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Credit Allocation and Financial Crisis in Korea

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Abstract

This paper analyzes some of the structural problems associated with the Korean financial sector, and investigates whether the financial system has allocated credit in an efficient way over the past three decades. Using data for 32 manufacturing sectors, we find no evidence that credit flows were directed to the relatively more profitable sectors, either before or after the financial reforms. We also find that the flow of credits did not contribute to improve the economic performance of the favored industries over time.

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I. INTRODUCTION

The spread of the East Asian crisis to Korea in late 1997 was perhaps one of the most surprising developments in the regional debacle. A member of the original “four Asian tigers” (the other three being Hong Kong SAR, Singapore and Taiwan Province of China), and a recent addition to the OECD club, Korea had shown a remarkable economic performance for decades. Korea’s economic situation clearly did not fit the mold of the typical configuration of a balance of payments crisis. Foreign debt was fairly low, the fiscal position was quite strong and the exchange rate was hardly overvalued. Moreover, notwithstanding the large terms of trade deterioration of 1996/97, the current account deficit had remained modest and export growth continued at a remarkable pace.

While a healthy debate on many aspects of the Asian crisis is likely to continue for a long time, there will surely be a consensus on the fact that the financial sector was the Achilles heel of the Korean economy.² Traditionally heavily controlled but poorly regulated in the prudential sense, the Korean financial sector lagged far behind the real sector in its development, with a weak loan portfolio, and large maturity mismatches in foreign currency operations. But it was probably an unusual combination of factors that caused the Korean financial sector to trigger a major balance of payments crisis, rather than slowly evolving into a more conventional financial sector crisis as happened, for example, in Japan. Furthermore, it was paradoxical that the crisis arose when Korea was trying to accelerate a process of financial reforms that, albeit in a gradual and somewhat disjoint way, had started as long as one decade earlier.

The purpose of this paper is to look in depth at the structure and performance of the Korean financial sector, and to search for detectable changes in credit allocation after financial reforms started to be implemented. The structural problems that affected the Korean financial sector are not unlike those that have been stressed in the recent literature on banking crisis more generally, such as government interventions, connected lending, and lack of prudential regulation and supervision (see Goldstein and Turner, 1996, and Demirguc-Kunt and Detragiache, 1997). In Korea, the government had traditionally used the banking sector as the instrument of choice for industrial policy initiatives. Furthermore, the clout and sheer economic power of a few large conglomerates (the chaebols) dominated credit allocation and nearly obviated the need for project evaluation and monitoring by banks. In spite of the general move to a more market-oriented system in recent times, explicit or implicit government interventions did not disappear, and the influence of the chaebols hardly declined.

The paper evaluates whether the financial system has allocated credit in an efficient way, both before and after the start of the process of financial reform. Krugman (1998)

²See, for example, IMF(1997), Corsetti et al. (1998), Goldstein (1998), Krugman (1998), Radelet and Sachs (1998), and World Bank (1998).

argued that the over-guaranteed and poorly regulated financial system led to over-lending and over-investment into risky projects in the East Asian economies. Using data at the level of 32 industrial branches over the past 30 years, we test whether credit flows were directed to the relatively more profitable activities, and we find no evidence to support this proposition, either before or after the financial reforms. We also examine the converse proposition, namely, whether the flow of credits contributed to improve the performance of the favored industries over time. Again, we find no evidence to support this proposition both before and after the reforms.

The paper is organized as follows. Section II provides a general overview of the developments leading to the Korean crisis. Section III presents a description of the evolution of the Korean financial sector and a brief overview of the reforms implemented since the mid-1980s. Section IV displays the econometric tests on the efficiency of credit allocation. Section V concludes.

II. ONSET OF THE FINANCIAL CRISIS IN KOREA

Since the 1960s, Korea's economic performance has been considered one of the most successful in the world. The growth rate surpassed 8 percent, inflation remained at moderate levels, and a rapidly rising investment rate was increasingly financed by domestic saving (Table 1 displays a number of basic macroeconomic indicators that highlight this economic performance). Korea emerged quickly from the debt crisis of 1982 through sharply increasing domestic saving and turning out large current account surpluses. The "lost decade" of the Latin American debtors was a decade of accelerated investment and growth for Korea.

Yet some signs were present to bring into question the sustainability of the rapid economic growth rates. Empirical work by Young (1995) and Kim and Lau (1994), (see also Krugman, 1994) showed that the engine of growth in Asian economies, including Korea, was factor accumulation rather than productivity increases. That is, the rapid growth was being generated by rapid factor accumulation rather than by a sustained increase in total factor productivity (TFP), implying that a slowdown was inevitable. Although there is a certain degree of uncertainty about the TFP growth estimates³, it seems clear that the rapid capital accumulation was facing diminishing returns. Figure 1 shows the estimates of productivity of capital by Kwack (1994): the rates of return on capital in Korean manufacturing industries fell rapidly from around 25 percent in 1972 to 10 percent in 1990. Although data on rates of

³Korea may actually not compare badly with other Asian economies. Even according to Young's (1995) growth accounting exercise, average annual TFP growth in Korean manufacturing sector was 3.0 percent for the period 1966-1990, while it was 1.7 percent per annum in the overall economy except agriculture. Kim and Hong (1997) estimated average TFP growth to be 3.6 percent for the whole economy from 1963 to 1995, while Hsieh (1997) estimated a TFP growth rate of 1.7 percent based on a dual cost function approach for the period 1966 to 1990.

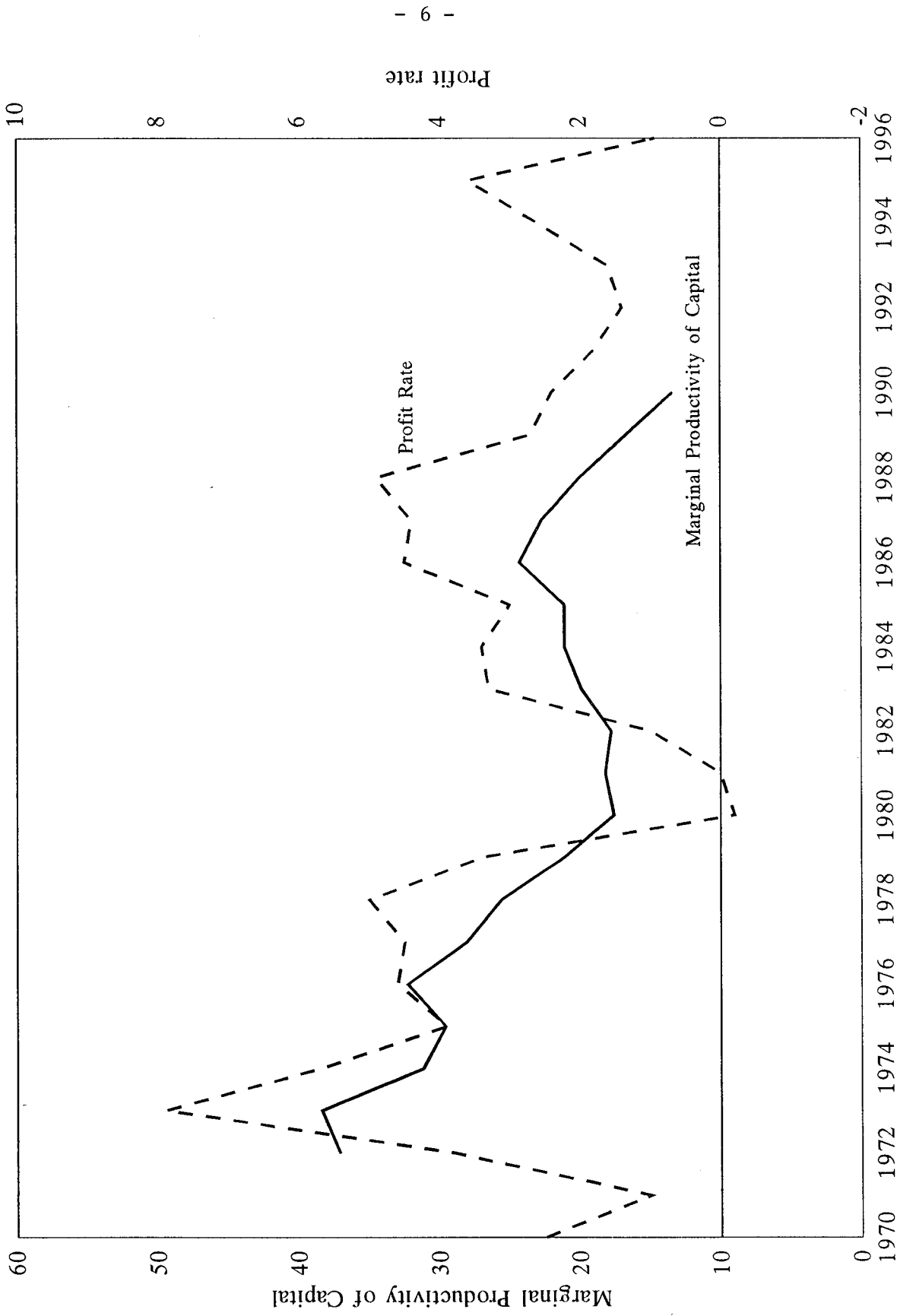
Table 1. Korea Economic Indicators, 1962-96
(In percent, period average)

Indicator	1962-73	1974-82	1983-92	1993	1994	1995	1996
Growth Rates							
Real GDP	8.7	7.1	9.1	5.8	8.6	8.9	7.1
Manufacturing sector	18.9	12.7	11.8	5.0	10.4	10.8	7.4
Real export	29.7	13.0	11.8	11.3	16.5	24.0	14.1
Share in GDP							
Agriculture	32.7	19.9	10.3	7.0	7.1	6.5	6.3
Mining and Manufacturing	20.8	28.7	30.7	27.3	27.2	27.1	26.1
Other	46.5	51.3	59.0	65.7	65.7	66.4	67.6
Ratios to GNP							
Exports	13.8	31.6	34.9	29.3	30.1	33.1	32.4
Fixed investment	19.8	29.8	32.4	36.2	36.0	36.9	37.1
Current account surplus 1/	-4.0	-5.3	1.2	0.1	-1.2	-2.0	-5.0
Monetary growth rate (M2)	26.3	22.5	14.5	16.6	18.7	15.6	15.8
Inflation rate (CPI)	12.3	15.1	4.8	4.8	6.2	4.5	5.0
Unemployment rate	5.8	4.1	3.1	2.8	2.4	2.0	2.0

Source: Bank of Korea, *Economic Statistics Yearbook*, various issues.

