# Why Does the Problem Persist?
# "Rational Rigidity" and the Plight of Japanese Banks

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# Why Does the Problem Persist?
## *"Rational Rigidity" and the Plight of Japanese Banks[†]*

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## Abstract

One of the most perplexing factors in the Japanese financial crisis is the apparently non-optimal and non-rational behaviour of Japanese banks. In this article, we provide a "rational" explanation for bank behaviour based on the long-term relationships between banks and entrepreneurs and show that they result in "rational rigidity" in lending. We find three implications of rational rigidity – a low lending rate, a low bankruptcy rate, and an institutional pledge of no profit maximization – in Japanese banks. We argue that this type of banking is viable as long as the economy expands and asset prices go up, which was the case before the asset market crash in 1990. The stagnation and free-fall of asset prices in the 1990s exerted tremendous pressure on Japanese banks but did not paralyse them completely in the 1990s, although there are indications that they failed to restructure distressed large corporations in some industries, notably construction and real estate. Thus, the problem is not that paralysed banks are blocking recovery, but that their current rational rigidity in banking practices is no longer viable as private enterprises in the market economy are suffering from asset price deflation and economic stagnation. Major institutional changes seem, therefore, inevitable.

## Keywords

Japanese banks, long-term relations, entrepreneurs, rational rigidity

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# 1. Introduction

Japanese banks have been in trouble for a long time.[1]   In the crisis of November 1997, Sanyo Securities, a mid-sized securities firm, Hokaido Takushoku Bank, a city bank, and Yamaichi Securities, one of the Big Four securities houses, all collapsed within three weeks of each other. Following the crisis, the government quickly arranged with the Bank of Japan and the Deposit Insurance Corporation 30 trillion yen: 17 trillion yen to protect the depositors of failed financial institutions and 13 trillion yen to inject as capital into undercapitalised banks.   Of this public money, 1.8 trillion yen was then injected into 18 major banks and three regional banks, all of which were rather reluctant to receive it.   This initiative did not resolve the problem, however, and in 1998 the government was forced to nationalise two failing banks, the Long-Term Credit Bank and the Nippon Credit Bank, both of which had already received public money.   The government increased the amount of public money available from 30 to 60 trillion yen and encouraged banks to apply for a second subsidy.   Fifteen major banks applied, again reluctantly, and received a total of 7.5 trillion yen.   Yet again, this failed to resolve the problem.   Non-performing loans that had persisted throughout the 1990s remained despite massive write-offs.   New non-performing loans surfaced as old ones were written off.   As of March 2002, it is widely recognized that the Japanese financial market problem is not over.
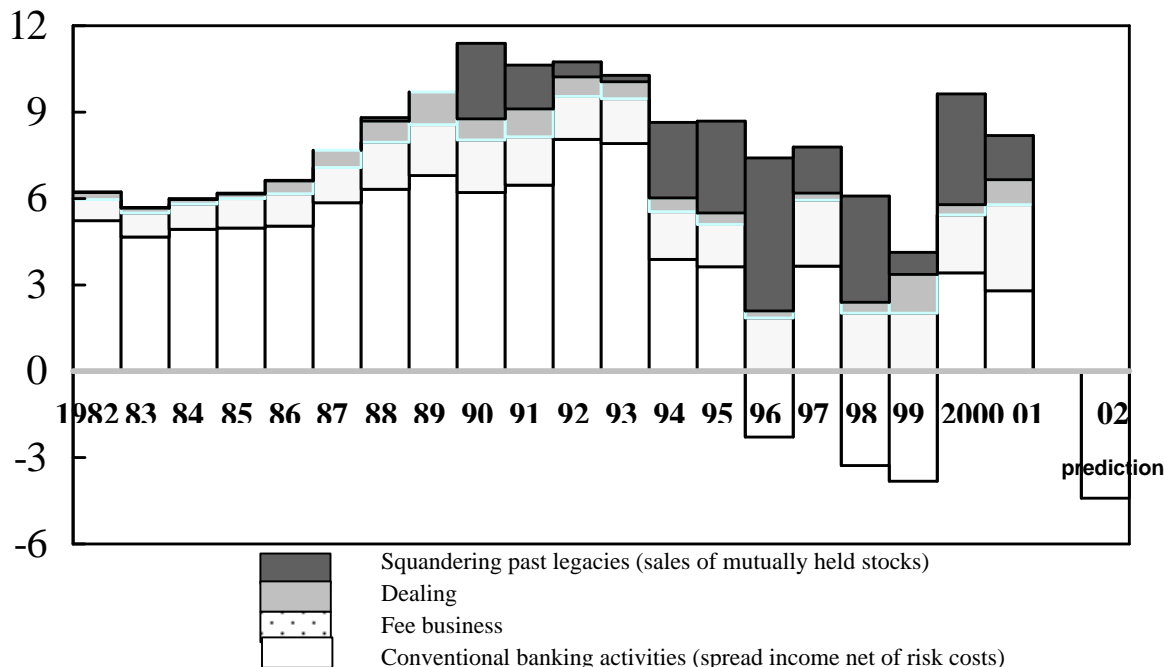
A remarkable feature of Japanese banking problems is the *persistence* of the apparently non-optimal and non-rational behaviour of Japanese banks.   Figure 1 shows the authors' estimate of Japanese banks' gross profit rate and composition between 1985 and 2001.   There is a remarkable contrast between the stable pattern of profits from conventional banking activities, dealing, and the fee business in the 1980s, and the deterioration of profitability of these "core" banking activities after 1994.[2]   Even more remarkable is the squandering of "past legacies," i.e., realized capital gains, in the sales of stocks held mutually with their close trading partners (some are Keiretsu firms) that have consistently been used to prop up the gross profit rate, particularly after 1994.   For example, in 1996, 1998 and 1999 banks suffered losses in their conventional banking activities but managed to generate profit overall in this way.   This activity amounts to depleting shareholders' assets for the

