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Capital Market Competition in
High-Growth Japan**

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Directed Credit?

Capital Market Competition in High-Growth Japan

by Yoshiro Miwa and J. Mark Ramseyer*

Abstract: Observers routinely claim that the Japanese government during the high-growth 1960s and 70s rationed and ultimately directed credit. It banned investments by foreigners, barred domestic competitors to banks, and capped loan interest rates. Through the resulting credit shortage, it manipulated credit to promote its industrial policy.

In fact, the government did nothing of the sort. It did not bar foreign capital, did not block domestic rivals, and did not set maximum interest rates that bound. Using evidence on loans to all 1000-odd firms listed on Section 1 of the Tokyo Stock Exchange from 1968 to 1982, we show that the observed interest rates reflected borrower risk and mortgageable assets, and that banks did not use low-interest deposits to circumvent any interest caps. Instead, the loan market probably cleared at the nominal rates.

We follow our empirical inquiry with a case study of one of the industries where the government tried hardest to direct credit: ocean shipping. We find no evidence of credit rationing. Rather, we show that non-conformist firms funded their projects readily outside authorized avenues -- so readily that the non-conformists grew with spectacular speed and earned their investors enormous returns.

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"There is no question," writes Krugman (1994: 142), "that before the early 1970s the Japanese system was heavily directed from the top, with the MITI [i.e., the Ministry of International Trade & Industry] and the Ministry of Finance [i.e., the MOF] influencing the allocation of credit and foreign exchange in an effort to push the economy where they liked."

No question, indeed. By standard economic theory, Krugman's Japanese government (and in truth, it is not his Japanese government, for he accurately reflects the secondary literature) would have accomplished a spectacular feat. Throughout the world, governments have shown themselves congenitally unable to ration gasoline, electricity, medicines -- even rice.

Yet by Krugman's account, the Japanese government rationed money with ease. Durable, invisible, fungible by definition, traded in the most fluid of markets, available from anyone with assets of value, and arbitrable on a moment's notice -- because money is all this and more, it should be the hardest asset of all to ration. Notwithstanding, if the standard accounts be true, the Japanese government isolated the economy from foreign funds, suppressed competitors to bank loans, kept interest rates low, and manipulated the resulting credit shortage to route capital as it pleased. Contradicting the most basic lesson of the communist disaster, it embodied a dream-come-true for regulatorily inclined intellectuals.

A dream it was, for the Japanese government managed nothing of the sort. Despite the massive secondary literature detailing the dream as if it were true, the Japanese government did not isolate the market from foreign investment. It did not block firms from raising funds through the stock market, through trade credit, or even through the bond market. It did not keep nominal interest rates at sub-market levels. It did not create a capital shortage, it did not stop arbitrage, it did not ration credit, and it had virtually no say in who invested how much in what. The Japan of the high-growth 1960s and 70s was not a world of directed credit. It was a world where firms raised their funds through decentralized, competitive capital markets.

We begin by surveying the literature on which Krugman and others rely (Section I). We then explain the contours of the actual -- not mythic -- regulatory structure (Section II). Using data on all firms listed on Section 1 of the Tokyo Stock Exchange (TSE; the largest firms), we estimate the supply function for bank loans. We explore the determinants of both interest rates and deposit balances (Section III). Finally, we use the ocean shipping industry to illustrate how the regulations did not bind (Section IV).

I. Tales of Japanese Finance

A. Introduction:

Krugman accurately captures the secondary literature on Japan. Granted, most economically sophisticated scholars have jettisoned the notion that omniscient and omnipotent bureaucrats masterminded the high-growth in 1960s and 70s Japan. Yet even they retain the idea that bureaucrats controlled the allocation of credit. The foreign

exchange controls, bond market restrictions, and interest rate ceilings collectively led to rationing, they reason. Within that rationed environment, bureaucrats determined which firms borrowed and which went without.

B. The Structure of the Controls:

1. The tale. -- Lincoln, Gerlach & Ahmadjian (1998: 324) put the standard account most straightforwardly:

Japanese corporations have been extraordinarily dependent on bank debt as a vehicle for financing investment. This level of concentration in financing sources coupled with the extremely rapid growth of the Japanese economy put enormous pressure on Japanese banks The precarious position of the banks rendered them, in turn, highly dependent on borrowing from the Bank of Japan. The Bank of Japan and the Ministry of Finance were able to leverage this dependence into a high degree of control over the financial sector

In his NBER study, Meerschamper (1991: 206) echoes the tale:

[T]he Japanese financial system, by allowing a complex form of rationed capital allocation within the context of steering and guidance by authorities ..., provided the beneficiaries of the preferential funds [the ability] to embark on growth strategies without having to rely, to a large extent, on impersonal capital markets.

According to Cargill (2000: 39):

[The] financial system was an instrument of industrial policy maintained and protected by mutual support, restraints on competition, and insularity between the domestic financial sector, the Ministry of Finance, the Bank of Japan, and politicians.

These players "assumed a specific set of objectives," he explains (*id.*), like "reindustrialization" and "export-led economic growth." They then accomplished the objectives through "a rigidly regulated and administratively controlled financial system."

2. Foreign exchange. -- Traditionally, observers give several reasons why the government could wield so heavy a hand. First, using its control over foreign exchange, it isolated the Japanese financial market from international competition. Throughout the 1960s, explain Ito & Kiyono (1988: 166-67), the Japanese government exercised "strict control" over foreign direct investment.

Indeed, the regulations themselves did seem labyrinthian in the extreme (Smith, 1984). As Cargill (2000: 40) again puts it, "[f]oreign financial institutions were prohibited or restricted to limited participation in the financial system." Legal scholar Henderson (1986: 132) argues that the Japanese foreign exchange controls helped:

exclude and restrict foreign banking and to shield from international market forces Japan's high savings managed by a controlled banking system, fixed interest rates, and preferential credit allocations (discriminating against small producers and consumers) essential to the large export firms.

In sum, concludes Calder (1993: 35), the exchange controls "gave Japan the crucial freedom to determine its interest rates in isolation from the rest of the world."

2. Domestic limits. -- Second, the government effectively banned most domestic alternatives to bank loans. According to Weinstein & Yafeh (1998: 636), "capital

markets in Japan were highly regulated and immature." Similarly, Calder (1993: 137) asserts that "[s]ecurities markets were not well developed and issuing conditions ... were onerous." Conclude Weinstein & Yafeh (1998: 636), "[f]irms could raise only limited amounts of capital through commercial flotation of debt or equity."

Corporations simply "did not have alternative sources of funding until the mid 1970s," explains Ito (1992: 119). "[T]he domestic securities market was underdeveloped, and loans from abroad were not allowed." Consequently, "Japan's financial system was one of the most regulated and administratively controlled in the world" (Ito, 2000: 95-96). Declare Hoshi & Kashyap (2001: 310) flatly: banks "were the only game in town."¹

3. Interest rates. -- Last, the government suppressed interest rates at artificially low levels. We return to these rates immediately below, but Patrick (1972: 114) reflects the consensus when he asserts that the "interest rate structure [was] extremely inflexible," and that the rates were "set below that which would have resulted solely if market forces had been relied upon to determine them." "It was," he more recently (2001) explained, "a situation of credit rationing." As Hamada & Horiuchi (1987: 236) put it:

The regulation of interest rates has been very comprehensive during the past three decades in Japan. ... [A]t least on the surface, most interest rates in Japan have been rigidly regulated, and price mechanisms do not appear to have been effective in financial markets.

C. "Compensating Deposits":

1. Introduction. -- Although most observers agree about the above, a few argue that banks and firms partially circumvented the loan interest ceiling. Some banks sometimes, they explain, required borrowers to take more than they needed and deposit the "compensating balance" in a low-interest-bearing account at the bank. Through the ploy, they raised the effective interest rate on the loan.

If so, the credit allocation debate turns on the effect of the balances. Did the banks indeed use them to raise artificially low rates closer to market levels? Or did they merely use the balances -- like banks in other countries -- to lower risk by monitoring cash flow patterns at the firm?

2. The debate. -- On the one hand, Hamada & Horiuchi (1987: 236-37) claim that such balances "raised the effective interest rates on bank loans to a level much higher than the regulated nominal rates." In his recent text, Flath (2000: 274) similarly concludes that although "the interest rates on bank loans [were] nominally suppressed," they "were effectively raised toward market-clearing levels by the device of compensating balances."

Yet most scholars assert that at least residual capital rationing remained. In one of the first studies in English on point, Patrick (1972: 116) reasons that "[c]ompensatory deposit ratios probably do not increase effective interest costs sufficiently to restrict

¹ Similarly, Cargill & Yoshino (2000: 214) write that "corporations had no alternatives in the form of domestic money and capital markets or external markets." Pempel (1978: 152) claims that "the virtual absence of a private capital market" made the Bank of Japan "the single tap through which virtually the entire Japanese monetary and credit supply must flow."

demand to the level of supply. Since the price mechanism does not clear most financial markets, the system relies extensively on credit rationing"² More recently, Ueda (1994) reaches similar results: Although "the practice of requiring compensating deposits on loans made the effective interest rate more variable than the official rate, ... the effective interest rate [remained] below market clearing levels in the business loan market."³

3. Rationing. -- Whether the government could allocate credit depends crucially on whether the credit market cleared. If interest rates (either formally or effectively through compensating balances) remained at market levels, anything the government did to shift funds would simply have produced offsetting shifts elsewhere. Because the marginal cost of funds would have stayed at market levels, even loan subsidies would not have affected investment patterns. "Industrial policy" would have remained hollow to the core (Miwa & Ramseyer, 2001b).