1/ Current account surplus includes net current transfers from the rest of the world.

Figure 1. Productivity and Profit Rates in Korean Manufacturing Sector
(in percent)



Source: Kwack (1990) and Bank of Korea, *Financial Statement Analysis*.

return to capital are not easily comparable internationally, Kwack's estimates suggest that in the late 1980s the rate of return to capital in the manufacturing sector of Korea had fallen to a level lower than that in the United States, a surprising fact given the relative level of development.⁴ However, a different estimate derived from the firms' aggregate balance sheets suggests that the declining trend of rates of return was not as sharp, although rates of return have fallen gradually since the early 1970s.⁵

In recent years, it appeared that Korea was trying to resist the effects of diminishing returns to investment by increasing the investment rate further rather than by upgrading the technology, restructuring industries or improving institutions. The share of fixed investment in terms of GNP rose from an already high 32 percent average during 1983–92, to over 36 percent during 1993–96 (see Table 1). Although the high level of investment helped to maintain economic growth, it also contributed to lower the rates of return on new investment even further.

These high rates of fixed investment in the Korean economy have been accompanied by a continuous decline in profit rates. The profit rate in the manufacturing sector declined from 7.9 percent to 0.9 percent in 1996 (see Figure 1).⁶ The Bank of Korea, in its periodic financial analyses, compares profit rates in the Korean manufacturing sector with those in the manufacturing sectors of the United States, Japan, and Taiwan Province of China, and finds that the aggregate profit rate in Korea has fairly consistently been the lowest one for the past two decades.⁷ Allowance must be made, however, for differences in accounting and depreciation rules, corporate taxes, etc., which affect the comparability of these data. Yet the picture that emerges is one of economic growth sustained by higher and higher levels of investment even in the face of declining productivity of capital and almost vanishing corporate profitability.

⁴See Kwack (1994) for details. The rate of return on capital is measured by the value added net of wage compensation (including estimated wages of the self-employed) divided by the net value of the capital stock.

⁵The rate of return on capital is measured as the capital's share in valued added divided by total capital. The manufacturing data is constructed from the aggregate balance sheet of firms reported in Bank of Korea, *Financial Statement Analysis*.

⁶The profit rate is measured as the share of normal profits in total assets. The data come from aggregate balance sheet of manufacturing firms reported in Bank of Korea, *Financial Statement Analysis*.

⁷The data are from Bank of Korea, *Financial Statement Analysis*, which reports financial statistics compiled from the countries' official sources. The U.S. data, which is originally from U.S. Department of Commerce, is the share of net profits in total assets.

The counterpart to overinvestment by a part of the corporate sector was overborrowing from domestic financial institutions. For many years, the Korean government regarded the financial sector as the ideal instrument for pursuing its industrial policy objectives. The government allocated credit at preferential lending rates, which represented heavy subsidies for firms with access to bank credit. The main beneficiaries of these selective credit allocations were large firms that belong to chaebol groups. Although the financial sector has been liberalized and privatized since the early 1980s, government intervention has not disappeared. The government still influences directly or indirectly the allocation of credit to favor particular priority sectors. What is more troublesome, the intimate connection among government, financial intermediaries and large firms has resulted in many risky or uneconomic investment with banks financing projects without appropriate profitability or risk analysis. Because chaebols were traditionally considered to be “too big to fail”, financial institutions believed that the government would protect them from any harm, and risky or unprofitable projects were financed.⁸

Soft lending and low profits and resulted in extremely high leverage rates for the largest conglomerates. Compared to those in advanced countries, Korean firms rely substantially more on bank finance, and less on internal funds.⁹ Figure 2 compares the debt-equity ratios in the manufacturing sectors of Korea, Japan, Taiwan Province of China and the United States.¹⁰ The debt-equity ratio has been about 300 percent in Korea, much higher than in the United States and Taiwan Province of China. Although Japan also had a high debt-equity ratio in the early 1970s, it has gradually dropped, reaching 200 percent in 1995.

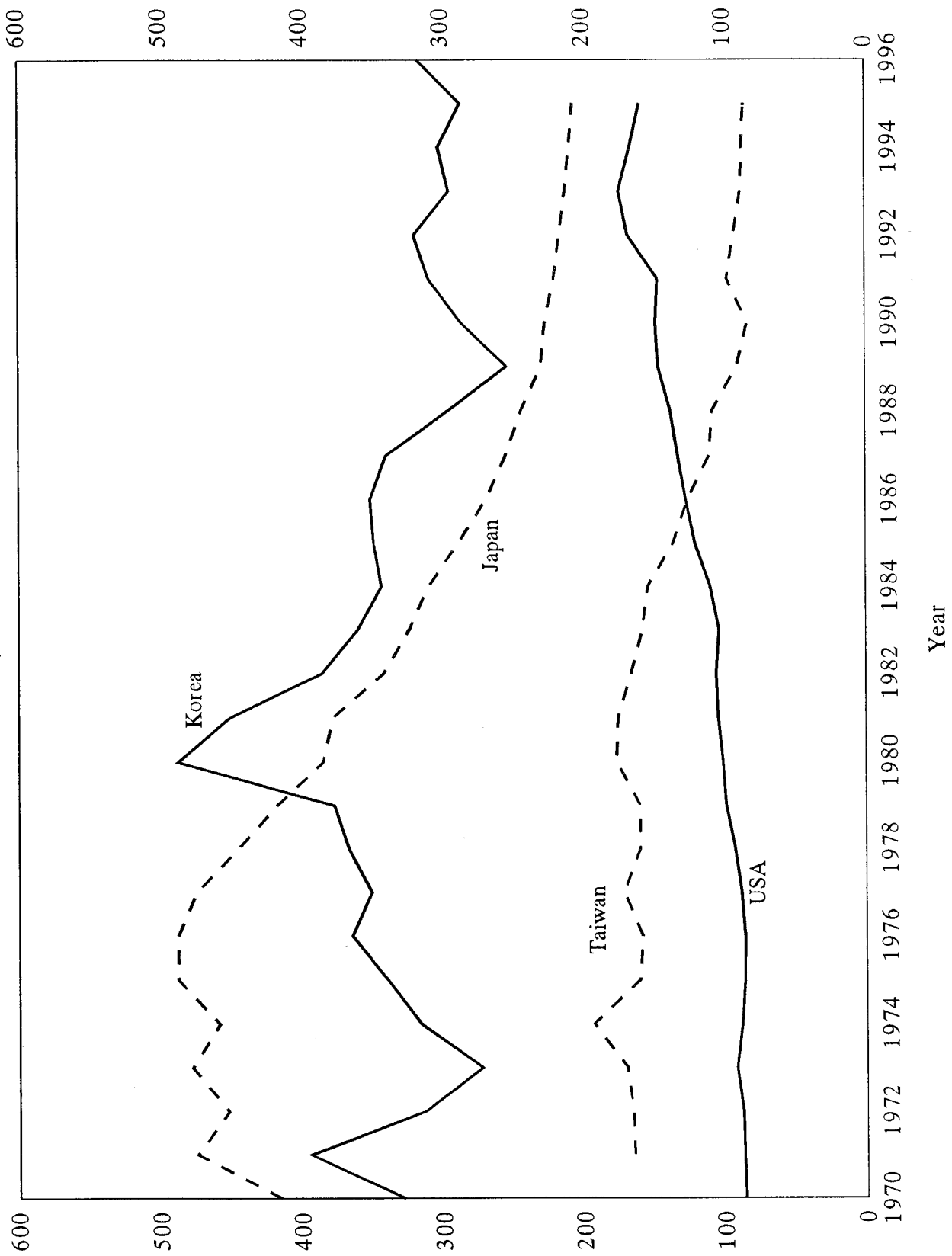
Overinvestment, risky projects and high corporate leverage did not cause any serious economic troubles because the Korean economy kept growing fast and market perceptions continued to be favorable. But when the economy was hit hard by unfavorable terms of trade

⁸A conspicuous case involved the Hanbo group, the 18th largest group in Korea in terms of total assets, which collapsed in January 1997 after spending more than \$3 billion in a questionable steel-mill project. Indictments for bribery included the President’ son, several politicians, bankers and the owner of the group. As a result, in order to avoid a “credit crunch”, the central bank injected some \$7 billion to financial system.

⁹Corbett and Jenkinson (1994) show that internal funds were the most important source of finance for the non-financial corporate sector in the U.S., Germany, and Japan over the period 1970–89. In US and Germany internal funds were over 60 percent of total fund, while in Japan it was 40 percent. In Korea, during the period of 1975–89 loans from bank and non-bank financial institutions constituted about 28 percent of total funds, while internal funds was 31 percent of total funds (see Table 3).