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[1] Hoshi and Kashyap (1999) and Hoshi and Kashyap (2001, Chapter 8) contain very vivid summaries of the development of the troubled banking sector throughout the series of crises.

[2] There is consensus among economists that the government's slow, uneven and *ad hoc* approach to financial deregulation coupled with the banks' inability to adapt to changing market conditions brought about by this deregulation caused the sharp decline in the gross profit rate from conventional banking activities.   See, for example, Hoshi and Kashyap (2001).

sake of the government's taxes.    President Nishikawa of Sumitomo Mitsui Bank laments: "We have lost almost everything we had accumulated since the war.   We are down to the bare bones." (*Nihon Keizai Shimbun*, October 12, 2001).

**Figure 1: Squandering Past Legacies: Deteriorating Bank Profits**



Sources: Analysis of financial statements from all banks, various issues; *Nihon Keizai Shimbun;* disclosure papers of various banks; McKinsey in-house analysis.
Note:    Calculated by the authors

Another example of apparently non-optimising and non-rational behaviour that is hard to understand in the logic of economics was witnessed at the very moment of the second banking crisis that occurred in 1998.   In September of that year when taxpayers' money was being injected into the banks in order to re-capitalise them, President Masao Nishimura of the Industrial Bank of Japan made his famous comment about the Bank "having a social responsibility to apply for tax money." He said: "This is not about the interests of one bank, but the interests of the entire Japanese economy and indeed the entire global economy.   If we do not do this, we will be forced to accept re-capitalisation, so we must do it.   The government has prepared 25 trillion yen and we have a social responsibility to receive that." (quoted by Nihon Keizai Shinbun, October 21,1998)   This nebulous comment can only be understood when one accepts the idea that a bank is a "public institution".

In this paper we aim to give a "rational" account for the apparently non-optimising and non-rational behaviour of Japanese banks, and to explain why their plight has been so prolonged and wide reaching despite ample and mounting evidence that they must change their business practices. In doing so, we depart from the mainstream of literature on Japanese banking, which is

predominantly concerned with the close relationships between big banks and large corporations as exemplified by the debate over the main bank system and Keiretsu financing.[3] Instead, we focus on the long-term relationships between banks and small to medium-sized enterprises, which account for almost half (49.45%) of all loans made in the Japanese banking sector with paid capital of no more than 0.3 billion yen (in the case of wholesale trade, 0.1 billion yen). 5.6% are to enterprises with paid capital of 0.3 to 1 billion yen. Thus, for the banking sector as a whole, small to medium-sized enterprises are at least as important as large corporations. Moreover, large corporations such as Toyota and Sony started out as small enterprises. Thus, to capture the characteristics of Japanese banking as a whole it is important to understand the nature of banking with small to medium-sized enterprises in Japan.