Those observers who argue that the interest rates stayed below market-clearing levels usually claim that only firms favored by the government could raise funds. According to Pempel (1978: 153), for example, "credit for firms [was available] only in accordance with broader policies of the Bank of Japan and the government." Likewise, asserts Cargill (2000: 40), "[g]overnment credit allocation policies ... played a major role in allocating funds through intermediation markets."⁴

In this world, the large firms were the favored firms. As Meerscham (1991: 199) puts it, "the authorities [used their] influence to steer the system through a rationed capital market that favored established corporations." By Milgrom & Roberts' (1994: 25) account, "Japan's high national savings rates combined with government restrictions and regulations on financial institutions and financial markets combined to give large, established Japanese firms a lower cost of capital"

The role that the keiretsu corporate groups allegedly played is more mixed. On the one hand, some scholars argue that members could raise funds preferentially. As Nakatani (1988) reasons, "[g]roup financing ... often played a central role" in ensuring that firms had "a stable supply of capital to execute its investment plans." On the other, scholars also claim that the keiretsu preference came at a high price. The powerful banks, they explain, used their control to extract rents. The more a firm depended on a

² In their early work, Ackley & Ishi (1976: 205) thought the point "obvious": "Obviously, the use of rationing instead of price during periods of restriction -- which has been in effect during about 40 percent of the time over the past twenty years -- means that the average rate of interest could be kept considerably lower than it would otherwise have been." Proceeding along the same line, Wallich & Wallich (1976: 251) claimed that "[d]iscrimination among lenders and among borrowers, rationing, and subsidies have been the rule."

³ After surveying the literature, Cargill & Yoshino (2000: 209-10) likewise determine that the government's "objectives were achieved by rigid regulation and administrative control; market forces played only a small role."

⁴ See also Meerscham (1991: 205) (firms who wished to borrow "had to force a consistency between their own goals and those of the authorities"); Ito (1992: 114) ("During the 1950s and the 1960s, the Japanese financial markets were heavily regulated and isolated from the world financial market. ... The monetary authorities explicitly or implicitly fixed most interest rates at low levels. Lending from banks was often rationed. Consumers and small businesses often had difficulties obtaining mortgages and business loans.")

bank, the more vulnerable it was, and keiretsu firms were (the argument runs) nothing if not dependent. Rather than favor their group firms, the banks exploited them. Caves & Uekusa (1976) were the first to make the point, but others -- most prominently Weinstein & Yafeh (1998) -- soon followed.

II. Regulation in the Loan Market:

A. The Overseas Capital Market:

Throughout the 1950s and 60s, the government did “regulate” foreign investment in Japan. It banned it in principle, but subjected the ban to various exceptions. The question is how broadly it allowed the exceptions. After all, rich foreigners were not fighting to park their money in Japan after the war. Within that world, the Japanese government sought less to limit than to encourage foreign investment (Tsusho, 1990: 398).

From 1952 to 1960, foreign firms invested \$1.01 billion. Of that amount, they invested 16 percent as equity and 84 percent as debt. Of the debt, the World Bank loaned 43 percent (the largest amount to electrical utility firms) and the Washington-based EXIM Bank 21 percent. Of the remaining private-sector (i.e., not World or EXIM Banks) loans, 33 percent went to petroleum, 25 to shipping, 18 to electrical utility, 11 to metals, and 6 percent to chemical firms (Tsusho, 1990: 402-10).

By the 1960s, foreigners poured money into Japan at rates that swamped the earlier levels. In 1961 alone they invested \$581 million, in 1963 \$904 million, in 1965 \$549 million, and in 1967 \$880 million (Nihon ginko, 1974: 210). Come the 1970s, they hiked their investment higher still, and increasingly took equity positions: \$3.5 billion in 1969 (71 percent as equity), \$4.3 billion in 1971 (63 percent equity), and even \$2.9 billion in recessionary 1973 (70 percent equity) (id.). By the 1970s, any notion that the Japanese government had insulated the financial market from international competition stood subject to an annual \$3-5 billion exception.

B. The Domestic Capital Market:

1. Equity issues. -- The government never seriously regulated domestic equity issues. Subject to routine corporate (e.g., par value) and securities (e.g., registration) rules, firms could sell stock as they pleased. Granted, the stock they issued often came with preemptive rights to future issues. Yet preemptive issues at submarket prices do not increase the cost of an issue. Although they increase the number of shares necessary to raise a given amount, they do not increase the cost of raising it. Instead, when investors disagree about the market value of existing stock, they simply let the firm raise equity at a price all investors consider fair.

And sell stock the firms did. In 1964, TSE-listed firms raised 531 billion yen through 533 issues, in 1970 681 billion yen through 537 issues, and in 1975 1,001 billion yen through 285 issues.⁵ To be sure, cross-country comparisons typically show much lower leverage among American firms than Japanese. According to the recent consensus, however, the lower U.S. ratios merely reflect (Myers, 2001: 83; see Rajan & Zingales [1995]) “differences in accounting.”

⁵ Tokyo (1985: 110 tab. 37). 1965 was a low-year -- only 122 issues totalling 117 billion yen. In the 1950s and 60s, the Bretton-Woods system pegged the yen at 360 yen per dollar.

In effect, the modern consensus confirms what Kuroda & Oritani (1979) claimed years ago. Although U.S. firms have a book debt/asset ratio of 37 percent (1991 data) where Japanese firms have 53 percent, adjusted for basic accounting differences the ratios fall to 33 (U.S.) and 37 (Japan) percent. Although U.S. firms have a market debt/asset ratio of 28 percent where Japanese firms have 29 percent, adjusted for accounting differences the ratios fall to 23 (U.S.) and 17 percent (Japan) (Myers, 2001). Based on their study of mid-1970s firms, Kuroda & Oritani (1979) had estimated equity/asset ratios of 33.0 percent for U.S. firms and 47.4 percent for Japanese firms. They further calculated intermediated financing ratios of 50.4 percent for large U.S. firms and but only 46.7 percent for Japanese.

2. Bond issues. -- Neither did the government formally restrict the bond market. To be sure, the major banks did try collectively to restrict the firms that could issue bonds. Notwithstanding, companies used bonds to raise enormous amounts. In 1965, TSE-listed firms raised 324 billion yen through 467 bond issues, and in 1970 509 billion yen through 306 issues. By 1975, they raised 1,406 billion yen through 306 straight bond issues, 408 billion through 57 convertible issues, and 372 billion through 52 foreign issues (Tokyo, 1985: 111).

From the institutional investors who elsewhere bought bonds, Japanese firms also borrowed directly. In the U.S., institutional investors like insurance companies traditionally bought most of the bonds firms issued. In Japan, those investors also lent funds to industrial firms directly (Kuroda & Oritani, 1979: 19).

C. The Interest Rate Ceiling:

1. The cap. -- During the 1960s and 70s, banks faced a cap on the interest they could charge their commercial borrowers. They did not face a serious government-imposed cap. At 11.5 to 12.25 percent a year, the legal cap seldom structured commercial loans. Rather, they faced a cap imposed by their own trade association on loans of more than 1 million yen for less than one year. In the mid-1970s, it ranged from 6.75 percent on the lowest risk loans to 8.5 percent for the highest.⁶

It was a bizarre cap. One can imagine lenders trying collectively to impose an interest-rate floor. One can imagine borrowers trying collectively to obtain an interest-rate cap. Why lenders would want a cap is a tougher question.

Perhaps it is also a needless question. For perhaps they imposed no such thing. If the cap bound lenders, observed nominal interest rates should bunch at the mandated level. They did not. Instead, according to Figure 1 they ranged broadly. With their blue-chip customers, the city banks charged modal rates of 6.5 to 6.75 percent and their remaining customers rates of up to 9.75 percent. With their smaller, riskier clients, the regional banks charged modal rates of 8.25 to 8.5 percent, and their remaining customers rates that ranged down to 5.75 percent.

Observed interest rates exceeded the cap because the cap applied only to large, short-term loans. Suppose a bank wanted to lend at rates beyond the cap. First, for a small client it could simply cut the amount of the loan. It could either split it into several

⁶ Nihon ginko (1977: 168). For account overdraws, the rate was 9.5 %. After 1975, the trade association removed itself from the process. Id., at 168-69. See also Kitahara (1970: 70-71).

smaller loans, or lend some of the money and tell the firm to go elsewhere for the rest. Most firms did borrow only 10-20 percent of their debt from their lead lender anyway. Second, it could extend the loan term beyond the 1-year limit. The 1-year loan term was arbitrary, after all. Most banks regularly rolled over short-term loans.

City banks made 60-80 percent of their loans subject to the cap, while regional banks made 50-60 percent (see Table 1). Given the ease with which either could avoid the regulation if they wished, that they nonetheless kept 50-80 percent within the regulatory framework suggests how loosely the regulations bound. Given their lower-risk clients, the city banks made only a third of their loans outside the framework. Given their riskier customers, regional banks made half.

2. “Compensating balances.” -- If banks could freely avoid the cap by adjusting the size or term of a loan, they should not have demanded deposits to adjust the effective interest charge. For the most part, they did not. Given how safe the larger firms were, banks never demanded deposits from them. With the small firms, they largely stopped demanding the balances by the mid-1960s.⁷

In order to reduce risk by letting the lender monitor cash flow, firms might still have routed their transactions through their lending bank. If so, then cap or no cap the higher risk firms would voluntarily have kept deposits at their lead lenders. In the mid-1960s, MOF surveyed the use of “compulsory deposits” at various banks. Starting at the same time but continuing haphazardly through the 1970s, the Fair Trade Commission (FTC) surveyed the use of the balances among smaller firms. We reproduce the two surveys in Table 2. According to Panel A (MOF), the banks used the practice only with the smaller firms, and abandoned it after the mid-1960s. According to Panel B (FTC), banks similarly cut the use of the balances to the smaller firms, but never entirely abandoned them. By 1979, of the FTC's 3,600 respondent firms 20 percent maintained formally compulsory deposits and 35 percent that they maintained informally compulsory deposits (Kosei, 1979: 1-3). The former averaged 1.4 percent of a firm's outstanding debt, and the latter 8.2 percent (*id.*, at 3).