¹⁰The data are from the countries’ official sources, reported in Bank of Korea, *Financial Statement Analysis*.

Figure 2. Debt/Equity Ratio in the Manufacturing Sector
(in percent)



Source: Bank of Korea, *Financial Statement Analysis*.

shocks in 1995 and 1996 the vulnerability of the financial system became exposed.¹¹ The terms of trade shocks affected severely the Korean economy because exports were fairly concentrated in a few products such as steel, automobiles, and electronics.¹² In 1997, several large Korean firms moved into bankruptcy and thus the solvency of the financial sector was threatened. According to official estimates, non-performing loans reached 6.8 percent of total loans made by commercial banks in 1996 (Kim, 1997).

As the Asian currency crisis began to unfold, it became clear that confidence in the Korean economy was beginning to falter. Suddenly, foreign investors became concerned and started to withdraw their funds. Despite a relatively low overall external debt level and a moderate and clearly sustainable current account deficit (especially in view of the recent terms of trade deterioration) Korea had high short-term debt relative to its international reserves level, which made it vulnerable to a balance of payments crisis. Over 60 percent of private capital inflows during 1994–96 was in the form of short-term capital. In September 1997, Korea's short-term debt reached \$104.8 billion, while the official foreign reserves were at \$30.4 billion. Because banks borrowed short-term, foreign currency-denominated funds and invested in longer-term, domestic currency-denominated loans, they were exposed to currency mismatches and subject to potential liquidity pressures, that materialized when investors' sentiment turned negative. Furthermore, the Bank of Korea (BOK) had deposited part of its foreign exchange reserves with Korean banks and was unable to use those reserves without triggering a liquidity crisis for those banks. The collapse of the won was sharp: from an exchange rate of 890 to the US dollar in July 1997, it fell to over 2000 to the dollar in December, and gradually recovered to a 1200–1300 range only in the latter part of 1998.

A. The Structure of the Financial Sector in Korea

In this section we describe briefly the main features and structural problems of the Korean financial sector.

¹¹Recent empirical studies such as Caprio and Klingebiel (1997), Kaminsky and Reinhart (1996) and Milesi-Ferretti and Razin (1998) identify deterioration in the terms of trade as one of the important factors preceding banking crises in most countries.

¹²The terms of trade deteriorated by approximately 20 percent in the 1995–96 period. The prices of major export products fell significantly during the period. For example the unit export price of memory chips fell by more than 70 percent, and the steel export price dropped by about 30 percent. Semi-conductors and steel products account for about 13 percent and 6 percent of total Korean exports, respectively. The sharp drop in the prices of the major export products was partly self-inflicted. Korean firms made huge investments in semi-conductor and steel plants in the mid-1990s, thereby contributing to global excess supply.

Development and structural changes in the financial sector¹³

During the past three decades, the Korean financial sector has grown dramatically. The ratio of M3 to GNP tripled from 48 percent in 1980 to 146 percent in 1996.¹⁴ The structure of the financial sector has changed significantly too, with the remarkable growth of the non-bank financial institutions (NBFIs). Since they appeared in the early 1970s to diversify financing sources and to attract funds into the organized market, the NBFIs have grown rapidly by cutting into the market share of DMBs and replacing the informal (curb) loan market. The market share of NBFIs in terms of deposits increased from about 29 percent in 1980 to around 68 percent in 1996. (See Table 2). As for loans and discounts, the NBFIs has increased the market share from 37 to 56 percent during the corresponding period. The rapid growth of NBFIs is largely attributable to the relatively free regulatory environment in which they have been allowed to operate, enjoying greater freedom in the management of their assets and liabilities and, more importantly, in their ability to set interest rates on deposits and loans.

Since the 1980s, stock markets have also grown impressively mainly on account of the government's efforts force large business group to go public and to reduce the high leverage ratio of firms. During the period 1980 to 1996, market capitalization increased from W 2.5 trillion (6.9 percent of GNP) to W 117.4 trillion (30 percent of GNP).

The growth of the NBFIs and the stock markets has brought changes to the sources of financing for corporations. Table 3 shows the shifts in the composition of funds raised by the corporate sector. Since the 1980s the proportion of bank credit has fallen, while that of debt securities has risen markedly. After their decline in the 1980s, the proportion of foreign loans has risen significantly again.

Government intervention in the financial sector

The Korean government has intervened extensively in the financial sector, mainly pursuing industrial policy objectives. The government was a major stockholder of the five nationwide commercial banks until 1983 and still operates five specialized banks. The government has used allocation of credit with preferential interest rates as a powerful incentive to promote key industries. For most of the period since 1970, the nominal interest rates on deposits and loans were kept low relative to inflation rate, thus creating a persistent excess demand for credit. In addition to the low interest rate ceilings, there were various types of policy loans, such as export loans, national investment funds and special loans for agriculture and fisheries, which received preferential interest rates much lower than the

¹³See Cole and Park (1983), Nam(1994), and Park (1994,1998) for comprehensive discussion of the Korean financial sector.

¹⁴M3 is the sum of M2 plus deposits in all non-bank financial institutions (NBFIs).

Table 2. Financial Institutions in Korea
(as of end 1996)

Institutions	Number of Institutions	Assets		Loans and Discounts	
		(Trillion won)	(Percentage of total)	(Trillion won)	(Percentage of total)
<i>Deposit Money Banks</i>		451.2	39.6	200.2	43.8
Commercial Banks		341.6	30	137.4	30
Nationwide	15	264	23.2	108.4	23.7
Local	10	52.8	4.6	20.7	4.5
Foreign(branches)	70	24.7	2.2	8.3	1.8
Specialized Banks 1/	5	109.6	9.6	62.8	13.7
<i>Nonbank Financial Institutions</i>		687.1	60.4	257.3	56.2
Development institutions		83.5	7.3	46.1	10.1
Korea Development Bank		58.5	5.1	29.9	6.5
Export-Import Bank of Korea		8.9	0.8	7.1	1.6
Korea Long-Term Credit Bank		16.1	1.4	9.1	2
Savings Institutions		376.5	33.1	143.9	31.5
Trust banks	49	245.3	21.6	54.6	11.9
Mutual savings and finance co.	234	36.3	3.2	28.1	6.1
Credit unions	1664	16.7	1.5	10.7	2.3
Mutual credit facilities	1765	52.3	4.6	36.9	8.1
Commodity credit cooperatives	2814	25.6	2.3	13.7	3
Postal saving	1	0.3	0	0	0
Investment Institutions		142.4	12.5	28.5	6.2
Merchant banks	30	52.5	4.6	21	4.6
Securities investment trust co.	26	82.2	7.2	0	0
Korea securities finance co.	1	7.7	0.7	7.5	1.6
Insurance Institutions		84.7	7.4	38.7	8.5
Life insurance companies	33	80.1	7	38.7	8.5
Postal life insurance	1	4.7	0.4	0	0
<i>Total 2/</i>		1138.3	100	457.5	100

Source: Bank of Korea, *Economic Statistics Yearbook*, 1997.

1/ Includes the Industrial Bank of Korea, Korea Housing Bank, National Agricultural Cooperative Federation, National Federation of Fisheries Cooperatives, and National Livestock Cooperatives Federations.

2/ Does not include other quasi-non bank financial institutions such as securities companies, investment advisory companies, credit guarantee funds, non-life insurance companies, leasing companies, venture capital companies, and installment credit companies.

Table 3. Sources of Funds Raised by the Corporate Sector
(in percent) 1/

	1975-79	1980-84	1985-89	1990-94	1995	1996
Internal funds 2/	23.0	27.4	38.3	27.3	27.9	22.6
Borrowing from banks	15.6	12.8	13.3	12.1	10.7	10.9
Borrowing from non-banks	9.1	13.8	9.6	15.8	12.3	10.8
Government loans	1.1	1.5	0.2	0.2	0.1	-0.2
Equity	11.3	11.3	13.6	11.3	12.6	9.1
Debt securities 3/	4.6	10.8	10.7	17.7	23.0	27.5
Foreign borrowing	10.0	3.8	1.2	5.1	6.1	8.0
Trade credit	10.8	10.8	5.9	5.7	3.6	5.3
Others	14.4	7.9	7.1	4.8	4.7	6.0
Total	100	100	100	100	100	100

Source: Bank of Korea, *National Accounts, 1990* for the data from 1975 to 1989 and *Economic Statistics Yearbook*, various issues for the data after 1989.

1/ The corporate sector includes both private and public enterprises.

2/ Internal funds are savings, fixed capital depreciation, and capital transfer(net).

3/ Includes bonds, industrial paper, and debentures.

general lending rates (Table 4). By contrast, firms that were not favored by official policies were forced to resort to the curb market, where interest rates were much higher than both bank lending rates and corporate bond rates.¹⁵

Government intervention in the financial system intensified during the period of the heavy and chemical industries (HCI) drive in the 1970s.¹⁶ Over-investment in the HCI sector left a sequel of non-performing loans in the commercial banks' portfolio. At the end of 1986, according to Bank of Korea's estimates, nonperforming loans at the five largest commercial banks amounted to over 11 percent of total credit and to three times the banks' total net worth (Park and Kim, 1994). Under market principles, most of the largest banks would have been considered insolvent. During 1985 and 1987, the government initiated several programs aimed for the restructuring of troubled or insolvent firms, and to relieve banks of the financial burden incurred as a consequence of the programs, and the Bank of Korea provided them with more than W 3 trillion in subsidized loans carrying interest rates of 3 to 6 percent per annum (Nam, 1994).