The paper is organised as follows: in Section 2, we develop the theory of rational rigidity of banking with entrepreneurs, based on their long-term relationships with their banks. We argue that this is a manifestation of rational rigidity in the Japanese economy and that it is particularly prevalent in the labour market. In Section 3, we explore the implications of this type of banking, and present three examples showing how it characterises the Japanese banking system. We also explain how an expanding economy and ever-increasing asset prices made rational rigidity banking viable until the collapse of the asset markets in 1990. In Section 4, we examine whether deteriorating financial positions in the 1990s had an adverse effect on banks' influence on individual enterprises, using large-scale panel data from Japanese enterprises. We show that, with the exception of a small number of large corporations in specific sectors, Japanese banks do rather well in their assumed role. The main problem, therefore, is not that Japanese banks are paralysed due to deteriorating financial conditions, but that the rational rigidity business model is no longer profitable enough to sustain them. In Section 5, we look at changes that must be made to this model and discuss if it should even be abolished altogether.

## 2. The Long-run Rational Rigidity Theory

One of the most distinctive characteristics of the Japanese economy in the 1990s was its apparent long-run rigidity across many economic activities. For example, since the so-called Bubble Economy burst at the beginning of that decade, many large firms have been reluctant until recently to change their wage and employment practices despite very weak market conditions. This has puzzled economists because rational economic agents must adapt their practices to changing

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[3] See Hoshi and Kashyap (2001) and references therein for theories and evidence stressing the importance of the main bank system and Keiretsu financing. Also Miwa and Ramseyer (2001) for strong arguments against the same.

economic conditions all the time.   This rigidity is apparent not only in the labour market but also in corporate management and the public sector.

We believe that the apparent inability of the Japanese banking sector to adjust to changing market conditions has its roots in the same rigidity seen in other industries.   Employing and re-interpreting the rational rigidity model of Nishimura and Tamai (2001), we explain that the apparent long-run rigidity is in fact rational as long as large permanent changes do not occur.   The argument is based on the long-term relationship between the bank and the debtors.   We are concerned mostly with small to medium-sized firms or entrepreneurs as opposed to large corporations that have been the major focus of past studies, although much of the discussion also holds true for large corporations.   This segment is more appropriate for this study, which attempts to examine the effect of the Japanese banking system on all firms, not just large corporations, and to investigate different effects on Japanese banking between small to medium-sized enterprises and large corporations especially in the 1990s.

Let us first explain the rational rigidity theory in the framework of labour markets since rigidity is most pronounced in labour relations.   The oft-cited merit of the long-term employer-employee relationship is that it enables workers to learn by doing in the production process, or equivalently, it takes advantage of the so-called experience curve of workers.   As a worker works longer with one firm, he acquires more firm-specific skills in his workplace.   These skills increase the worker's productivity in the production process.   In addition, these skills may reduce the worker's disutility of labour through better cooperation with his co-workers.   It has been argued that the advantage of long-term relationships is greater in Japan than in other countries for social and cultural reasons, explaining the prevalence and strength of the Japanese long-term employer-employee relationship. There is ample evidence that such learning-by-doing, or on-the-job training, is important in Japanese workplaces.

In this learning-by-doing process, the degree of skill acquisition is dependent on worker motivation and resulting work attentiveness.   A motivated worker works more attentively, acquires more skills, and becomes more productive than a demotivated worker.   The dependence of learning-by-doing on worker motivation and work attentiveness introduces an inter-temporal link: workers' high work attentiveness in the present implies acquisition of skills, which increases their productivity in the future.   The firm can motivate the worker by offering an implicit long-term wage contract to him which pledges a higher wage in the future, rewarding high future labour productivity acquired through attentive work in the present.   In fact, the practices of large Japanese firms can be viewed as long-term wage contracts in an implicit form.   These firms have an age-related wage profile that is stable over set periods, allowing a worker to infer his future wage.

