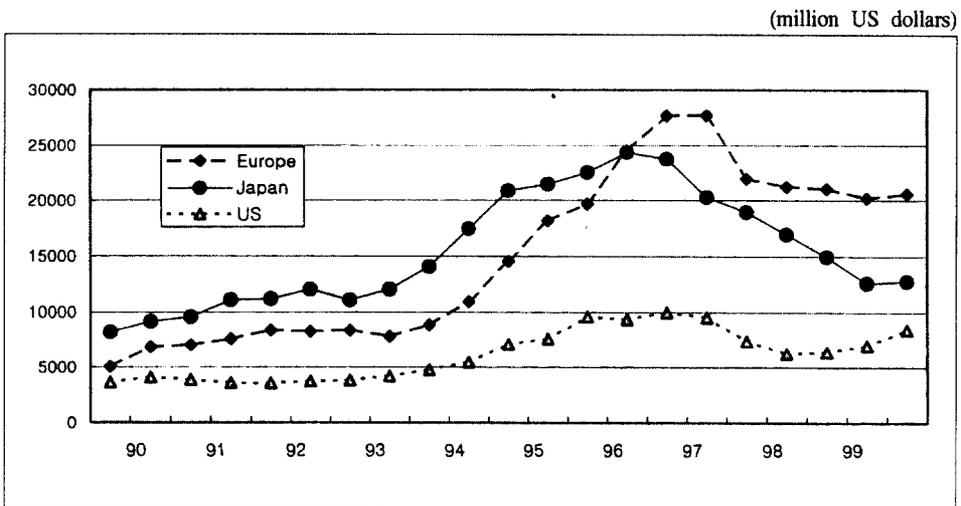
The weak yen could not shield the negative impact of plunged asset prices any more and affected overseas loan activities. This is confirmed in Figure 3.

⁶ We also think that the contagion effect from the currency crisis of South East Asian countries played an important role in the eruption of 1997 Korean currency crisis in addition to the collapse of Japanese asset markets and yen depreciation.

As capital liberalization accelerated, bank loans to Korea from Japan, the US, and Europe increased significantly beginning 1993. Bank lending kept increasing until 1997.⁷ However, the lending started to decrease in 1997. From the first half of 1997, Japanese banks began to close down their lending, especially in the second half of 1997 when they reduced their lending significantly. US and European banks, however, maintained their lending throughout 1997. They began to withdraw their lending to Korea in the first half of 1998. This suggests that Japanese banks led other countries' in withdrawing capital from Korea. It is known that financial institutions often carry out 'herding behaviour' under an uncertain situation. The sudden withdrawal of loans from the Korean market by Japanese banks hastened the withdrawal of loans by US and European banks, which had become more sceptical and averse to taking risks due to the Thailand crisis. The sudden withdrawal of capital by Japanese banks, therefore, was a major trigger of the Korean currency crisis. The leading role of Japanese banks can be confirmed by the Granger-causality test [See Appendix Table A-3]. Japanese banks' lending proved to Granger-cause the German and US banks' lending.

From Figure 3, it is noted that Japanese banks' lending to Korea was influenced not by the worsening situation of Korean economy, but by the

[Figure 3] Trends of Banks' Lending Towards Korea



Source: BIS <<http://www.bis.org>>

⁷ Although Japanese banks' lending to Korea kept increasing until 1997, its growth rate suddenly plunged into 7.8% in the first half of 1996 from 23.1% in the second half of 1995. The growth rate in the second half of 1994 and the first half of 1995 were 44.8%, and 48.8% respectively. The sudden turnaround of Japanese lending trend of 1996 began to have a negative impact on the Korean economy.

exacerbation of Japanese banking problems. As the Korean economy recovered in 1998, US and European banks stopped reducing their lending to Korea. However, Japanese banks kept reducing their lending to Korea until 1999 because of Japanese internal banking problems caused by declining land prices and the depreciating yen.

IV. CONCLUSION

Many scholars, both inside and outside of Korea, have explored the causes of the Korean currency crisis in 1997. However, the role of Japanese banks in the currency crisis in Korea has not been satisfactorily explained.