Since the early 1980s, the Korean government started to liberalize financial markets by gradually eliminating credit and interest rate ceilings and other restrictions affecting lending and borrowing activities. But government involvement remained substantial. The share of subsidized policy-directed loans, which had reached about half of total domestic credit by financial institutions in the 1970s, gradually decreased to about 30 percent of total credit in 1990. It still accounted for about 60 percent of total DMB loans throughout the period.¹⁷ Furthermore the government continued to intervene when it was forced to help financial institutions and firms that faced financial difficulties due to overexpansion of credit in the 1970s.

The government also controlled the allocation of foreign loans tightly, again with industrial policy goals in mind. All foreign loans had to be authorized by the government and nearly all of them were guaranteed either by the government directly or by financial institutions owned or controlled by the government. Because the cost of borrowing abroad (adjusted for exchange rate depreciation) was generally lower than the cost of borrowing

¹⁵The exact volume of the curb market has not been known, although it is regarded as having shrunk over time.

¹⁶See Stern et al. (1995) for the detailed analysis of heavy and chemical industry drive in Korea.

¹⁷See Cho and Kim (1995, Table 6). Defining policy loans is not simple. In fact, in an environment of financial repression all bank loans carry an implicit subsidy. Cho and Kim define policy loans as "loans with preferential interest rates and availability that are supported by the central bank's automatic rediscounts."

Table 4. Interest Rates
(in percent)

Year	Curb Market	Corporate Bonds 1/	Bank Loans			Inflation 5/
			General 2/	Export 3/	NIF 4/	
1970	48.6	n.a.	24.0	n.a.	n.a.	15.6
1975	41.3	20.1	15.5	9.0	12.0	25.2
1980	44.9	30.1	20.0	15.0	19.5	19.6
1981	35.3	24.4	17.0	15.0	16.5	24.0
1982	30.6	17.3	10.0	10.0	10.0	16.9
1983	25.8	14.2	10.0	10.0	10.0	7.1
1984	24.7	14.1	10.0-11.5	10.0	10.0-11.5	5.0
1985	24.0	14.2	10.0-11.5	10.0	10.0-11.5	3.9
1986	23.1	12.8	10.0-11.5	10.0	10.0-11.5	4.2
1987	23.0	12.8	10.0-11.5	10.0	10.0-11.5	2.8
1988	22.7	14.5	10.0-11.5	10.0	10.0-11.5	3.5
1989	23.1	15.2	10.0-12.5	n.a.	10.0-11.5	5.9
1990	19.9	16.4	10.0-12.5	n.a.	10.0-11.5	5.2
1991	23.4	18.9	10.0-12.5	n.a.	10.0-11.5	10.2
1992	23.9	16.1	10.0-12.5	n.a.	10.0-11.5	6.1
1993	20.8	12.6	8.5-12.0	n.a.	9.0	5.1
1994	19.4	12.9	8.5-12.5	n.a.	—	5.5
1995	20.8	11.9	9.0-12.5	n.a.	—	5.7
1996	—	12.6	11.1	n.a.	—	3.6

n.a. Not applicable — Not available

Source: Bank of Korea, *Economic Statistics Yearbook*, various issues; and the curb market rate is unofficial survey data available from Bank of Korea.

1/ Bonds with maturities between 1 and 3 years.

2/ General purpose loans up to 1 year maturity.

3/ Abolished in December 1988.

4/ National Investment Fund. It was established in 1974 to support the heavy and chemical industries.

5/ GNP deflator.

from domestic sources, the allocation of foreign loans provided the government with the opportunity to subsidize strategic industries.

Chaebols and corporate debts

Korea's industrial structure in which large conglomerates (chaebols) dominate has influenced many aspects of credit policy. In 1995, for instance, the value added of the largest 30 groups (excluding the value added created by their financial affiliates) accounted for 16 percent of GNP and for 41 percent of value added in the manufacturing sector (Choi, 1996). Given this high degree of concentration, it is not surprising that these groups are the major recipients of domestic credit. According to BOK data reported by Park and Kim (1994), the thirty largest chaebols received 18.3 percent of total bank credit and 42.1 percent of total non-bank credit in 1989. Table 5 shows that in 1996 the thirty largest chaebols received more than 40 percent of total borrowing including bank and non-bank loans, foreign loans, and debt securities.

The weak financial structure and poor corporate governance of chaebols eventually became a destabilizing factor for the whole economy. Most chaebol firms have higher debt-to-equity ratios than small and medium firms. Because chaebol firms are highly interdependent financially through cross-share holdings and cross-loan guarantees, one chaebol firm's trouble can easily lead to the collapse of the whole group.

Government policy toward chaebols has become somewhat ambivalent (see Leipziger and Petri, 1993 and Yoo, 1998). While the government initially encouraged the formation and growth of chaebols in the belief that large scale firms were necessary to effectively compete in global markets, it later became concerned about an excessive concentration of power in the Korean society, and tried to check the growth of the chaebols. For instance, to prevent chaebols from owning financial institutions, the government limited bank shareholdings by a single owner to 4 percent of capital. Yet the government has (until the present crisis) maintained its policy of supporting financially distressed chaebols, thus creating incentives for chaebols to borrow and invest in risky projects. The bankruptcy of large firms was out of question because of concerns about unemployment, financial instability and possible damage of international creditworthiness. The idea that chaebols were "too big to fail" has thus prevailed, causing financial bailouts to be expected whenever necessary.

Liberalization and deregulation

Realizing that government intervention had resulted in a backward financial system, the Korean authorities embarked in a gradual process of financial liberalization and deregulation in the 1980s. The major elements of the financial reform were the elimination of many administrative controls, decontrol of interest rates, privatization of major commercial

Table 5. Total Credit Extended to Thirty Major Conglomerates

Year	Borrowing of corporate sector 1/ (billion wons) (A)	Borrowing of 30 Chaebols 2/ (billion wons)(B)	B/A (Percent)
1986	9,771	2,658	27.2
1987	7,989	3,924	49.1
1988	8,970	2,049	22.8
1989	23,538	6,433	27.3
1990	35,552	14,664	41.2
1991	38,529	16,514	42.9
1992	34,562	12,714	36.8
1993	39,069	8,670	22.2
1994	59,585	13,722	23.0
1995	67,791	26,091	38.5
1996	84,984	33,900	40.3

Source: Bank of Korea and Korea Economic Research Institute. Reproduced from Kim (1997, Table 5).

1/ Includes loans from financial institutions, commercial paper, debentures, external bonds and other foreign debts of the corporate business sector.

2/ A sum of increases in short-term and long-term borrowing, and debentures.

banks, diversification of financial services, and a reduction of entry barriers.¹⁸ In December 1988, the government announced that direct government controls on the allocation of loans would be abolished and most bank and non-bank lending rates and some long-term deposit rates would be decontrolled. However, implicit and indirect controls continued even after the announcement because of the opposition from firms that depended heavily on bank loans (Chung, 1994). In 1993, a wide range of lending interest rates were liberalized, followed by a liberalization of interest rates on deposits in 1994 and 1995.

The reforms have also partly opened domestic financial markets to foreign investors. Branches of foreign commercial banks were allowed to offer a broad range of banking services and were given national treatment in 1986. But foreign banks were not allowed to acquire Korean commercial banks or to name foreign senior managers for their local branches. In 1992, foreign investors were allowed to purchase Korean stocks, but their holdings were subject to an overall ceiling of 10 percent of the shares and some companies remained off-limits.

Notwithstanding the significant measures undertaken since the 1980s toward a liberalization of the financial sector, Korea's financial sector continued to be subject to considerable government influence. It is still believed that the government maintains a close relation and may directly influence important decisions of financial institutions. It is common for the Ministry of Finance to be involved in the appointment of top managers of private banks.

There is no denying that, however limited in scope, financial liberalization has helped to strengthen competitive forces and to eliminate some distortions in the Korean financial sector. The government's direct control of the financial system has been replaced by market forces to a certain degree. In principle, in a more competitive market environment, financial intermediaries are free and motivated to apply more selective lending policies. It seemed, however, that bank management that was accustomed to the earlier repressed environment did not adapt or acquired the requisite expertise to monitor and evaluate projects on a market basis. Furthermore, liberalization appeared to induce some financial institutions--smaller ones in particular--to undertake excessively risky positions, further affecting the overall soundness of financial institutions (Park and Kim, 1994). The pursuit of profit margins that were not available through domestic lending, and the evasion of domestic controls also encouraged risky strategies in foreign borrowing by financial institutions. As a result of the web of existing regulations, banks relied in foreign currency-denominated short-term borrowing to fund long-term domestic currency-denominated loans. With inadequate prudential regulations, the capital market opening left the financial sector highly exposed to external shocks.

¹⁸Nam (1994) and Park (1994, 1998) provide details on Korea's financial reform since the 1980s.

To summarize, although financial markets have been liberalized and deregulated to some extent, government intervention in financial markets has not been eliminated, and the environment faced by financial institutions still does not provide the most adequate incentives. The next section investigates the extent to which financial reforms have resulted in a measurable improvement in credit allocation practices by financial institutions.

III. EFFICIENCY OF FINANCIAL SYSTEM

This section analyzes the degree to which the allocation of financial resources in Korea was subject to distortions and tries to identify perceptible differences in credit allocation since the onset of structural reforms in the financial sector in the mid-1980s. In particular, it examines whether the differential access to credit was related to differences in profitability across sectors. It also evaluates the effects of access to rationed credit on the performance of the beneficiary sector in later years.