This inter-temporal nature of learning-by-doing causes long-run rigidity. Because of the dependence of present work attentiveness on future productivity, the firm pledges high future wages to encourage learning-by-doing in the present. However, by the time a worker has accumulated skills he has also grown older. The firm could cut his wages below the pledged level but the worker could not retaliate the firm's renege by lowering his skill accumulation, since he had already accumulated present skills and that there would be lower future skill acquisition anyway. In this way, a firm could increase profits.

It is unlikely, however, that such opportunistic behaviour would pay off. It would jeopardise a firm's credibility and no worker would credit future wage pledges. In addition, learning-by-doing would also be substantially reduced, adversely affecting the firm's long-term profits. If the long-term losses caused by the opportunistic behaviour outweigh its short-term gains as outlined in the previous paragraph, the firm would elect not to do it.

Suppose, then, that market conditions change unexpectedly. The firm, a rational economic agent, wants to adjust its wage policy for young and older employees according to the new economic conditions. However, since a change in wages for older employees would constitute reneging on the long-term wage contract (the wage rate pledged in the previous period), the firm finds itself in a dilemma: does it adjust wages and trigger an adverse effect on future productivity, or stick to the current contract that is now inefficient? The firm has to make a rational choice between the two. Most Japanese firms opt for the latter, i.e., long-run rigidity, since the adverse effect on productivity is considerable in Japan.

This argument can easily be applied to a bank and its long-term relationship with small to medium-sized debtor-entrepreneurs (see Appendix for detailed explanation). Consider a bank and a set of entrepreneurs "attached" to it, where the bank plays the same role as the firm, and the entrepreneurs are in the same position as the workers. The bank has a monopoly over supplying funds to these entrepreneurs. The bank is a going concern with infinite horizons, while new entrepreneurs are born and old entrepreneurs retire. The entrepreneur's performance in the market depends on his level of effort, just as the worker's productivity is determined by his work attentiveness. Moreover, there is a similar inter-temporal link: the entrepreneur's management skills improve and thus his costs are reduced when he combines his efforts with the bank's advice. Greater efforts today mean lower costs tomorrow and higher profits today. These joint proceeds are shared between the bank and the entrepreneur in various and subtle ways. The bank may charge the entrepreneur various fees. In some cases, the entrepreneur may be asked to put his money in

non-interest-bearing accounts.[4]　In other cases, the entrepreneur may be encouraged to employ retiring bank employees or contribute to bank subsidiaries' activities.　In addition, the entrepreneur's efforts expand his business so he borrows more from the bank, thereby contributing to the bank's profits.　This is probably the bank's biggest motivation to maintain a long-term relationship with the entrepreneur (although this is not explicitly considered in the Appendix model because of mathematical tractability).

As the firm can encourage the worker's efforts by offering higher wages, so the bank can encourage the entrepreneur's efforts by offering a lower lending rate[5] to increase the reward for making more efforts that combine with the bank's advice to improve efficiency and expand business. In this way, the bank gets a share of the proceeds of the entrepreneur's improved management skills.

The bank then faces the same problems as the firm in the labour market.　The bank encourages the entrepreneur's efforts by offering him an implicit "long-term contract" which pledges a lower lending rate in the future, rewarding high future efficiency acquired through his efforts in the current period combined with the bank's advice.　However, once the entrepreneur has learned management skills and grown older, the bank could increase the lending rate with no fear of an adverse effect on management skill acquisition, and could thus increase its profits by reneging on the long-term implicit contract with the old entrepreneur in the present.　However, this would jeopardise the bank's reputation and no subsequent entrepreneur would believe in the bank's pledge.　This would result in lower management skill acquisition and ultimately lower profits for the bank.　Thus, the bank, comparing long-term losses and short-term gains, is not likely to renege.　Moreover, even when market conditions change unexpectedly, the bank is likely to honour its pledge, since any change to the old entrepreneur's interest payment scheme would constitute reneging on the long-term contract.　The bank is therefore likely to employ rational rigidity as long as the change is not a large, structural one.