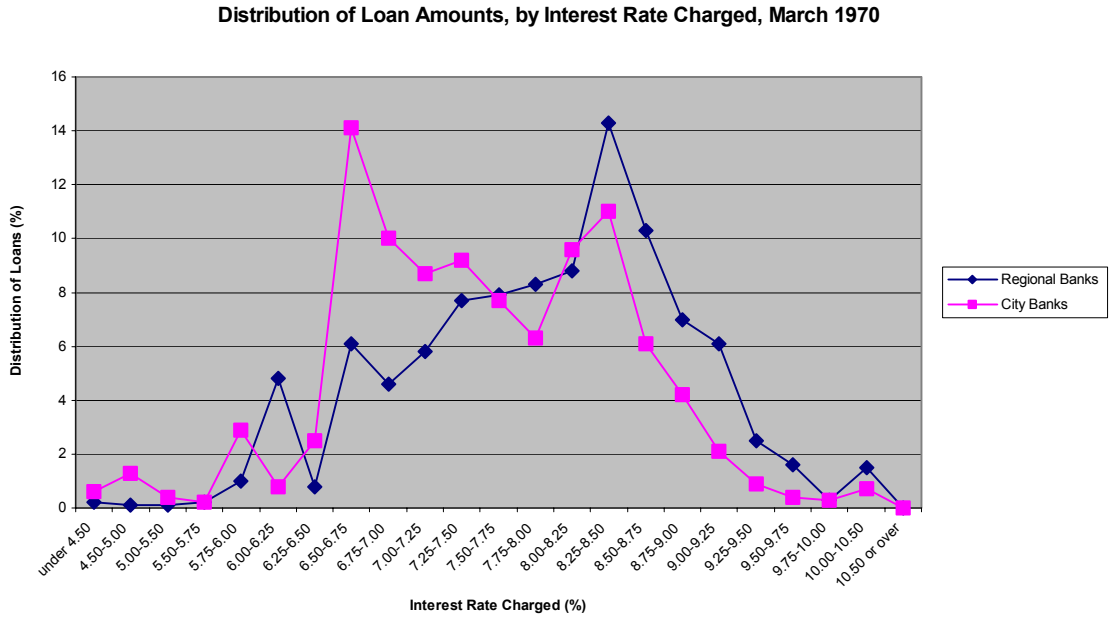
If firms had kept deposits at their lending bank voluntarily, then the level of bank deposits would not have fallen with the 1980s deregulation. If the earlier deposits had been compulsory, however, then they would indeed have fallen during the 1980s. They did not fall. Instead, if anything average deposits/bank-loan ratios (cash and deposits, divided by short- and long-term bank borrowings; in percentages) for large firms (capitalized at 10 billion yen or more) increased:

	1965	1970	1975	1980	1985	1990	1995
All industries	29.9	30.9	29.7	30.5	31.8	42.2	28.2
Manufacturing firms	32.2	33.0	31.9	34.6	47.0	88.3	59.9

(Okura sho, Hojin: various years).

⁷ The appropriate measure of the compensating balances in these surveys is not the “kosoku sei yokin,” but rather the “jishuku taisho yokin.”

Figure 1



Source: Zenkoku chiho ginko kyokai, ed., Kin'yu ginko shotokei [Statistics for Finance and Banking] (Tokyo: Zenkoku chiho ginko kyokai, various years).

Table 1: Regulated and Unregulated Loans

	<u>Tot Lns</u>	<u>Reg'd</u>	<u>Unreg'd</u>	<u>(LT)</u>	<u>(SmA)</u>
<i>A. City Banks</i>					
1960	4,053	70.0	30.0	10.6	17.5
1961	4,875	70.1	29.9	11.4	16.4
1962	5,660	71.6	28.4	11.9	14.5
1963	7,113	71.7	28.3	13.4	12.7
1964	8,513	75.2	24.8	13.4	11.4
1965	9,804	76.1	23.9	13.2	10.7
1966	10,979	75.6	24.4	14.4	10.0
1967	12,398	77.3	22.7	13.3	9.4
1968	13,857	77.4	22.6	13.9	8.7
1969	15,995	76.7	23.3	15.6	7.7
1970	19,118	75.4	24.6	17.9	6.7
1971	22,472	73.7	26.3	20.4	5.9
1972	27,737	69.0	31.0	26.2	4.8
1973	34,703	64.2	35.8	32.1	3.7
1974	39,504	63.9	36.1	33.3	2.8
1975	43,481	63.4	36.6	34.1	2.5
<i>B. Regional Banks</i>					
1960	1,897	52.8	47.2	10.0	34.4
1961	2,346	54.9	45.1	10.2	31.8
1962	2,816	57.5	42.7	10.5	28.9
1963	3,476	58.4	41.6	10.6	27.6
1964	4,269	62.1	37.9	11.8	26.1
1965	4,820	63.2	36.8	12.9	23.9
1966	5,561	63.7	36.3	14.5	21.8
1967	6,597	63.7	36.3	16.4	19.9
1968	7,734	64.5	35.5	17.5	18.0
1969	8,988	64.9	35.1	19.3	15.8
1970	10,015	64.1	35.9	21.6	14.3
1971	11,944	63.6	36.4	23.5	12.9
1972	14,526	60.9	39.1	28.5	10.6
1973	18,348	59.3	40.7	32.4	8.3
1974	21,482	60.8	39.2	32.8	6.4
1975	24,044	60.6	39.4	33.8	5.6

Notes: Tot Lns: Total loans, in billion yen. Reg'd gives the percentage of total loan amounts subject to the interest rate cap. Unreg'd gives the percentage of total loan amounts not subject to the interest rate cap; LT gives the percentage of such amounts not regulated because the stated term was 1 year or longer, and SmA gives the percentage unregulated because the face amount of the loan was 1 million yen or less. For 1960-63, some 1-4 percent of the loan amounts were unregulated because they were both small and long-term.

Source: Zenkoku chiho ginko kyokai, ed., Kin'yu ginko shotokei [Statistics for Finance and Banking] (Tokyo: Zenkoku chiho ginko kyokai, various years).

Table 2: Compulsory Deposits/Loans (in %)

A. Min. of Finance	5/64	11/64	5/65	11/65
City Banks	3.6	1.0	0	0
<i>Large firms</i>	1.7	0.4	0	0
<i>Sm & med firms</i>	9.4	2.7	0	0
Regional Banks	5.1	1.3	0	-
<i>Large firms</i>	3.8	0.6	0	0
<i>Sm & med firms</i>	6.1	1.8	0	-
Mutual banks	13.2	8.3	5.1	2.6
Cooperatives	11.7	6.8	4.1	2.5
B. <u>FTC</u> (<i>Sm & med firms only</i>)	Formally compulsory		Informally compulsory	
1966	14.5		25.1	
1968	9.8		25.3	
1971	8.5		17.6	
1973	4.1		16.8	
1976	2.7		16.8	
1978	1.5		10.3	

Note: The fraction of compulsory deposits to total loans, in percent. In Panel A, we give the results of 4 Ministry of Finance surveys; in Panel B, we give the results of 6 FTC surveys of small- and medium-sized firms.

Sources: Okura sho, ed., **Ginko kyoku nempo [Annual Report of the Banking Bureau]** (Tokyo: Okura sho, 1965, 1966); Kosei torihiki iinkai, ed., **Kosei yokin no jittai [The Reality of Compulsory Deposits]** (Tokyo: Kosei torihiki iinkai, 1979) (31st survey report).

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III. Bank Loans in the Japanese Capital Market

A. The Determinants of Interest Rates:

1. Introduction. -- By standard micro-economic theory, this haphazardly binding institutional framework should not have caused either credit shortages or rationing. To explore what factors did determine the allocation of credit, we assemble a data set of over 1,000 large Japanese firms in the 1970s, and estimate the supply function for bank loans. To date, most empirical studies of the Japanese credit market have used Bank of Japan data to estimate the determinants of average interest rates. Obviously, that tells us nothing about the distribution of credit among firms. By using firm-level data instead, we ask whether the observed credit allocation patterns differ from what one would expect in competitive capital markets.

2. The model. -- To study the determinants of bank loans, we estimate a loan supply function. Toward that end, we begin with a pair of structural equations in which the observed interest rate is a function of both the demand for and the supply of loans:⁸

⁸ The use of a structural model and 2SLS is crucial, as OLS (used for this purpose by, e.g., Caves & Uekusa, 1976) will not disentangle the effects of demand and supply shifts.

$$i_d = f(\text{bank debt, profit volatility, } Q, \text{ sales, industry})$$

$$i_s = g(\text{bank debt, profit volatility, mortgageable assets, leverage, financial shareholdings, keiretsu affiliation})$$

We posit, in other words, that potentially the amount of debt a firm demands at a given interest rate could depend on: the volatility of its performance, its business opportunities (Tobin's Q), its sales (reflecting its transactional demand for cash), and the industry in which it competes. We further posit that potentially the amount a bank supplies at a given interest rate could depend on: the volatility of the firm's performance, the security interests the firm can offer, and its equity cushion (leverage). Arguably, the amount a bank supplies could also depend on the shares it holds in the firm or on the firm's keiretsu affiliation.⁹

Suppose the market for bank loans is competitive and subject neither to rationing nor to disguised interest charges through compensating balances. In such a market, the interest rate at which a bank supplies funds will primarily reflect the volatility of a firm's performance. It may also reflect the steps the bank can take to mitigate that risk, such as obtaining a security interest or providing an equity cushion.