Some previous studies, including Leipziger (1987) and Chung (1994), argued that the financial sector in Korea was not efficient in allocating savings among investment projects but their conclusions are not based on a formal empirical analysis. In contrast, World Bank (1993) and Cho and Kim (1995) make a generally positive evaluation of credit policies in Korea. Dailami and Kim (1994), based on firm-level data for the period 1984–86, show that subsidized credit did not stimulate business investment in productive assets, but instead encouraged corporations to hold more financial assets and increase their investment in real estate operations.

A. Financial Characteristics of Manufacturing Sectors

This section compares several financial indicators among the different sectors of Korean industry. All data come from the Bank of Korea, *Financial Statement Analysis*, issued annually since 1969, which reports aggregate balance sheets and income statements by industry branch. For 1996, the publication covered 41 percent of all firms and 91 percent of total corporate sales. The manufacturing sector is disaggregated into 32 sectors based on the classification of the Korea Standard Industry Classification (KSIC).

Table 6 summarizes the distribution of total bank loans and foreign loans across sectors for two sub periods: 1970–84 and 1985–96. As discussed in Section III, bank and foreign loans have been the major source of finance of the corporate sector throughout the period and the costs of these loans were much cheaper than those of other sources of borrowing thanks to the lower interest rates and relatively stable exchange rates. The data show that there has been some convergence in the access to bank and foreign loans among different sectors since the late 1980s, as indicated by the decline in the standard deviation of the ratio of loans (total loans, bank loans and foreign loans) to the (accounting measure of) capital stock. This, in principle, suggests the existence of an application of a more level playing field, with more even access to domestic and foreign sources of financing for the Korean manufacturing sector. Table 6 also shows that the standard deviations of average

Table 6. Summary of Variables in 32 Korean Manufacturing Industries
(averages, in percent)

Variable	1970-84		1985-96	
	Average (Percent)	Standard Deviation	Average (Percent)	Standard Deviation
Total Loans/Capital	35.3	7.9	28.6	3.7
Bank Loans/Total Capital	28.3	7.8	26.8	3.8
Foreign Loans/Total Capital	7.0	6.8	1.8	1.5
Average Borrowing Cost 1/	20.3 2/	6.5	16.4	4.4
Profit Rate 3/	4.0	3.1	2.8	1.4
Productivity of Capital 4/	15.4	4.5	12.9	2.1
Debt/ Total Capital	75.8	8.5	76.2	6.5

Source: Authors' estimates from Bank of Korea, *Financial Statement Analysis*, various issues

1/ The ratio of financial expenses to total borrowing.

2/ Average over the period from 1979 to 1984.

3/ The ratio of normal profit (ordinary income) to total capital stock.

4/ The ratio of capital's share of valued added to total capital stock.

borrowing costs have been declined, though slightly, implying that the access to subsidized credit may have been more equal across sectors.¹⁹

Of course, the gaps in access to and cost of credit across sectors do not necessarily imply the existence of financial distortions. In a financially repressed economy, different sectors may have access to different segments of credit with different interest rates. Even in a perfectly competitive regime, however, financial intermediaries would normally charge different interest rates to different borrowers and impose different ceilings on their credit exposure based on economic criteria. But the existence of large disparities in the marginal return to capital among different sectors would be an indicator of distortions in the allocation of investment. Abstracting from risk and transaction costs, it is to be expected that when resources are allocated efficiently the marginal returns to capital are equalized across different industries and sectors.

Table 6 shows that in the manufacturing industries on average profit rates and marginal efficiency of capital have declined over time, confirming the declining trend of return rate of capital in the aggregate manufacturing industry (Figure 1). The standard deviations of profit rate and marginal efficiency of capital have been also declined over time, an *a priori* indicator of improvements in the efficiency in credit allocation.

Despite the substantial convergence of return rates across sectors over time, we note that there was apparently negative correlation between the allocation of loans and the average profitability in the corresponding manufacturing sector over the long-run period. Figure 3 displays a scatter plot between the allocation of total loans and the average profitability (proxied by the accounting profit rates) for the two sub periods.²⁰ We notice that there was a significant negative relationship between the loan size and the average profit rate across sectors. Furthermore, in more recent years, the situation did not change significantly despite the ongoing financial reform process. This apparent negative correlation between the allocated credit and the profit rate across sectors over a long period can be thought to indicate that Korean financial sector has allocated financial resources to less profitable or less efficient sectors throughout the period. For instance, Figure 3 shows that a few chosen heavy industries such as Aircraft and Shipbuilding have had good access to credit despite their lower profitability throughout the period.

Figure 4 shows that the allocation of bank loans was also negatively correlated to the profit rates over the period. Compared to the allocation of bank loans, the access to foreign

¹⁹Cho (1988) argues that financial liberalization in Korea led to more efficiency in the allocation of credit by showing that the variance of borrowing costs for the 68 4-digit manufacturing industries declined significantly over the period from 1972 to 1984.

²⁰The pictures are very similar when we replace the profit rate with the marginal product of capital.

Figure 3. Total Loans-to-Capital Ratios and Profit Rates
32 manufacturing industries (in percent)

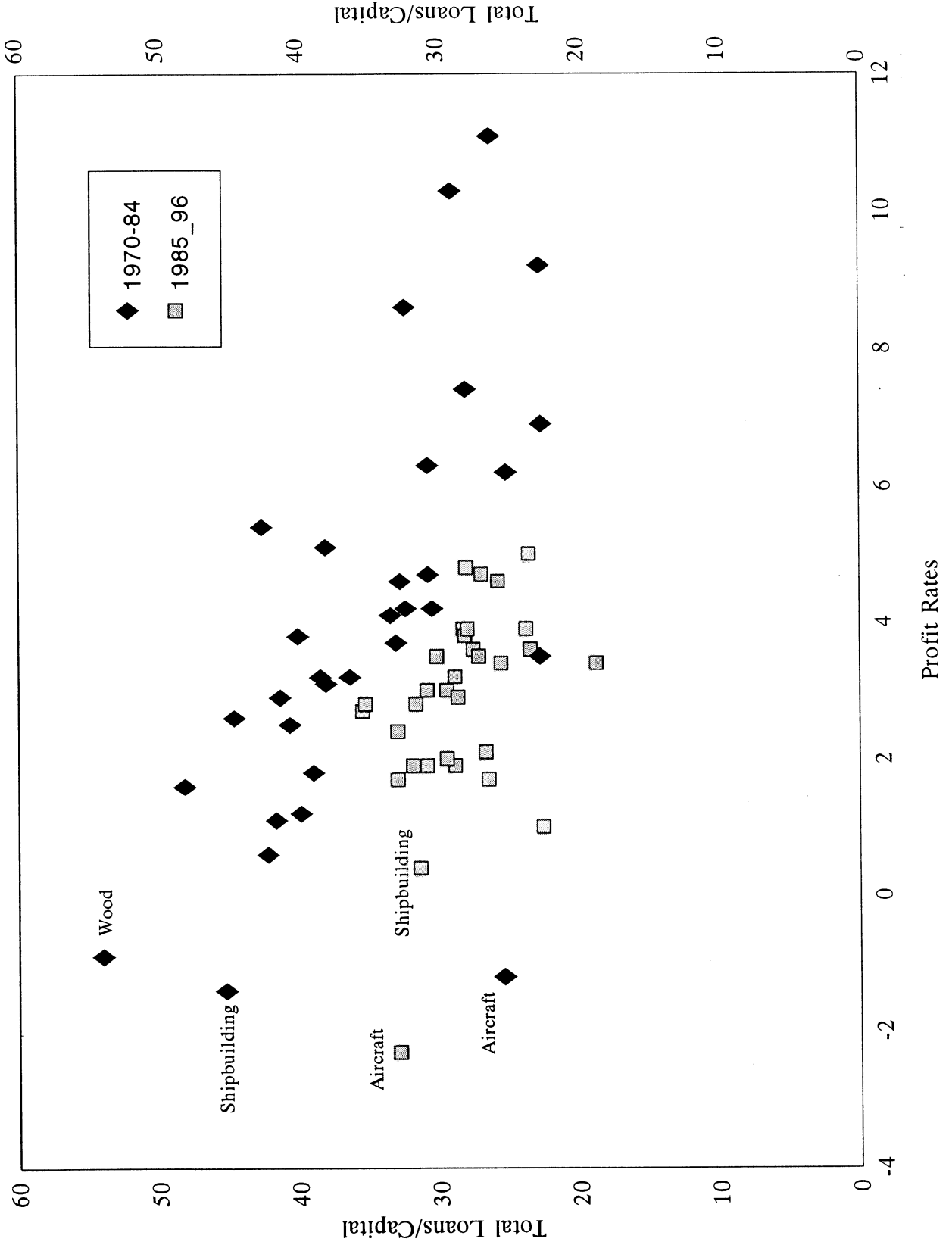
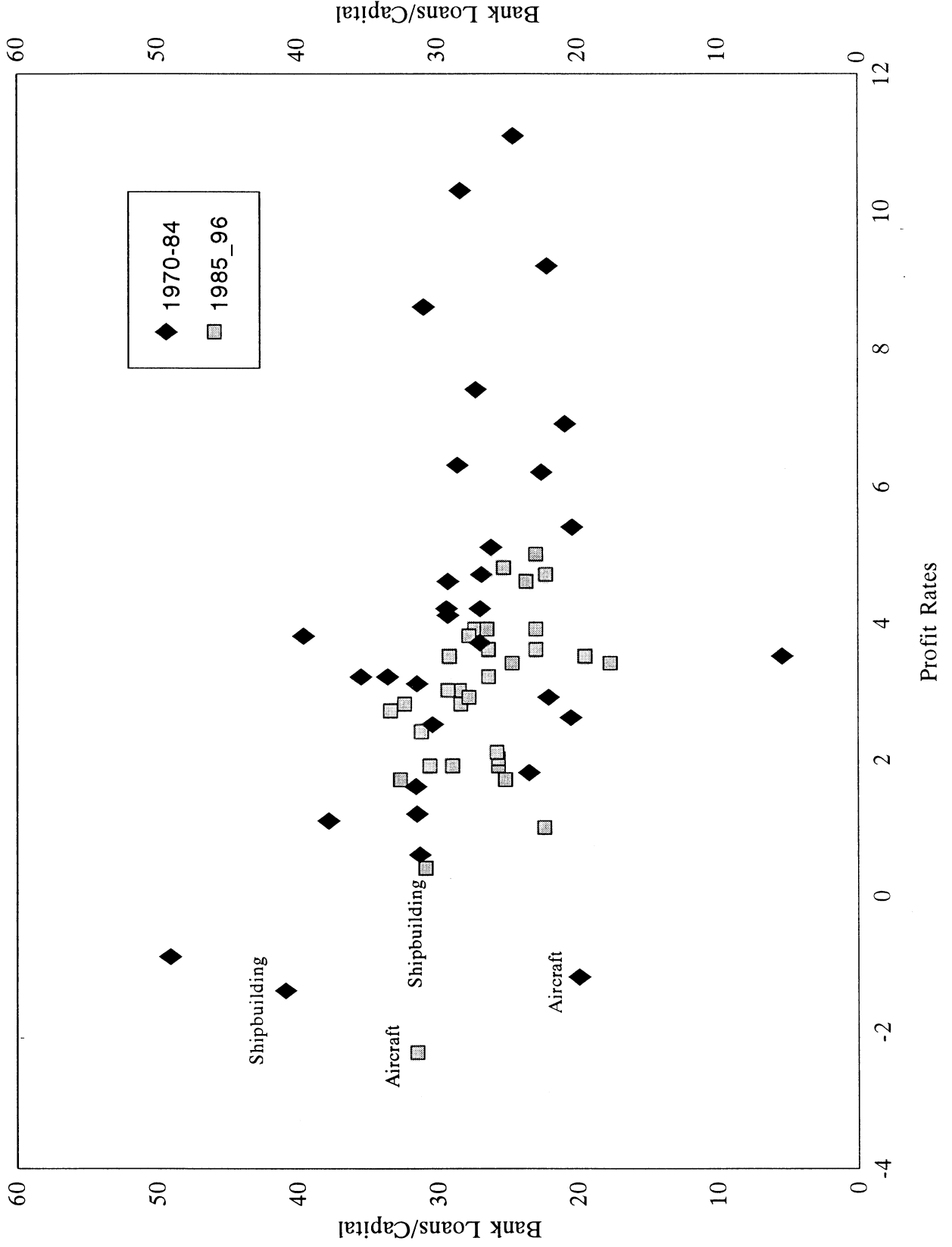