# 3. Rational Rigidity in Japanese Banking

## 3.1. Three Implications of Rational Rigidity

The theory of rational rigidity as explained in the previous section has three implications. First, the bank is likely to offer a lower lending rate to encourage entrepreneurs to acquire management skills.　The bank gets its share of these improved skills not directly from a higher lending rate, but indirectly through, for example, fees and higher interest payments incurred by a

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[4] This arrangement is common.　In literature, it is considered a means to raise effective interest rates, but it is not clear why such a complicated scheme is employed instead of raising lending rates.

[5] Through a downward shift in the interest rate schedule.　See Appendix.

greater borrowing volume.   In this case, the bank's base lending rate is probably lower than when no such long-term relationship exists.

Second, the bank tries to honour past pledges even if they are no longer optimal when market conditions change.   In arm's length transactions, the bank is likely to call in firms' loans if they fail to repay their debts.   Although we do not examine such cases explicitly in our formal model, rational rigidity results suggest that a bank maintaining long-term relationships with many entrepreneurs is not likely to take such an immediate disciplinary strategy, but to keep a distressed firm alive for a while to give it time to recover and to offer managerial advice; the firm may recover from a temporary downturn and begin to repay its debts.   And even if it eventually fails, the bank will have honoured its long-term pledge not to let the firm down, so it does not antagonise its current and potential small trading partners.   Consequently, the rate of bankruptcy is substantially lower than in arm's length banking.

Third, the entrepreneur knows that the bank always has an incentive to renege on the implicit long-term contract, which makes the entrepreneur sceptical of the bank's proposal to make any changes to that contract.   In other words, the long-term contract that the bank offers to one generation of entrepreneurs is time-inconsistent.   It becomes time-consistent only in the framework of overlapping generations of entrepreneurs who would view the bank badly it if reneged, leading to a substantial decline in long-term profits.

In some cases renegotiation of long-term contracts is mutually beneficial both for bank and entrepreneur when market conditions change.   However, often only the banks are aware of the changes and they are faced with the problem of credibly conveying that a change has occurred while avoiding the misperception that it wants to exploit the ignorance of the entrepreneur.   If there are institutional measures that punish the bank's opportunistic behaviour, the entrepreneur is likely to believe the bank and mutually beneficial renegotiations take place.   Consequently, the bank is willing to honour these arrangements even though such institutional measures may pose additional constraints on their short-term profit maximisation.   Thus, the third implication of the rational rigidity is that institutional measures prohibiting opportunistic behaviour are likely to emerge, even though these measures constrain profit maximisation.

In this section, we explore whether evidence of these three implications of "rational" rigidity is to be found in Japanese banking.


## 3.2. Low Base Lending Rate to Small to Medium-sized Firms

There is strong evidence that the lending rate of Japanese banks is lower than the lending rate in arm's length banking, in which the kind of long-term relationships observed in rational rigidity

banking do not exist.   In Table 1, we take Standard and Poor's global rate of default for each category of borrowers, which is often taken as a benchmark for the default rate in other countries, in which arm's length banking is the rule.   We then calculate the credit cost rate, which is the default rate minus the asset collection rate.   It is evident that, for profit-seeking firms, the lending rate should exceed the estimated credit cost rate substantially.   In fact, the estimated credit cost rate is higher if the borrower has a lower rating.   Since many small to medium-sized enterprises have lower ratings in general, we expect that the lending rate offered to them is substantially higher than that offered to large corporations with good credit rating in arm's length banking.

### Table 1: Lending Rates for Segments of Borrowers

| Rating | S&P Default Rate | Estimated Credit-Cost Rete | Actual Lending Rate |
|--------|-----------------|---------------------------|---------------------|
| AAA | 0.01 | 0.01 | 0.2 |
| AA | 0.03 | 0.03 | 0.3 |
| A | 0.06 | 0.06 | 0.4 |
| BBB | 0.26 | 0.22 | 0.7 |
| BB | 1 | 0.78 | 1 |
| BB | 1.75 | 1.29 | 1.2 |
| below B | 5.04 | 3.5 | 1.5 |

Source: Standard & Poor's, *Rating Performance 2000 - Corporate defaults : Will Things get Worse Before They Get Better?* , 2001.  Interviews conducted by the authors in September 2001.
Notes: "S&P Default Rate" is 1-year rate caluculated from S&P's global 3-year cumulative rate of default. "Estimated Credit-Cost Rate" is the default rate minus the asset-collection rate (average collateral rate times collection rate) [authors' calculation]. "Actual Lending Rate" is interview-based figures of big city banks.