We estimate i_s through two-stage least squares. We include surrogates for Tobin's Q in order to capture the business opportunities a firm faces -- important in determining a firm's demand for funds. Because we lack the data necessary to calculate Q itself, we use two proxies: market capitalization/equity (denominated Surrogate Q) and operating income/total assets (denominated Profitability). To ask whether (as sometimes asserted) bank dominance affects a bank's willingness to lend, we include both the percentage of a firm's shares held by financial institutions, and several measures of keiretsu affiliation.¹⁰ We use a vector of industry dummies to reflect industry-specific variation in demand patterns.

2. Variables. -- We use the means and variance of the financial variables, but calculate them separately for 1968-75 and 1976-82. We do so because the "oil shock" of the mid-1970s divides the period into distinct economic environments. During 1968 to 1975, real GNE in Japan rose 54 percent. By contrast, from 1975 to 1982 it rose only 22 percent (Toyo, 1983).

Tables 4 and 5 report our 2SLS coefficients calculated separately for the two periods. Table 6 reports coefficients calculated using the means for the entire 1968-82 range. Table 3 gives selected summary statistics. We define the following variables.

Interest rate: The ratio of a firm's interest expenses (#103 of the Nikkei NEEDS data base) to the sum of its bank debt (#46, 47, 63), long-term notes payable (#64), bonds (#48, 62), and discounted notes receivables (#142).

Bank debt: The sum of a firm's short- (#46) and long-term (#47, 63) borrowings.

Volatility: The variance of the ratio of a firm's operating income (#95) to total assets (#89).

⁹ In a recent review of corporate financing literature in the 40 years after MM, Myers (2001) reports empirically that debt/equity ratios tend to be lower when a firm is smaller, is riskier, has more intangible assets, and is more profitable. He also finds considerable industry-specific variation.

¹⁰ In Miwa & Ramseyer (2001), we give the genesis of the concept of "keiretsu," and explain why it proxies for nothing of substance.

Mortgageable assets: The ratio of a firm's tangible assets (#21) to total assets (#89).

Leverage: The ratio of a firm's total liabilities (#77) to total assets (#89).

Surrogate Q: The ratio of a firm's stock market capitalization (at the end of a firm's April-March fiscal year) over its equity (#78).

Profitability: The ratio of a firm's operating income (#95) to total assets (#89).

Sales: A firm's net sales (#90).

Financial shares: The fraction of a firm's shares held by financial institutions (#202/#201).

Keiretsu dummies: We calculate three measures of keiretsu affiliation as of 1975. First, we take the roster found in Research on the Keiretsu (Keizai chosa kai, 1976; definition [3], see Miwa & Ramseyer, 2001). This is the roster behind the well-known Nakatani (1984) and Hoshi, Kashyap & Scharfstein (1990, 1991) studies. Second, we look to the groups of firms whose presidents meet occasionally for lunch (Toyo keizai, 1975). These lunch clubs are also more majesterially known as "presidents' councils." Third, we examine main bank affiliation (from id.). We follow scholarly custom in defining the main bank as the bank from which a firm borrows the greatest amount. For a fuller discussion of these definitions, see Miwa & Ramseyer (2001).

Industry dummies: See summary statistics. In general, we rely on regressions over all industries. To check whether manufacturing firms are relevantly different from others, in Table 4 we also report regressions on the manufacturing firms only.

3. The data. -- We assemble our basic financial data from the Nikkei NEEDS data base. We use data on all Tokyo Stock Exchange Section 1 firms (the largest firms) from 1968 to 1982. After dropping firms with 2 years of data or less and extreme outliers, we obtain the sample described in Table 3. We take our keiretsu measures from Keizai chosa (1976) and Toyo keizai (1975). We use stock price data from the Daiwa securities firm (Daiwa).

4. The results. -- (a) Risk. The results largely corroborate our hypothesis that the capital market cleared: interest rates reflect risk, and show no evidence of rationing (see Table 4). According to our basic results, firm volatility strongly predicts the interest rate banks charge for credit. Whether we look at the early period (1968-75) or later (1976-82), whether we look at all industries or only manufacturing firms, and whether we instrument the demand for loans with our proxy for Q or firm profitability -- whatever set of measures we use, the coefficient on firm volatility is consistently positive and statistically significant.

(b) Mortgageable assets. As basic logic predicts, firms with large stocks of mortgageable assets borrow at lower rates. This result, however, is less robust than the results for volatility. It appears only for 1968-75, and only in three of the four Table 4 estimates.

(c) Equity cushion. The impact of a firm's equity cushion (inversely proxied by leverage) on interest rates is non-linear. Initially, an increase in leverage is associated with lower interest rates, but at high leverage levels interest rates again rise. We offer no

explanation for why interest rates would fall with leverage at lower levels. That they would increase at higher leverage levels, however, is exactly what one would expect. The most plausible estimates are those for 1968-75 for the largest sample (Table 4, Panel A): interest rates rise as leverage climbs beyond 89 percent (for all firms) or 84 percent (for manufacturing firms).

Potentially, of course, the level of leverage at a firm will depend on the interest rate the firm must pay to borrow. To address this endogeneity, we re-run our Table 4 regressions without leverage or leverage squared. The crucial results remain largely unchanged: in all the 1968-75 estimates, the coefficient on volatility ranges from 2.1 to 2.5 with a t-statistic between 1.49 and 4.25; in the 1976-82 estimates, it ranges from 0.928 to 1.769 with a t-statistic between 1.41 and 3.43.

(d) Q. By basic finance theory, Tobin's Q is the appropriate proxy for a firm's business opportunities, and the 2SLS estimates in Panel B use our surrogate Q. This presents two problems. First, we have neither the market value of a firm's debt nor the replacement costs of its assets. As a result, our surrogate Q simply measures the ratio of a firm's market capitalization to accounting capital. Second, for the first period (1968-75), we have stock price data only for a minority of the firms. Accordingly, the use of Q dramatically lowers sample size.

Given these problems with our surrogate Q, in Panel A we instrument bank debt with accounting profitability. Largely, this yields results consistent with regressions using surrogate Q (Panel B). To exploit the much larger data base, in our later regressions (Tables 5 and 6) we use profitability.

(e) Bank dominance. Several scholars argue that Japanese banks use their influence over the firms most dependent on them to extract rents through high interest charges. Caves & Uekusa (1976) first made this claim when they purported to show that keiretsu firms faced higher interest rates than independent firms. Weinstein & Yafeh (1998) repeated the claim, and similar assertions appear in such studies as Morck & Nakamura (1990) and Macey & Miller (1995).

In fact, Tables 4 through 6 show nothing of the sort. The more heavily financial institutions have invested in a firm, the lower the interest rate a firm pays. We have no theory about why the interest rate should fall with bank shareholdings. Suffice it to say that the evidence is inconsistent with any claim that banks raise rates at the firms they most dominate.

Neither do banks charge higher interest rates to firms within their keiretsu. Instead, keiretsu affiliation is simply irrelevant. Whichever period one examines and whichever keiretsu roster one uses, the coefficients are almost uniformly insignificant. For reasons we explain in detail elsewhere (Miwa & Ramseyer, 2001), this is exactly what one would expect. Given that keiretsu affiliation proxies for nothing of substance, the correctly estimated coefficient on keiretsu affiliation would be zero. Zero it generally is.

Table 3: Selected Summary Statistics

	1968-75			1976-82				
	n	Min	Mean	Max .	n	Min	Mean	Max .
Interest rate	1003	.022	.086	.468	1094	0	.091	.463
Bank Debt (billion yen)	1022	0	24	871	1138	0	44	1940
Volatility	1022	0	.001	.029	1138	0	.001	.045
Mortgageable assets	1022	0	.277	.857	1138	.002	.232	.832
Leverage	1022	.147	.762	1.154	1138	.124	.746	1.518
financial shares	965	.001	.278	.754	1068	.004	.293	.755
Surrogate Q	267	.06	1.7	8.2	760	.3	2.1	8.7
Profitability	1022	-.331	.081	.554	1138	-.097	.069	.524
Sales (billion yen)	1022	.068	78	5204	1138	.920	165	11100
<u>Keiretsu dummies:</u>		n	mean		n	mean		
1. <u>By Research on the keiretsu</u>								
Mitsui	1022		.081		1137		.073	
Mitsubishi	1022		.108		1137		.097	
Sumitomo	1022		.100		1137		.091	
Fuji	1022		.076		1137		.069	
DKB	1022		.049		1137		.044	
Sanwa	1022		.051		1137		.046	
2. <u>By lunch club membership</u>								
Mitsui	1022		.013		1137		.011	
Mitsubishi	1022		.010		1137		.009	
Sumitomo	1022		.012		1137		.011	
Fuji	1022		.022		1137		.019	
DKB	1022		.023		1137		.021	
Sanwa	1022		.030		1137		.027	
3. <u>By main bank affiliation</u>								
Mitsui	731		.056		736		.056	
Mitsubishi	731		.071		736		.071	
Sumitomo	731		.082		736		.083	
Fuji	731		.078		736		.077	
DKB	731		.093		736		.092	
Sanwa	731		.063		736		.063	
<u>Industry dummies:</u>		n	mean		n	mean		
Construction	1022		.100		1138		.097	
Trade	1022		.100		1138		.121	
Service & finance	1022		.038		1138		.052	
Util & transp	1022		.083		1138		.078	
Light industry	1022		.125		1138		.123	
Chemicals	1022		.157		1138		.149	
Metals	1022		.118		1138		.109	
Machinery	1022		.279		1138		.272	

Sources: Nippon keizai shimbun sha, Nikkei zaimu deeta [Nikkei Financial Data] (NEEDS), on line; Toyo keizai, ed., Kigyo keiretsu soran [Firm Keiretsu Overview], Nov. 1975; Keizai chosa kai, ed., Keiretsu no kenkyu [Research on the Keiretsu] (Tokyo: Keizai chosa kai, 1975); [stock price data.]