Figure 4. Bank Loans-to-Capital Ratios and Profit Rates
32 manufacturing industries (in percent)



loans has been more concentrated on favored sectors, in particular in the earlier years. Some heavy and chemical industries including industrial chemicals, petroleum and steel benefitted from good access to foreign loans, while many other industries have had little access to foreign loans.(see Figure 5).

B. Econometric Evidence on the Efficiency of Credit Allocation

We assess more formally whether credit allocation was efficient in Korean manufacturing industries using industry-level panel data of 32 Korean manufacturing sectors for the period from 1969 to 1996. The specific question we address is whether financial resources have been directed to more efficient sectors or not. In a financially repressed economy with heavy government controls industries that have more access to credit are not necessarily the most profitable or efficient ones. The government can use credit policy to stimulate “priority” sectors, or to aid financially distressed firms. Or, in the chaebol-dominated industrial structure, large and politically well-connected firms may obtain disproportionate access to credit. Even as the process of liberalization and deregulation advances, bank managers may still not be competent in the evaluation and monitoring of projects, and strong bank/client relationships may persist for a long time.

Our first test is whether financial institutions increased bank loans to the sectors that had been more profitable in the previous year. In the regressions, the dependent variable is the net flow of total loans as a proportion of the total capital stock over one year in each sector. In alternative specifications, the efficiency of investment is measured by the profit rate or the marginal productivity of capital.²¹ In addition to the efficiency variable, we include other control variables (mainly industry characteristics) that may help explain the allocation of credit. These additional explanatory variables are: the lagged value of total loans as a ratio to the total capital stock, the logarithm of the fixed capital, the average debt-capital ratio and the export-output ratio. In order to minimize endogeneity problems, we included the efficiency measures and the industry characteristic variables lagged by one year. In the equations we also add year dummies (not reported in the table). The model was estimated applying the random effects GLS method.

The results, reported in Table 7, show that the profitability of investment did not play an important role in the allocation of credit. In fact, given other industry characteristics and year dummies, the previous year’s profit rate turns out to have a *negative* effect (although sometimes not a statistically significant one) on the current year’s flow of credit. This implies that credit was allocated preferentially to the sectors with worse economic performance.

²¹Another test in the same spirit was conducted by Jaramillo et al. (1993) with reference to Ecuador. They find an improvement in the credit allocation after the financial reform in Ecuador by applying a production function to obtain a measure of technical efficiency and See Schiantarelli (1994) for a survey of empirical studies on the effects of financial liberalization on credit allocation.

Figure 5. Foreign Loans-to-Capital Ratios and Profit Rates
32 manufacturing industries (in percent)

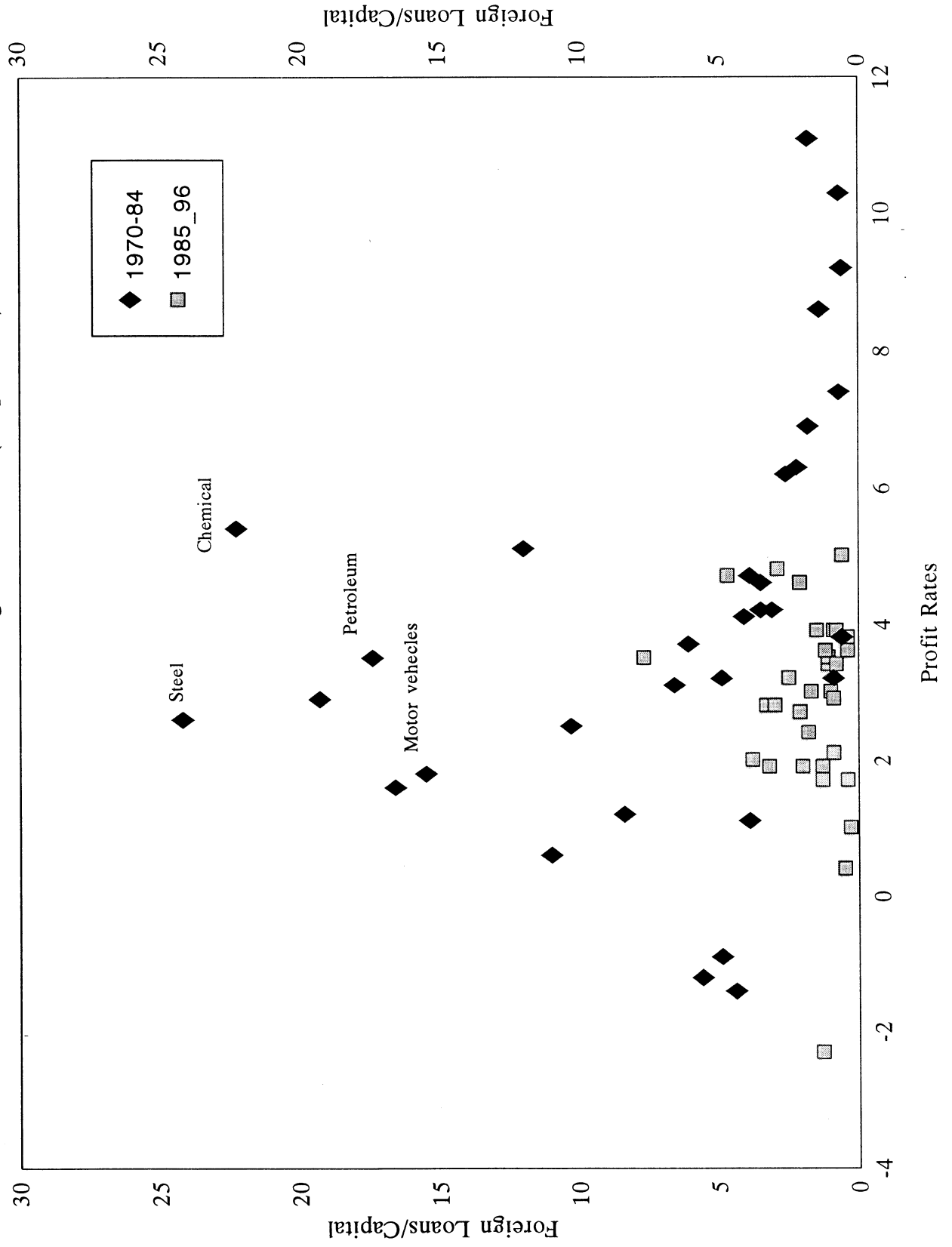


Table 7. Determinants of Credit Allocation in 32 Manufacturing Sectors

Dependent Variable	Increase in (Total Loans/Capital) _t					
	1970-96		1970-84		1985-96	
	(7.1)	(7.2)	(7.3)	(7.4)	(7.5)	(7.6)
Loans/Capital (t-1)	-0.522 (-16.3)	-0.519 (-16.4)	-0.489 (-11.0)	-0.480 (-11.0)	-0.619 (-13.3)	-0.628 (-13.6)
Log(FixedCapital) (t-1)	0.648 (3.06)	0.622 (2.94)	0.543 (1.61)	0.514 (1.51)	0.642 (2.64)	0.658 (2.78)
Debt/Capital (t-1)	0.089 (2.44)	0.091 (2.70)	0.096 (1.84)	0.100 (1.97)	0.087 (1.70)	0.078 (1.90)
Export/Output (t-1)	0.034 (2.83)	0.029 (2.38)	0.043 (2.30)	0.038 (2.01)	0.024 (1.75)	0.021 (1.50)
Profit Rate (t-1)	-0.160 (-1.91)		-0.157 (-1.45)		-0.116 (-0.81)	
Productivity of Capital (t-1)		-0.147 (-2.54)		-0.110 (-1.45)		-0.247 (-2.47)
R ²	0.34	0.35	0.32	0.32	0.42	0.43
No. of Observations	850	850	470	470	380	380

Note: The dependent variable is the change in the ratio of total loans to the capital stock over a year in each of 32 manufacturing industries. The estimation is by random effects GLS. Year dummies are included but not reported. Z-statistics are reported in parentheses. A value of the Z-statistics greater than 1.96 implies the coefficient is significant at the 5 percent significance level.