The lending behaviour of Japanese banks can be explained by the fluctuations of the Japanese asset prices and the yen-dollar exchange rates. These factors made the BIS ratio of Japanese banks lower and thus caused the withdrawal of existing loans to Korea. The currency crisis in Korea was initially triggered by the sudden withdrawal of lending by Japanese banks. Following Japanese banks, US and European banks withdrew their lending to Korea. In the end, a sudden capital outflow sparked by Japanese banks caused both the currency and banking crisis in Korea.

The weak yen against the dollar contributed to the abrupt deterioration of the current account in Korea, which also drained dollars through real sector in Korea. If we add this real sector impact of a weak yen against the Korean won, the role of the yen-dollar exchange rate in the Korean currency crisis will be a paramount factor. Rapidly weakening yen played a critical role both in the current and capital account deterioration in Korea. Therefore, stabilizing key currencies (US, Japan and Europe) may be essential to financial stability in neighbouring small open economies.

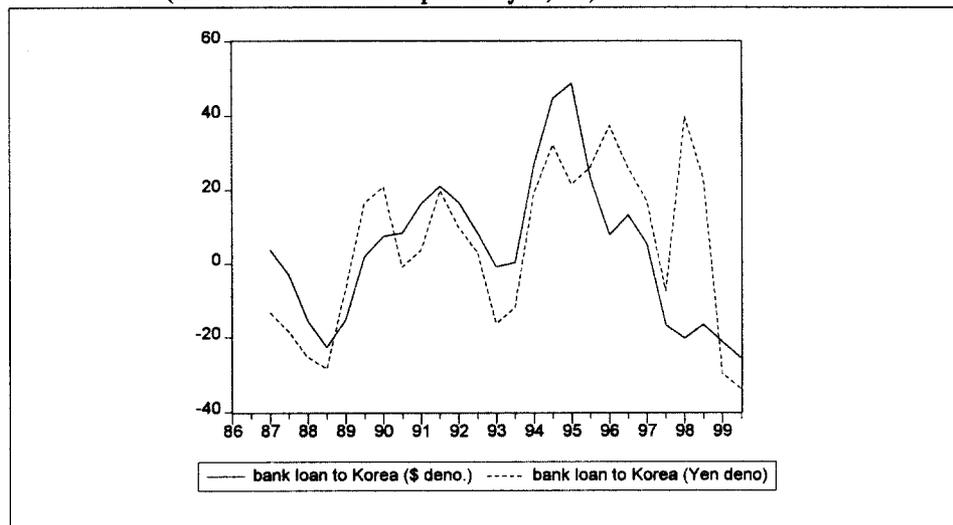
It is often said that a weak internal economic situation brought about the Korean financial crisis. However, this paper emphasizes the role of the international banking sector in explaining the eruption of the crisis in Korea. Financial stability in Japan is very important towards maintaining stability in Korea and East Asian countries. Japan should do its utmost in reforming and restructuring financial system to prevent any future crisis in Asian countries.