**Table 4: Determinants of Interest Rates --
Basic Results, 1968-75 and 1976-82**

A. Using Profitability:

	<i>All industries</i>		<i>Manufacturing only</i>	
	<u>1968-75</u>	<u>1976-82</u>	<u>1968-75</u>	<u>1976-82</u>
Volatility	1.423 (3.25)	2.028 (3.87)	1.618 (2.84)	1.378 (2.36)
Mortgageable assets	-.015 (2.58)	.001 (0.12)	-.009 (0.80)	.018 (1.16)
Leverage	-.305 (5.78)	-.154 (3.01)	-.443 (5.13)	-.156 (2.62)
Leverage squared	.174 (4.67)	.055 (1.53)	.265 (4.36)	.056 (1.35)
Financial shares	-.014 (2.20)	.004 (0.42)	-.017 (1.96)	-.005 (0.43)
Bank debt	.246 (1.37)	.142 (1.17)	1.39 (4.93)	.690 (3.02)
n	948	1026	649	684

Dependent variable: Interest rate.

Instruments of bank debt: Profitability, volatility, sales, industry dummies.

B. Using Surrogate Q:

	<i>All industries</i>		<i>Manufacturing only</i>	
	<u>1968-75</u>	<u>1976-82</u>	<u>1968-75</u>	<u>1976-82</u>
Volatility	2.319 (2.15)	1.368 (2.19)	2.125 (1.65)	1.352 (1.85)
Mortgageable assets	-.080 (3.24)	.001 (0.14)	-.114 (2.98)	.021 (1.16)
Leverage	-.260 (1.72)	-.181 (2.48)	-.520 (1.73)	-.134 (1.38)
Leverage squared	.048 (0.43)	.078 (1.48)	.222 (1.02)	.041 (0.59)
Financial shares	-.060 (2.90)	.003 (0.25)	-.079 (2.75)	-.004 (0.29)
Bank debt (/10 ⁷)	9.30 (5.32)	.079 (0.67)	11.1 (4.83)	.565 (2.43)
n	258	728	196	505

Dependent variable: Interest rate.

Instruments of bank debt: Surrogate Q, volatility, sales, industry dummies.

Notes: The regressions are two-stage least squares, treating bank debt as endogenous. Coefficients, followed by the absolute value of the t-statistics. All regressions include a constant term, not reported here.

Sources: See Table 3.

**Table 5: Determinants of Interest Rates --
The Influence of Keiretsu, 1968-75 and 1976-82**

A. Specific Keiretsu:

	1968-75						1976-82					
Volatility	1.446	(3.03)	1.404	(3.20)	2.112	(4.02)	1.939	(3.68)	2.026	(3.86)	1.902	(3.76)
Mortg'ble assets	-.014	(2.42)	-.015	(2.56)	-.018	(2.77)	.001	(0.08)	.001	(0.11)	-.007	(0.76)
Leverage	-.310	(5.85)	-.304	(5.72)	-.333	(5.00)	-.161	(3.12)	-.154	(2.99)	-.143	(2.61)
Leverage squared	.176	(4.73)	.173	(4.61)	.192	(4.08)	.057	(1.61)	.055	(1.52)	.048	(1.31)
Finan shares	-.017	(2.61)	-.012	(1.91)	-.013	(1.83)	-.000	(0.02)	.005	(0.51)	-.003	(0.29)
Bank debt (/10 ⁷)	.239	(1.33)	.319	(1.60)	.402	(2.21)	.137	(1.13)	.142	(1.09)	.124	(1.16)
<i>Research on the Keiretsu:</i>												
Mitsui	.003	(0.89)					.010	(2.01)				
Mi'bishi	.001	(0.32)					.003	(0.61)				
Sumitomo	.004	(1.49)					.001	(0.19)				
Fuji	.007	(2.21)					.003	(0.60)				
DKB	.003	(0.70)					-.004	(0.64)				
Sanwa	-.000	(0.05)					.002	(0.38)				
<i>Lunch clubs:</i>												
Mitsui			-.002	(0.28)					-.004	(0.31)		
Mi'bishi			-.008	(0.86)					.009	(0.69)		
Sumitomo			-.005	(0.61)					-.004	(0.33)		
Fuji			-.005	(0.87)					-.000	(0.03)		
DKB			-.002	(0.33)					-.002	(0.24)		
Sanwa			-.003	(0.56)					-.005	(0.72)		
<i>Main banks:</i>												
Mitsui					.003	(0.64)					-.000	(0.03)
Mi'bishi					-.002	(0.53)					-.001	(0.13)
Sumitomo					-.005	(1.18)					-.002	(0.51)
Fuji					.002	(0.51)					-.000	(0.04)
DKB					.008	(2.27)					-.005	(1.02)
Sanwa					-.001	(0.15)					-.002	(0.42)
n	948		948		729		1026		1026		721	

Dependent variable: Interest rate.

Instruments of bank debt: Profitability, volatility, sales, industry dummies.B. Grouped Keiretsu:

	1968-75						1976-82					
Volatility	1.455	(3.33)	1.405	(3.21)	2.104	(4.00)	2.035	(3.89)	2.030	(3.87)	1.935	(3.87)
Mortg'ble assets	-.014	(2.50)	-.015	(2.59)	-.018	(2.68)	.001	(0.17)	.001	(0.10)	-.007	(0.80)
Leverage	-.307	(5.82)	-.305	(5.77)	-.346	(5.20)	-.156	(3.03)	-.153	(2.98)	-.140	(2.57)
Leverage squared	.174	(4.69)	.173	(4.65)	.202	(4.29)	.055	(1.53)	.054	(1.51)	.046	(1.26)
Finan shares	-.017	(2.62)	-.012	(1.92)	-.013	(1.73)	.000	(0.02)	.005	(0.53)	-.002	(0.25)
Bank debt (/10 ⁷)	.237	(1.33)	.301	(1.58)	.222	(1.20)	.142	(1.18)	.157	(1.24)	.125	(1.18)
Any ROK	.003	(1.71)					.003	(1.03)				
Any lunch club			-.004	(1.20)					-.002	(0.54)		
Any main bank					.001	(0.58)					-.002	(0.72)
n	948		948		729		1026		1026		721	

Dependent variable: Interest rate.

Instruments of bank debt: Profitability, volatility, sales, industry dummies.

Notes: The regressions are two-stage least squares, treating bank debt as endogenous. Coefficients, followed by the absolute value of the t-statistics. The data include all industries. All regressions include a constant term, not reported here.

Sources: See Table 3.

Table 6: Determinants of Interest Rates -- 1968-82

Volatility	2.637 (5.44)	2.652 (5.47)	2.649 (5.47)	2.637 (5.44)
Mortg'ble assets	-.013 (1.64)	-.013 (1.60)	-.013 (1.62)	-.014 (1.66)
Leverage	-.217 (3.21)	-.217 (3.22)	-.217 (3.22)	-.216 (3.19)
Leverage squared	.095 (1.99)	.095 (1.98)	.095 (2.00)	.095 (1.98)
Finan shares	-.004 (0.44)	-.007 (0.81)	-.006 (0.70)	-.003 (0.38)
Bank debt (/10 ⁷)	.206 (1.24)	.205 (1.24)	.163 (0.94)	.205 (1.24)
Any ROK		.003 (1.10)		
Any lunch club			.005 (1.17)	
Any main bank				-.001 (0.27)
n	1044	1044	1044	1044

Dependent variable: Interest rate.

Instruments of bank debt: Profitability, volatility, sales, industry dummies.

Notes: The regressions are two-stage least squares, treating bank debt as endogenous. Coefficients, followed by the absolute value of the t-statistics. The data include all industries. All regressions include a constant term, not reported here.

Sources: See Table 3.

B. Determinants of Bank Deposits:

1. Introduction. -- Turn then to the factors that best predict the amount of deposits a firm will keep. As noted earlier, many observers claim that Japanese banks routinely demanded deposits to raise the effective interest rate they charged on their loans. According to the very documents on which these observers rely, however, banks never demanded deposits from large firms -- and our sample (TSE Section 1 firms) includes only large firms.

Suppose, however, that banks did demand deposits to raise interest rates. All else equal, deposits should be positively associated with three sets of variables: with loan interest rates, with the amount of bank debt, and with keiretsu affiliation and bank shareholdings. First, deposits would be positively associated with interest rates because banks would disproportionately demand them from firms facing the regulatory interest cap. By contrast, we hypothesize (i) that deposits help a bank monitor a debtor's performance, (ii) that deposits partially substitute for mortgages, and (iii) that higher interest rates raise the cost of holding large deposits. For all these reasons we predict that deposits will be negatively associated with observed interest rates.