Similarly, the marginal productivity of capital also has a negative effect on credit flows. Thus, the evidence shows that loans were directed toward the sectors in which the return rates of investment have been lower. In this regard, the result supports that the allocation of credit was not efficient in Korean manufacturing industries.

The coefficient of total fixed capital is generally positive, which implies that the probability of obtaining credit is higher for industries with larger firms. The positive effect of the fixed capital variable could also capture the greater availability of collateral, although it is likely that it is capturing the greater power by larger firms to obtain credit. The coefficient on the previous year's debt ratio is positive and significant. This result is somewhat surprising for a highly leveraged economy, where the most indebted firms are likely to be in financial distress, and should therefore face more difficult access to new loans.

The coefficient on export-output ratio appears significantly positive, confirming that the broad targeting of credit was to exporters. In Korea, exporters from all industries had access to subsidized credits and the firm's export performance was a key criterion in allocating credit (World Bank, 1993, page 281, and Hong, 1998).

We also tested the impact of the financial liberalization and deregulation that has occurred since the mid-1980s by dividing the sample into two periods: before and after 1985. Regressions (7.3)—(7.6) show that the profitability of investment still appears to have negative effects on credit in either subsample, which may indicate that the allocative efficiency of the financial system has not improved in Korea. This result suggests that the burden of past debts may have constrained the allocation of credit by banks, and that bank/client relationships continued to be a strong determinant of credit decisions.

We disaggregate total loans between domestic bank loans and foreign loans in Table 8. We still find negative, although less significant, effects of the efficiency variables on credit flows in Korea for the period 1969 to 1996.²² There is a difference, however, in the effects of total fixed capital and debt ratios on credit allocation. Total fixed capital is positively related to foreign loans but negatively related to bank loans. Conversely, the debt ratio is positively related to bank loans but negatively, though statistically insignificantly, related to foreign loans. We consider that this result is partly generated from the fact that foreign loans have been more concentrated on specific sectors which seem to have larger capital and smaller debt.

C. Effects of Credit Allocation on Productivity Growth

In this section we test how credit allocation affected the industry's performance in subsequent periods. The results of the previous section show that credit was allocated

²²The impacts of the efficiency variables on credit flows still remain either negative or insignificant in the regressions based on the subsamples before and after 1985.

Table 8. Determinants of the Allocation of Bank and Foreign Loans in
32 Manufacturing Sectors, 1970-96

Dependent Variable	Increase in (Bank Loans/Capital) _t		Increase in (Foreign Loans /Capital) _t	
	(8.1)	(8.2)	(8.3)	(8.4)
Lagged Dependent Variable	-0.488 (-15.6)	-0.486 (-15.6)	-0.244 (-11.6)	-0.246 (-11.7)
Log(Fixed Capital) (t-1)	-0.369 (-1.87)	-0.384 (-1.95)	0.386 (3.48)	0.380 (3.43)
Debt/Capital (t-1)	0.101 (2.91)	0.098 (3.03)	-0.016 (-0.99)	-0.020 (-1.32)
Export/Output (t-1)	0.048 (4.15)	0.046 (3.92)	-0.006 (-1.11)	-0.007 (-1.28)
Profit Rate (t-1)	-0.047 (-0.61)		-0.017 (-0.44)	
Productivity of Capital (t-1)		-0.060 (-1.10)		-0.030 (-1.09)
R ²	0.32	0.32	0.21	0.21
No. of Observations	850	850	850	850

Note: The dependent variable is the change in the ratio of either bank loans to capital stock (for regressions 8.1 and 8.2) or foreign loans to capital stock (for regressions 8.3 and 8.4) over a year in each of 32 manufacturing industries. The estimation is by random effects GLS. Z-statistics are reported in parentheses.

preferentially to the less profitable sectors of Korean manufacturing. However, the negative relationship between profit rate and credit size may not be necessarily an outcome of distortions created by undesirable government regulations or other structural problems in the financial system.²³ For instance, the negative relationship may arise from the fact that profitable firms can more easily finance their investment projects with their own resources, while less profitable firms must rely more on external financing. The allocation of more credit to less profitable sectors can be also justified when credit policy is used to help industries which face temporary financial difficulties but have a potential profit opportunity in future. Then, it is possible that the sectors favored by the cheaper bank and foreign loans, though less profitable at present, could become more profitable in the long run.

We estimate the effects of access to credit on the subsequent evolution of two economic performance measures: the profit rate and the marginal productivity of capital. In order to capture a possible longrun effect of credit allocation on an industry's performance, we constructed the data as a nine three-year sub-periods panel of 32 sectors for the period 1970 to 1996 (1970–72, 1973–75, 1976–78, 1979–81, 1982–84, 1985–87, 1988–90, 1991–93, 1994–96). On this panel, we tested if the previous period's independent variables had any effects on this period's profit rate or productivity of capital. Because all the regressors are included as one—period lagged values, endogeneity problems are minimized.²⁴

The regression results, displayed in Table 9, indicate that although the significance of the coefficient varies across specifications, credit availability has never served to improve the productivity of the chosen sectors. In regressions (9.1) and (9.2) there are strong negative effects from total credit to future profit rates. Bank loans or foreign loans have also negative coefficients. In regressions (9.3) and (9.4) in which the productivity of capital is the dependent variable, either total loans, bank loans or foreign loans have negative, though not

²³It should be noted that because of information asymmetries and contract enforcement problems, even a free market regime does not necessarily allocate investment funds to areas where the marginal productivity of capital is the highest. Banks may care about the probability of loans being repaid, but not about the expected returns on projects. It is not clear, however, how importantly banks consider the risk of projects when they make loans to firms in an economy where the repayment of loans is somehow guaranteed by the government. When the regressions in Table 7 include the standard deviation of profit rate or productivity of capital over the sample period as a measure of risk inherent in each sector, this measure turns out insignificant.

²⁴While this seems a reasonable test, we recognize that this empirical framework does not capture externalities, if any, that may radiate from a favored sector to other sectors. Also, it is possible that the subsidized credit granted to a specific sector generates productivity gains after a period substantially longer than 3 years. But, when we have included two—period (6 years) lagged values of the credit variables in the regressions, the results change little.

Table 9. Effect of Credit Allocation on Profit Rates and Productivity of Capital in 32 Manufacturing Sectors
(9 Sub-periods, Averaged over 3-years, from 1970 to 1996)

Dependent Variable	Profit Rate		Productivity of Capital	
	(9.1)	(9.2)	(9.3)	(9.4)
Lagged Dependent Variable	0.360 (5.58)	0.351 (5.38)	0.477 (9.68)	0.475 (5.38)
Debt/Capital	-0.058 (-2.26)	-0.064 (-2.42)	-0.056 (-1.92)	-0.058 (-1.95)
Total Loans/Capital	-0.047 (-2.19)		-0.020 (-0.74)	
Bank Loans/Capital		-0.038 (-1.54)		-0.015 (-0.47)
Foreign Loans/Capital		-0.060 (-2.28)		-0.026 (-0.81)
R ²	0.54	0.54	0.54	0.54
No of Observations	285	285	285	285

Note: The dependent variable is profit rate (for regressions 9.1 and 9.2) or productivity of capital (for regressions 9.3 and 9.4), averaged over 3-years from the period 1970-96 in each of 32 manufacturing industries. All independent variables are one period lagged (i.e. an average of 1 to 3 years lagged values). The estimation is by random effects GLS. Period dummies are included but not reported. Z-statistics are reported in parentheses.

statistically significant, effects on the productivity of capital. The other clear result is that the sectors with higher debt have been less productive than other sectors.

Although the empirical evidence shows no evidence that credit contributed to subsequent productivity gains, the allocated credit may have nevertheless contributed to growth in the respective sector. To test this proposition, we regress the previous period's flow of credit on per-worker valued added growth and find a positive correlation (Table 10).²⁵ This implies that loans, though allocated less efficiently, have increased output growth of the favored industry. Nevertheless, while the credit policy helped output growth in the favored sectors, it has never been successful in raising efficiency or productivity of investment.²⁶ Hence, the increase in investment and output in the sector that received more credit was coming at the expense of other sectors that have more productive uses for the financial resources.