REFERENCES

- Choi, Changkyu(2001), "Speculative Attack Theory and Currency Crisis in Korea," In B. N. Ghosh, ed., *Global Financial Crisis and Reforms: Cases and Caveat*, Routledge of London, 183~212.
- Corsetti, Giancarlo, Paolo Pesenti, and Nouriel Roubini(1998), "What Caused the Asian Currency and Financial Crisis?: Part 1: A Macroeconomic Overview," NBER Working Paper No. 6833.
- Diamond, Douglas and Phillip, Dybvig(1983), "Bank Runs, Deposit Insurance and Liquidity," *Journal of Political Economy*, 91, June. 401-419.
- Engle, R. and C.W.J. Granger(1987), "Co-Integration and Error Correction: Representation, Estimation and Testing," *Econometrica*, Vol. 55, 251~76.
- Flood, R. P. and P. M. Garber(1984), "Collapsing Exchange Rate Regimes: Some Linear Examples," *Journal of International Economics*, Vol.17, Iss.1, 2, 1~13.
- French, Kenneth R. and J. M. Poterba(1991), "Were Japanese Stock Prices Too High?," *Journal of Financial Economics*, Vol. 29, Iss. 2, October, 337-63.
- Goldberg, L. S.(1991), "Collapsing Exchange Rate Regimes: Shocks and Biases", *Journal of International Money and Finance*, Vol. 10, Iss. 2, June, 252~63.
- Goldfajn, I. and R. O. Valdés (1997), "Capital Flows and the Twin Crises: The Role of Liquidity," IMF Working Paper, WP/97/87.
- Krugman, P.(1979), "A Model of Balance of Payment Crises," *Journal of Money, Credit and Banking*, Vol. 11, Iss. 3, August, 311~25.
- Obstfeld, Maurice and K. Rogoff(1995), "The Mirage of Fixed Exchange Rate," NBER Working Paper No. 5191, July.
- Peek, Joe and Eric S. Rosengren(2000), "Collateral Damage: Effects of the Japanese Bank Crisis on Real Activity in the United States," *The American Economic Review*, Vol. 90, No. 1, March, 30~45.
- Peek, Joe and Eric S. Rosengren(1999), "Japanese Banking Problems: Implications for lending in the United States," *New England Economic Review*, January/ February, 25~36.
- Peek, Joe and Eric S. Rosengren(1998), "Japanese banking Problems: Implications for Southeast Asia," Paper prepared for the Second Annual Conference of the Central Bank of Chile, September.
- Peek, Joe and Eric S. Rosengren(1997), "The International Transmission of Financial Shocks: The Case of Japan," *The American Economic Review*, Vol. 87, No. 4, September, 495~505.
- Prowse, Stephen D.(1990), "Institutional Investment Patterns and Corporate Financial Behaviour in the United States and Japan," *Journal of Financial Economics*, Vol. 27. No. 1, September, 43~66.
- Sachs, Jeffrey, Aaron Tornell, and Andres Velasco (1996), "The Mexican Peso Crisis: Sudden Death or Death Foretold?," *Journal of International Economics* 41, 265-283.

Appendix

[Figure A-1] Change of Japanese Bank Loans to Korea
(In US dollars and Japanese yen, %)



[Table A-1] Unit Root Test (1987:1 to 1997:2)

Dependent Var. Independent Var.	ADF Test	Phillips-Peron Test
Loan by Japanese Banks (dollar-denominated)	-1.48(1)	-1.03(1)
Loan by Japanese Banks (yen-denominated)	-2.71(1)	-1.79(1)
Japanese Stock Price	-2.28(1)	-2.30(1)
Japanese Land Price	-2.67(2)	-2.19(1)
\$/Yen Exchange Rate	-1.26(1)	-1.53(1)
Korean Current Account	-2.35(1)	-2.45(1)
Loan by Korean Banks	-2.98(2)	-3.06(1)

Note: 1) Trend and constant are included.

2) The numbers in parenthesis represent time lags.

3) Bank loan is measured by the change of outstanding amount of loan from the same period of previous year.

[Table A-2] Determinants of Japanese Banks' Lending to Korea
(1987:1 to 1997:2, Loan denominated in yen)

Dependent Var. Independent Var.	Loan By Japanese Banks	Loan By Japanese Banks
Constant	-96.89** (0.05)	-70.62** (0.03)
Stock Price	0.40** (0.05)	0.37** (0.04)
Land Price	0.11 (0.53)	
\$/Yen Exchange Rate	0.37* (0.09)	0.34** (0.05)
Korean Current Account	-0.003*** (0.01)	-0.004*** (0.00)
Loan by Korean Banks	-0.000 (0.26)	
Adj. R-squares	0.71	0.72
D.W statistic	2.00	2.05
Prob. (F-test)	0.00	0.00
Unit root test on the residual	ADF	-4.30(0)***
	Phillips-Perron	-4.38(2)***

Note: * significant at 1% level, ** significant at the 5% level, *** significant at the 10% level

[Table A-3] Granger-causality Test (1986:1 to 1999:2 (lags: 2))

Null Hypothesis	F-Statistic	Probability
Loan by Japanese Banks does not Granger Cause Loan by US Banks	6.968	0.00
Loan by US Banks does not Granger Cause Loan by Japanese Banks	2.251	0.133
Loan by Japanese Banks does not Granger Cause Loan by German Banks	4.560	0.024
Loan by German Banks does not Granger Cause Loan by Japanese Banks	0.313	0.735

Note: Bank loans are measured by the change of outstanding amount of loans from the same period of previous year.