Second, if banks demand deposits to raise interest rates, deposits would also be positively associated with debt levels. After all, a bank would need a bigger deposit to raise the effective interest rate on a bigger loan. By contrast, we predict no relation between deposits and loans.

Third, if (as the conventional wisdom asserts) banks exploit those firms most dependent on them, they would exploit firms in their keiretsu and in which they have large equity stakes. If so, then financial shareholdings and keiretsu affiliation would both be positively associated with deposit levels. By contrast, for the reasons discussed earlier we expect no relation between deposits and these variables.

In addition, observed interest rate held constant, we predict that the size of deposits will be associated: (i) positively with sales, since sales amounts reflect the transactional demand for cash; (ii) negatively with the supply of mortgageable assets, since deposits partially substitute for mortgages; and (iii) positively with the volatility of firm performance, again since deposits partially substitute for mortgages (and volatile firms stand to gain the most from providing mortgages).

2. The model, data and variables. -- We employ a simple OLS model:

Deposits = h (interest rate, bank debt, mortgageable assets, sales, volatility, financial shareholdings, keiretsu affiliation)

We use the same data sets we used above, but normalize the relevant variables by firm size. We define the following variables:

Deposits/assets: The ratio of a firm's cash and deposits (NEEDS, #3) to total assets (#89).

Interest rate: As defined above.

Bank debt/assets: The ratio of a firm's bank debt (#46, 47, 63) to total assets (#89).

Mortgageable assets/assets: The ratio of a firm's tangible assets (#21) to total assets (#89).

Sales/assets: The ratio of a firm's net sales (#90) to total assets (#89).

Volatility, Inter rate, Financial shares, Keiretsu and industry dummies: As defined above.

3. Results. -- As we expected, the results in Table 7 indicate that banks did not use "compensating deposits" to raise effective interest rates. Instead, deposit levels are negatively and significantly associated with observed interest rates in all specifications. Only insignificantly are they associated with bank loan levels. The results also suggest that deposits substitute for mortgageable assets: the coefficients on mortgageable assets are consistently and strongly negative, while the coefficients on volatility are positive (though only haphazardly significant). The coefficients on sales remain a puzzle: positive for 1968-75 as predicted, but negative for 1976-82.

The coefficients on shareholdings by financial institutions are significantly negative -- rebutting the claim that banks used their power to extract rents. The coefficients on the keiretsu dummies similarly rebut the claim that banks used their power to extract rents from group firms: no matter what definition we use, the coefficients are either negative or insignificant.

Table 7: Determinants of Bank Deposits

A. 1968-75	<u>Manufac. only</u>		<u>All industries</u>		
Interest rate	-.238 (3.49)	-.161 (2.50)	-.197 (3.13)	-.207 (3.34)	-.175 (2.68)
Bank debt/asts	.019 (1.18)	.017 (1.32)	.005 (0.37)	.009 (0.70)	-.008 (0.55)
Mortg/assets	-.154 (7.78)	-.131 (9.64)	-.148 (10.81)	-.150 (11.12)	-.143 (9.81)
Sales/assets	.023 (3.67)	.011 (2.64)	.007 (1.54)	.008 (1.77)	.007 (1.50)
Volatility	2.931 (3.21)	2.208 (2.63)	.911 (1.08)	.755 (0.91)	.520 (0.57)
Finan shares			-.074 (6.19)	-.063 (5.37)	-.068 (5.53)
<i>Research on the Keiretsu:</i>					
Mitsui			-.024 (3.93)		
Mitsubishi			-.002 (0.28)		
Sumitomo			-.008 (1.45)		
Fuji			-.002 (0.35)		
DKB			-.010 (1.33)		
Sanwa			-.018 (2.44)		
<i>Lunch clubs:</i>					
Mitsui				-.047 (3.32)	
Mitsubishi				-.050 (3.10)	
Sumitomo				-.042 (2.83)	
Fuji				-.033 (2.97)	
DKB				-.024 (2.26)	
Sanwa				-.032 (3.48)	
<i>Main banks:</i>					
Mitsui					-.011 (1.48)
Mitsubishi					.009 (1.25)
Sumitomo					.001 (0.09)
Fuji					.007 (1.03)
DKB					.002 (0.24)
Sanwa					-.008 (1.10)
n:	678	1003	948	948	729

Table 7: Determinants of Bank Deposits (Continued)

B. 1976-82	<u>Manufac only</u>	<u>All industries</u>			
Interest rate	-.180 (3.73)	-.092 (2.09)	-.132 (3.03)	-.136 (3.18)	-.120 (2.16)
Bank debt/asts	.010 (0.74)	-.004 (0.32)	.004 (0.35)	.009 (0.77)	.003 (0.24)
Mortg/assets	-.140 (7.02)	-.135 (9.45)	-.148 (10.56)	-.148 (10.73)	-.129 (7.93)
Sales/assets	-.007 (1.40)	.002 (0.52)	-.007 (2.17)	-.007 (2.01)	-.007 (1.71)
Volatility	1.387 (2.05)	1.631 (2.27)	.817 (1.17)	.672 (0.98)	.428 (0.61)
Finan shares			-.068 (5.53)	-.053 (4.50)	-.058 (4.22)
<i>Research on the Keiretsu:</i>					
Mitsui			-.016 (2.43)		
Mitsubishi			.001 (0.11)		
Sumitomo			-.008 (1.28)		
Fuji			.005 (0.71)		
DKB			-.012 (1.49)		
Sanwa			-.018 (2.30)		
<i>Lunch clubs:</i>					
Mitsui				-.043 (2.82)	
Mitsubishi				-.055 (3.30)	
Sumitomo				-.036 (2.38)	
Fuji				-.035 (3.11)	
DKB				-.027 (2.40)	
Sanwa				-.034 (3.49)	
<i>Main banks:</i>					
Mitsui					.002 (0.29)
Mitsubishi					.013 (1.73)
Sumitomo					-.002 (0.32)
Fuji					.007 (1.06)
DKB					-.000 (0.03)
Sanwa					-.006 (0.82)
n:	710	1094	1026	1026	721

Dependent variable: Deposits/assets

Notes: The regressions are ordinary least squares. Coefficients, followed by the absolute value of the t-statistics. All regressions include a constant term and industry dummies, not reported here.

Sources: See Table 3.

IV. Credit Rationing in Ocean Shipping

A. The Programs:

To give context to the institutional detail and econometric results, consider what happened in one of the industries where the Japanese government tried hardest to ration credit. More specifically, consider finance patterns among the ocean shipping firms during the heyday of Japan's rapid economic growth. The war had left shipping firms decimated, and the government apparently decided to help them rebuild. Toward that end, it aggressively tried to manipulate investment. Although it started during the occupation, it tried even harder during the mid-1960s.

The shipping industry did grow. Given the custom of registering ships in nominal places like Panama or Liberia, national capacity can be hard to estimate. Still, from 1955 to 1975, Japanese-flag capacity increased from 4 million tons to 40. By 1975, no country except Liberia with its 66 million tons could claim more.¹¹

To the shipping and shipbuilding firms the government did offer massive subsidies. From 1961 to 1970, it routed the shipping firms 33.7 percent of all Japan Development Bank (JDB) loans. To shipbuilding firms preparing vessels for export, it routed 48.3 percent of all Export-Import Bank (Ex-Im Bank) loans.¹² According to Horiuchi & Otaki (1987: 128), during the early years of the decade shipping firms obtained over half their capital investment from the government. Only coal mining firms kept their dependence levels higher.

By these loans, the government transferred enormous wealth. The JDB raised its funds (through the Ministry of Finance's so-called "Fiscal Investment & Loan Program") from government-run financial institutions like the postal savings system. It then lent the funds to private firms at 6.5 percent (Nihon senshu, 1970: 177). To shipping firms on approved projects, it lent 60-80 percent of the cost of a ship, and spread repayment over 11-13 years (Nihon senshu, 1970: 166, 173).

The subsidies did not stop there. First, the government used the general budget to cut the cost of JDB loans further. For much of the 1960s, it forgave 2.5 percent of the 6.5 percent interest, and charged shipping firms only the remaining 4 percent (Nihon senshu, 1970: 177-78). Second, it informally guaranteed private-sector loans for the rest of the cost of a ship. In exchange, the banks loaned shipping firms the necessary funds at 8.4 to 9.1 percent, and extended repayment over 8 years.¹³

Third, usually the government paid 2-3 percent of the stated interest on the private-sector loans. As a result, shipping firms borrowed from private banks at 6 to 7.1

¹¹ Nihon senshu (various years). Other countries in 1975 -- U.K.: 33 million tons; Norway: 26 million tons; Greece: 23 million tons; U.S.S.R.: 19 million tons; U.S.A.: 15 million tons.

¹² Nihon zosen (1980). The annual ratios of shipping firm loans from the JDB ranged from 17.8 % (1962) to 44.7 % (1965). The mean of the annual ratios was 31.8 %. Over the decade, annual total loans by the JDB averaged 204 billion yen. The annual ratios of shipbuilding firm loans from the Ex-Im Bank ranged from 40.8 % (1961) to 58.4 % (1964). The mean of the annual ratios was 48.6%. Over the decade, annual total loans by the Ex-Im Bank averaged 247 billion yen.

¹³ Nihon senshu (1970: 166). Eight years from delivery of the ship. The terms were determined through negotiations between the bank trade association and the government. For details of the negotiations, see Ginko kyokai (1965: 347-67).

percent net.¹⁴ In effect, those who complied with the government program borrowed most of the cost of a ship from the JDB at 4 percent, and the remainder from private banks at 6-7 percent.