IV. CONCLUDING REMARKS

Although Korea presented basically none of the traditional imbalances that make debtor countries vulnerable to balance of payments crisis, it still fell into a deep foreign exchange and financial crisis in end-1997. Korea had a moderate level of external debt, a non-overvalued exchange rate, and (at least) balanced budgets. Yet the weak position of the financial sector made Korea vulnerable to the regional turbulence. It is paradoxical that, by the time the crisis hit, Korea had already broken away from a strategy of industrial development supported by directed lending and had been taking steps to liberalize financial markets for several years. But the strategy for financial reform had been timid and slow, and had not encouraged sufficient competition, with the result that financial institutions had taken hardly any action to restructure their loan portfolios and avoid questionable but traditional clients. The empirical results in this paper show, in fact, that it is difficult to discern any change in lending policies of financial institutions after the financial reforms were put under way.

Although government intervention in financial markets may be justified by the existence of externalities and information asymmetries, the degree and nature of the desirable interventions is a difficult question. In most cases, government interventions in financial markets do not remedy market distortions and instead cause different new distortions in credit allocation and pricing. The history of Korea seems to suggest that the costs of heavy controls and repression exceeded the benefits, as for example in the HCI drive of the 1970s. On average, government failure seems to have been greater than market failure in Korea.

²⁵The data on real value added are from Kim and Hong (1996).

²⁶Lee(1996) shows that for the period from 1963 to 1983, government industrial policy and trade protection were negatively correlated to total productivity growth in the Korean manufacturing industries.

Table 10. Effect of Credit Allocation on Output Growth in 32 Manufacturing Sectors
(9 Sub-periods, Averaged over 3-years, from 1970 to 1993)

Dependent variable	Growth Rate of Real Value Added per Workhour	
	(10.1)	(10.2)
Log (Initial Value Added per Work-hour)	-1.167 (-1.91)	-1.695 (-2.42)
Debt/Capital	-0.067 (-0.96)	-0.098 (-1.60)
Total Loans/Capital	0.180 (2.64)	
Bank Loan/Capital		0.114 (1.56)
Foreign Loan/Capital		0.239 (3.10)
R ²	0.13	0.16
No. of Observations	254	252

Note: The dependent variable is growth rate of real value added per workhour, averaged over 3-years from the period 1970-93 in each of 32 manufacturing industries. All independent variables are one period lagged (i.e. an average of 1 to 3 years lagged values). The estimation is by random effect GLS. Period dummies are included but not reported. Z-statistics are reported in parentheses.

Therefore, an immediate agenda for the Korean financial reform should be on strengthening the autonomy of the financial institutions and insulating from government interventions.

REFERENCES

- Bank of Korea. *Financial Statement Analysis*, annual issues.
- Caprio, G., and D. Klingebiel, 1997, "Bank Insolvency: Bad Luck, Bad Policy, or Bad Banking?" *Annual World Bank Conference on Development Economics 1996*.
- Cho, Yoon Je, 1988, "The Effect of Financial Liberalization on the Efficiency of Credit Allocation: Some Evidence from Korea," *Journal of Development Economics* 29, (July), pp. 101-10.
- Cho, Yoon Je, and Joon-Kyung Kim, 1995, "Credit Policies and the Industrialization of Korea," *World Bank Discussion Papers* 286, (Washington: World Bank).
- Choi, Sung-No, 1996, *Analysis of the 30 Korean Big Business Group for 1996*, in Korean, Korea Economic Research Institute.
- Chung, Un Chan, 1994, "Is Financial Deregulation a Panacea?" ed. by Sung Yeung Kwack, *Korean Economy At a Crossroad*, Westport, (Connecticut: Praeger).
- Cole, David C., and Yung Chul Park, 1983, *Financial Development in the Republic of Korea 1945-78*. (Cambridge, MA: Harvard University).
- Corbett, Jenny, and Tim Jenkinson, 1994, "The Financing of Industry, 1970-1989: An International Comparison," *CEPR Discussion Paper*, No. 948.
- Corsetti, Giancarlo, Paolo Pesenti, and Noriel Roubini, 1998, "Paper Tigers? A Preliminary Assessment of the Asian Crisis," mimeo, Yale University.
- Dailami, Mansoor, and E. Han Kim, 1994, "Effects of Debt Subsidies on Corporate Investment Behavior: the Korean Experience," *Pacific-Basin Finance Journal* 2 (March).
- Demirguc-Kunt Ash, and Enrica Detragiache, 1997, "The Determinants of Banking Crises: Evidence from Developing and Developed Countries," IMF Working Paper 97/106 (Washington: International Monetary Fund).
- Goldstein, Morris, and Philip Turner, 1996, "Banking Crises in Emerging Economies: Origins and Policy Options," *BIS Economic Papers*, No.46, Bank for International Settlements.
- Goldstein, Morris, 1998, *The Asian Financial Crisis: Causes, Cures, and Systemic Implications*, Institute for International Economics.

- Hong, Wontack, 1998, "Financing Export-Oriented Catching-Up in Korea: Credit Rationing, Sustained High Growth and Financial Chaos," *International Economic Journal*, 12 (Spring), pp.141-153.
- Hsieh, 1997, "What Explains the Industrial Revolution in East Asia? Evidence from Factor Markets," mimeo, University of California, Berkeley.
- International Monetary Fund, 1997, *World Economic Outlook*, Interim Assessment, (December).
- Jaramillo, Fidel, Fabio Schiantarelli, and Andrew Weiss, 1993, "The Effect of Financial Liberalization on the Allocation of Credit: Panel Data Evidence for Ecuador," *World Bank Policy Research Working Paper* 1092, February, (Washington: World Bank).
- Kaminsky, G., and C.M. Reinhart, 1996, "The Twin Crises: The Causes of Banking and Balance of Payments Problems," Working Paper, Federal Reserve Board.
- Kim, Jong-Il, and Lawrence J. Lau, 1994, "The Sources of Economic Growth of the East Asian Industrialized Countries," *Journal of the Japanese and International Economies*, 8 (September), pp.235-71.
- Kim, Kwang Suk, and Sung Duck Hong, 1997, *Accounting for Rapid Economic Growth in Korea, 1963-1995*, Korea Development Institute.
- Kim, Dong-Won, 1997, "Causes of Financial Crisis: Financial System Approach," in Korean, December, Bank of Korea.
- Kim, Jung Ho, and Sung Duck Hong, 1996, *Long-term Trend of Total Factor Productivity in Korean Manufacturing Sector: 1967-93*, In Korean, Korea Development Institute.
- Krugman, Paul, 1994, "The Myth of Asia's Miracle," *Foreign Affairs*, pp.62-78.
- Krugman, Paul, 1998, "What Happened to Asia?" mimeo (January).
- Kwack, Sung Yeung, 1994, "The Rate of Return on Capital in the United States, Japan, and Korea, 1972-1990," in Sung Yeung Kwack ed. *Korean Economy At a Crossroad*, Westport, Connecticut: Praeger.
- Lee, Jong-Wha, 1996, "Government Interventions and Productivity Growth," *Journal of Economic Growth*, vol 1 ,pp. 391-414.
- Leipziger, Danny M., 1987, *Korea: Managing the Industrial Transition*, A World Bank country study, 2 volumes, (Washington: World Bank).

- Leipziger, D. M., and Peter A. Petri, 1993, "Korean Industrial Policy: Legacies of the Past and Directions for the Future," World Bank Discussion Papers 197, (Washington: World Bank).
- Milesi-Ferretti, Gian Maria, and Assaf Razin, 1998, "Determinants and Consequences of Current Account Reversals and Currency Crises," draft, (Washington: International Monetary Fund).
- Nam Sang-Woo, 1994, "Korea's Financial Reform Since Early 1980s," ed. by Gerald Caprio, Jr., Izak Atiyas, and James A Hansen, *Financial Reform: Theory and Experience*, Cambridge University Press.
- Park, Yung Chul, 1994, "Korea: Development and Structural Change of the Financial System," ed. by Hugh T. Patrick and Yung Chul Park, *The Financial Development of Japan, Korea, and Taiwan: Growth, Repression, and Liberalization*, Oxford University Press.
- Park, Yung Chul, 1998, *Financial Liberalization and Opening in East Asia: Issues and Policy Challenges*, Korea Institute of Finance.
- Park, Yung Chul, and Dong-Won Kim, 1994, "Korea: Development and Structural Change of the Banking System," ed. by Hugh T. Patrick and Yung Chul Park. *The Financial Development of Japan, Korea, and Taiwan: Growth, Repression, and Liberalization*, Oxford University Press.
- Radelet Steve, and Jeffrey Sachs, 1998, "On the Onset of East Asian Financial Crisis," mimeo. Harvard Institute for International Development.
- Schiantarelli, Fabio, Izak Atiyas, Gerard Caprio, John Harris, and Andrew Weiss, 1994, "Credit Where It Is Due? A Review of the Macro and Micro Evidence on the Real Effects of Financial Reform," ed. by Gerard Caprio, Jr., Izak Atiyas, and James A. Hansen, *Financial Reform: Theory and Experience*, Cambridge University Press.
- Stern Joseph J., Ji-hong Kim, Dwight H. Perkins, and Jung-ho Yoo, 1995, *Industrialization and the State: The Korean Heavy and Chemical Industry Drive*, Harvard Institute for International Development and Korea Development Institute.
- World Bank, 1993, *East Asian Miracle: Economic Growth and Public Policy*.
- World Bank, 1998, *East Asia: The Road to Recovery*.
- Yoo, Seong Min, 1998, "Corporate Restructuring in Korea: Policy Issues Before and During the Crisis," mimeo, Korea Development Institute.

Young, Alwyn, 1995, "The Tyranny of Numbers: Confronting the Statistical Realities of the East Asian Growth Experience," *Quarterly Journal of Economics*, 110 (August), pp. 641-80.