Last, if financially troubled, the government let shipping firms defer repayment even beyond the (already generous) contractual terms. When shipping firms found themselves in distress after the Suez Canal reopened in the late 1950s, for example, it deferred their JDB obligations. It then induced private banks to allow similar deferrals.

B. Sanko:

1. The issue. -- If the program's structure is clear, its effect is less so. Reflecting the standard wisdom, Hoshi & Kashyap (2001: 159) argue that the program enabled the government "tightly [to] regulate[] the number of new vessels that could be produced each year." Yet to do so the government would have needed both (i) to stop firms from borrowing at market rates on non-approved projects, and (ii) to stop them from arbitraging funds from approved projects to the non-approved.

If the government could stop both unapproved loans and arbitrage, it had at least a shot at regulating investment. If not, it would seldom have affected a firm's returns on its marginal investments (Miwa & Ramseyer, 2001b: 196-97). Not changing marginal calculations, it would seldom have affected either the level or direction of investments. Not affecting output, for better or worse it would not have implemented any "industrial policy."

So -- could the government stop unapproved loans and arbitrage?

2. The strategy. -- Among the shipping firms, none was more outspoken than the Sanko steamship firm. Before the early 1950s, Sanko had taken government subsidies and complied with government mandates. In the mid-1950s, however, it decided to go it alone. Rather than take and comply, it would raise its own funds and follow its own plans. While its rivals stayed within the government's orbit, it repaid its JDB loans and turned exclusively to private capital (Table 8, Panel D).

In Sanko's eyes, the subsidies brought too much control. Loans always come with terms, of course -- whether in Japan or in the U.S., whether from the government or from private banks. Sanko was willing to accept the terms private creditors and investors imposed. It was not willing to accede to the government's.

For Sanko, the government loans presented several problems. First, the government claimed to be rebuilding the industry to its pre-war glory. Because regular, scheduled freight liners had been central to the industry pre-war, it focused the post-war program on liners as well. As Sanko saw it, though, the industry had shifted. The future lay not with standard liners, but with industry-specific ships like oil tankers, operating on shipper-specific schedules. If it accepted the subsidies, it would need to focus on a sector it no longer saw as central.

Second, for its loans the government imposed a lengthy and uncertain application process and offered only year-by-year clearance. Again as Sanko saw it, to meet its clients' requirements it needed to be able to plan over several years. Rather than apply

¹⁴ Nihon senshu (1970: 176-79). The subsidies called for partial repayment if profits/capital exceeded 10 % (id., at 167).

annually for funds it might or might not obtain, it needed to be able to work with its clients on an on-going basis.

Third, through the JDB loan terms the government obtained a veto over any new projects at the firm. To Sanko, this posed trouble on two fronts. On the one hand, in order to help the industry earn monopoly rents, the government often wanted to block construction just when Sanko -- as industry renegade -- wanted to expand. On the other, the government wanted Sanko under the control of (and perhaps as a mere division of) a larger, more compliant shipping firm. To reduce competition, it had decided to consolidate the industry into six firms (or firms under the control of the six), and Sanko was not to be one of the six. Whenever possible, it now wanted to stop Sanko from expanding.¹⁵

3. The results. -- Sanko jettisoned the government subsidies all the way to the bank. It had opened the 1950s with virtually nothing. It closed the 1960s as the most profitable firm in the industry. During the last half of the decade, it earned shareholder returns of 32 percent a year, and by the early 1970s 62 percent (Table 8, Panel E). Its closest rival during the late 1960s was Showa, but it earned only 17 percent and in the early 1970s only 32 percent. Its closest rival during the early 1970s was Japan Lines, but it earned only 50 percent and in the late 1960s only 9 percent.

OPEC transformed the industry in 1973 (more on this in Subsection D, below), but by then Sanko had grown from the sixth ranked firm (in 1964) to the very largest. From a stock-market capitalization of 3.59 billion yen in 1964, it had boomed to 514 billion yen by 1973, three-times its nearest rival (Table 8, Panel A). Despite making no "approved" vessels, it commanded a shipping capacity second only to Japan Lines (Table 8, Panel B). Despite refusing to participate in the government's loan program, it serviced the third largest debt in the industry (Table 8, Panel C).¹⁶

First, it did government policy, Sanko raised funds straightforwardly. First, it sold stock and retained its earnings. In 1952, it had had paid-in capital of only 420 million yen. By 1956, it had 1,300 million yen, by 1964 4,700 million yen, and by 1974 31,000 million (Kaisha nenkan, 1960; Sanko, 1968; Kyoiku sha, 1980: 76).

Second, it leased. From 1963 to 1971, Sanko increased the number of ships it controlled from 13 to 108. It did not buy them all. Instead, about half of the 108 it leased (Sanko securities filings). Depending on the contractual terms, leasing can have identical economic effects as borrowing. For Sanko, the identity presented a standard financing strategy.

Third, it borrowed. On the one hand, Sanko borrowed from banks. Sometimes it borrowed from a single bank, sometimes from multiple banks (Sanko securities filing, Mar. 1961: 496 et seq.). Generally, it arranged for its client -- the firm on whose behalf it would eventually operate the ship -- to guarantee its business (Sanko, 1968: 99).

¹⁵ The government also pressured private banks not to fund Sanko. Through their trade association, the banks had agreed to report any new loans they made to shipping firms to the association. Now the government could urge them not to fund non-conformist firms like Sanko.

¹⁶ Nor was it just quantity. It was quality too. Throughout the period, Sanko relentlessly upgraded its fleet, selling unprofitable ships, and modernizing and automating what it kept (Kyoiku sha, 1980: 32-33).

On the other, Sanko negotiated deferred payments to the builders from which it bought its ships (Sanko securities filings, Sept. 1966: 14). The trick involved arbitrage. Even if the government could discourage banks from lending directly to Sanko, it did not try to prevent banks from lending to shipbuilding firms that sold to Sanko. If those firms then let Sanko defer its payments to them, they effectively arbitrated their own credit. Suppose a firm obtained a subsidized loan through the Export-Import Bank to sell ship A abroad. If it then deferred payment on the ship B it sold Sanko, it even arbitrated the government loan on the exported ship.

The moral is simple. During the 1960s, the government intervened heavily in the ocean shipping industry. It intervened for a specific purpose (rebuild the industry), and offered compliant firms massive subsidies (low-cost loans). Throughout the decade, it did what it could to run Sanko out of business: it paid competitors subsidies, but not Sanko; it lent competitors money, but not Sanko; it encouraged private banks to lend to competitors, but not to Sanko. Ever the non-conformist, Sanko flouted all this to spectacular success. By the early 1970s it had raised enough funds to catapult itself into preeminence, and generated high enough profits to earn its investors huge returns.

Table 8: Relative Performance of Shipping FirmsA. Stock Market Capitalization (in million yen):

	1964	1968	1973	1978
Sanko	3,591	6,615	514,062	163,697
*NYK	18,104	28,908	146,439	162,383
*Mitsui OSK	11,004	26,800	112,800	109,435
*Japan Lines	11,099	14,406	153,731	83,580
*Kawasaki	7,740	17,280	101,655	45,098
*Yamashita	2,740	7,905	45,540	34,425
*Showa	2,160	6,750	29,160	24,300
Shinwa	1,427	3,600	15,012	22,194
Daiichi	1,000	2,320	5,400	12,240
Iino	2,924	3,456	14,688	13,920

Notes: In Panels A-C, we use 1964 data rather than 1963 because of mergers in 1964 between listed and unlisted firms (about which data are not available).

* Firms designated as "core" firms under government policy. The government hoped to consolidate the industry around these six.

B. Capacity (Number of Ships, 1000 tons):

	1964		1968		1973		1978	
Sanko	13	280	53	1,858	173	12,255	305	24,637
NYK	172	1,925	261	4,993	299	10,867	305	12,321
Mitsui OSK	245	2,548	289	4,738	291	10,372	282	10,058
Japan Lines	102	1,493	129	3,123	259	15,673	238	19,745
Kawasaki	135	1,684	189	4,246	206	7,775	199	9,970
Yamashita	127	1,143	130	2,971	190	8,688	178	8,795
Showa	53	844	70	1,754	123	4,756	138	5,905
Shinwa	84	555	122	1,377	131	4,376	155	4,979
Daiichi	64	436	97	1,346	129	3,800	133	3,635
Iino	52	558	55	1,119	58	2,447	74	2,564

Notes: For reasons of data availability, the 1964 data in Panel B reflect mid-year data rather than end of year data as elsewhere,.

C. Debt (Long-term, Short-term; in million yen;):

	1964		1968		1973		1978	
Sanko	3,247	1,594	19,719	7,282	109,368	43,820	183,628	64,156
NYK	31,114	10,661	92,241	13,660	175,963	49,604	119,104	118,281
Mitsui OSK	34,767	23,521	71,864	11,527	143,881	50,511	102,509	90,938
Japan Lines	21,078	9,661	56,779	9,332	106,810	26,581	58,494	56,238
Kawasaki	27,244	14,260	67,898	10,064	91,300	25,737	97,830	41,901
Yamashita	15,605	16,671	47,173	6,412	70,024	18,682	43,793	26,549
Showa	9,458	9,379	31,238	3,077	59,726	9,346	45,255	19,729
Shinwa	8,936	3,078	17,397	2,096	32,277	5,207	23,916	11,088
Daiichi	1,264	2,223	18,790	1,204	30,590	4,613	19,079	9,298
Iino	7,307	8,178	1,659	1,360	20,349	3,551	23,219	8,331

Table 8 (Continued)D. Composition of Bank Debt (% JDB, Name of and % Borrowed from Other Principal Creditor):

	1965			1970			1975		
Sanko	0	Dw	34	0	LTCB	13	0	LTCB	9
NYK	73	Mb	5	76	IBJ	4	59	Mb	10
Mitsui OSK	65	NA		75	IBJ	5	61	IBJ	6
Japan Lines	66	IBJ	9	77	IBJ	5	53	**	7
Kawasaki	65	NA		67	NA		61	IBJ	8
Yamashita	68	Sw	11	78	IBJ	4	68	Sw	7
Showa	61	IBJ	8	77	LTCB	6	67	LTCB	7
Shinwa	58	IBJ	17	77	IBJ	8	74	IBJ	8
Daiichi	57	Smt	16	80	IBJ	5	76	IBJ	5
Iino	45	*	19	80	IBJ	5	70	IBJ	7

Notes: Dw: Daiwa; Mb: Mitsubishi Bank; NA: information not available; IBJ: Industrial Bank of Japan; Sw: Sanwa Bank; Smt: Sumitomo Bank; LTCB: Long-term Credit Bank; * Kawasaki Shipbuilding; ** Bank of America.

E. Annual Shareholder Rate of Return:

	1955-60	1960-65	1965-70	1970-75
Sanko	6.1	10.5	32.0	61.5
NYK	1.8	7.5	11.9	25.1
Mitsui OSK	-0.9	4.5	8.6	25.9
Japan Lines	8.6	5.3	9.4	49.6
Kawasaki	3.5	10.5	12.4	27.4
Yamashita	5.4	-3.5	12.9	33.9
Showa	5.2	0.6	16.6	31.9
Shinwa	-2.6	-2.7	13.8	38.9
Daiichi	N.A.	N.A.	6.9	17.8
Iino	2.0	-24.9	6.9	33.0

Sources: Nihon shoken keizai kenkyu jo, ed., Kabushiki toshi shueki ritsu [Rates of Return on Common Stock] (Tokyo: Nihon shoken keizai kenkyu jo, various years).

C. Tanker Firms:

Nonconformity neither started nor stopped with idiosyncratic Sanko. Sanko may have been the most visible shipping firm to buck national shipping policy, but it was hardly alone. If it questioned the government's unwillingness to promote tankers, so did many petroleum refining firms. Rather than defer to national policy, some bought their own tankers or formed transportation subsidiaries that did.¹⁷

Through such policies, the refining firms integrated vertically into transportation. Sometimes, they bought the tankers in conjunction with foreign firms. These foreign firms could borrow abroad, of course. Arbitrage being what it is, Japanese firms that entered joint ventures with them could finance both their refineries and tankers abroad.

Take Tokyo tankaa (Tokyo Tanker), the first of the specialized tanker firms (Nihon sekiryu, 1982). The Nisseki refining firm had formed a joint venture with Caltex in 1951. That joint venture (it bought a 64 percent interest) then teamed up with Nisseki (4 percent) and Koa Petroleum (32 percent) to form Tokyo Tanker in 1952. Initially, Tokyo Tanker leased a ship from the joint venture itself. By 1956, it began building its own fleet. For its first vessel, it borrowed \$4 million from the First National City Bank of New York. It borrowed another \$5 million from First National in 1958, and \$5 million from Chase Manhattan in 1959.

Internationally, vertically integrated tanker operations were the norm (Okaniwa, 1981: 125), and Nisseki had close ties to Caltex. Yet within Japan even petroleum firms not tied to foreign firms borrowed abroad and bought their own tankers. From 1955 to 1963, the independent Idemitsu kosan firm borrowed \$56 million from Bank of America and Esso (\$6 million of that for tanker capacity). Independent Maruzen sekiryu borrowed \$61 million from the Bank of America, Unoco, and Continental Illinois (also \$6 million for tankers). And independent Daikyo sekiryu, Nihon kogyo, and Shin Ajia sekiryu each borrowed lesser amounts abroad (Sangyo keikaku, 1965: 71-73). Indeed, from 1960 to 1963, only 16 of the 41 tankers built were funded by the government, and 11 were funded abroad (Tonen, 1979: 315).

The petroleum refining firms built considerable transportation capacity. By 1978, Tokyo Tanker had 8 tankers carrying 749 thousand tons. Idemitsu (with its own tanker subsidiary) owned 10 tankers (1,200 thousand tons), Daikyo (also with a tanker subsidiary) owned 3 (189 thousand ton), and Maruzen 2 (46 thousand ton). The firm with the most tanker capacity, however, remained the Sanko shipping firm: 23 tankers carrying 2.6 million tons (Nihon tankaa, 1980: 220-21).

In Table 9, we detail the shipping capacity firms developed outside government policy. Of all new ships in 1965, they produced 36 percent (18 percent of total capacity) beyond the official programs. Like Sanko, they apparently found no financing barriers they could not circumvent. To fund these ships, they borrowed 15 percent from banks, 41 percent from trading partners (such as shipbuilding firms), and 26 percent abroad (Nihon senshu, 1970: 172-73; Ginko kyokai, 1965: 361).

D. The Oil Embargo:

¹⁷ Refineries affiliated with foreign firms used tanker subsidiaries because Japanese law prohibited the ownership of Japanese flag vessels by firms with foreign national directors. See Senpaku ho [Ship Act], Law No. 46 of 1899, § 1.

Come OPEC, all this changed. Facing radically higher oil prices, western firms now cut the amount of oil they consumed -- and, hence, shipped. They also began looking harder for oil outside of the Middle East -- and further cut the amount they shipped. Firms that had invested heavily in tankers suffered, and Sanko as much as any. By 1985, it filed for bankruptcy. Ex post, it had gambled and lost. Gambles that go bad ex post can still be good ex ante, of course. At least investors seem to have thought Sanko a good gamble ex ante. And in losing ex post, Sanko was also in good company. Even the government-favored firms lost heavily. Among the government's annointed six, Japan Lines had failed and been acquired by Yamashita by 1988.

Good or bad ex ante, Sanko's gamble was one in which it had been able to indulge. It was not a gamble the capital market stopped. Neither was it a gamble the government prevented. Competitive capital markets will usually route entrepreneurs the funds they need for sensible gambles. Often, they will route them the funds for foolish gambles too. Sensible or foolish, Sanko's gamble was one the market funded amply indeed.

Table 9: Government Approved and Independently Produced Vessels, 1961-73

	<i>Government approved ships</i>					<i>Indep ships</i>		<i>Gov/Tot</i>
	<u>Production</u>		<u>Financing</u>			<u>Production</u>		
	<u>No</u>	<u>Cap</u>	<u>Gov</u>	<u>PB</u>	<u>Eq</u>	<u>No</u>	<u>Cap</u>	
1961	27	498	.54	.56	0	42	581	.46
1962	13	393	.71	.29	0	15	209	.65
1963	18	567	.77	.23	0	15	170	.77
1964	41	1,209	.78	.22	0	32	424	.74
1965	65	1,825	.77	.23	0	36	405	.82
1966	75	1,909	.76	.24	0	69	483	.80
1967	56	2,033	.76	.24	0	72	809	.72
1968	57	2,308	.77	.23	0	128	841	.73
1969	57	2,747	.62	.28	.10	161	1,191	.70
1970	45	2,624	.61	.30	.09	118	1,162	.69
1971	41	3,218	.53	.30	.17	192	3,706	.46
1972	37	3,304	.52	.30	.18	115	1,307	.72
1973	25	1,985	.49	.32	.19	115	4,396	.31

Notes: No: Number of ships built. Cap: capacity of ships built, in 1000 tons. Gov: fraction of shipbuilding costs funded by government loans. PB: fraction of shipbuilding costs funded by loans from private banks. Eq: fraction of shipbuilding costs funded out of shipping firm equity. Gov/Tot: total capacity of ships produced with government approval, divided by total capacity of all ships produced. Slightly different figures for independently produced ships appear in Nihon zosen (1980: 139 tab. 1).

Sources: Nihon senshu kyokai, ed., Kaiun tokei yoran [Survey of Ocean Shipping Statistics] (Tokyo: Nihon senshu kyokai), pp. 172-73 (1970 ed.), pp. 284-85 (1981 ed.); Nihon zosen kogyo kai, ed., Nihon zosen kogyo kai 30 nen shi [A 30-Year History of the Japan Shipbuilding Industry Association] (Tokyo: Nihon zosen kogyo kai, 1980), p. 391; Ginko kyokai, ed., Ginko kyokai 20-nen shi [A 20-Year History of the Banking Association] (Tokyo: Ginko kyokai, 1965), p. 361;

V. Conclusions:

By most accounts, in the 1960s and 70s the Japanese government banned foreigners from investing in Japan. It closed domestic competitors to bank loans. It capped loan interest rates. Thereupon, it rationed credit to its favored firms.

In fact, the government did nothing of the sort. It did not stop foreign investors, did not shut down domestic competitors, and did not relevantly cap loan interest rates. It did not ration credit, for the credit market cleared. Because banks could set nominal interest rates at market levels, for large firms they did not use “compensating deposits” to hike effective rates.

The Japanese story of the 1960s and 70s is not a story about a government that directed credit to promote industrial policy. It is a story about decentralized financial markets that allocated funds competitively. Although the government did claim to regulate access to credit, like most other governments at most times it lacked the means to do so. For ultimately, such is the nature of money: fungible, durable, readily concealable, and widely available. Because it is all that, money is also easily tradeable and effectively arbitrable. Faced with government controls that did not bind, Japanese firms raised their funds in markets that cleared. Faced with controls that did not bind, they raised their funds where they wanted for what they wanted.

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