In the final column of Table 1, the actual lending rate of Japanese banks is reported.   It is evident from this table that Japanese banks overall offer a lower lending rate than that offered in arm's length banking.   In fact, the actual lending rate is *lower* than the estimated credit cost rate for categories BB+ and Below B, which is striking.   Moreover, the difference between the lending rate to large and high-rated corporations and to small and low-rated enterprises is remarkably smaller in today's Japan.   These facts cannot be rationally explained in arm's length banking without long-term relationships.   The long-term consideration is likely to enter a bank's rate decisions.

The strategy pays as long as the basic premise of the long-term relationship works, that is as long as entrepreneurs eventually increase their management skills and expand their business to pay higher fees to and borrow more from banks.   In an expanding economy with product-price inflation and asset-price inflation, this strategy works very well to expand the banking business.   This was the case until the collapse of the Bubble Economy in 1990.

## 3.3. Low Rate of Bankruptcy

Let us now turn to the second implication of rational rigidity, which is the lower rate of bankruptcy than in arm's length banking. Table 2 shows the number of bankruptcies reported in Japan and the United States after 1987. It reveals a striking contrast between the two countries. The number of Japanese bankruptcies that led to liquidation or reorganization is one fiftieth of the U.S. total around 1989, the heyday of the Japanese economy. Even in the depth of the prolonged stagnation in 1998, 3,508 Japanese enterprises went bankrupt, leading to liquidation or reorganisation, while in the height of the longest expansion, 37,113 U.S. firms went bankrupt. Although there is a downward bias in the Japanese bankruptcy data,[6] it does not fill the huge gap between the two countries. Moreover, even if one takes account of simple disposition by suspension by bank credit, far fewer enterprises went bankrupt in the prolonged period of stagnation in Japan than in the longest boom in the United States.

One could argue against such international comparisons because they ignore vast differences in business practices across national borders. With this in mind, Table 3 compares the post-World War II era with the pre-World War II era. As is now well known (see, for example, Hoshi and Kashyap 2001, Chapter 2 and references therein), the pre-World War II era was an era of active stock markets and passive banks. In particular, long-term stable relationships between banks and small entrepreneurs, the hallmark of post-World War II banking, were not predominant if indeed they ever existed. Thus, if the post-World War II era has a substantially lower rate of bankruptcies than the pre-World War II era, then this suggests a genuine difference due to long-term relationships and their resulting rational rigidity.

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[6] Japanese data are based on the survey of Tokyo Shoko Research, commissioned by the Small and Medium Enterprise Corporation. All bankruptcies involving no less than 10 million yen debts are included nationwide, but those smaller than that are included only if the bankrupt enterprises are located in major cities. Thus, there is a slight downward bias since small-scale bankruptcies in small cities may not be properly covered by this survey.

## Table 2: Bankruptcies in Japan and the United States 1987-2000

| Japan | Total | Quasi Chapter 7 | Quasi Chapter 11 | Others | Disposition by Suspension of bank credit | Grand Total |
|---|---|---|---|---|---|---|
| 1987 | 1,310 | 668 | 214 | 428 | 13,736 | 15,046 |
| 1988 | 989 | 523 | 108 | 358 | 11,149 | 12,138 |
| 1989 | 649 | 356 | 63 | 230 | 8,010 | 8,659 |
| 1990 | 766 | 452 | 78 | 236 | 8,406 | 9,172 |
| 1991 | 1,156 | 768 | 159 | 229 | 12,422 | 13,578 |
| 1992 | 1,588 | 1,057 | 231 | 300 | 14,467 | 16,055 |
| 1993 | 1,836 | 1,124 | 274 | 438 | 13,976 | 15,812 |
| 1994 | 1,753 | 1,187 | 182 | 384 | 13,551 | 15,304 |
| 1995 | 1,944 | 1,369 | 185 | 390 | 14,149 | 16,093 |
| 1996 | 2,159 | 1,574 | 196 | 389 | 13,643 | 15,802 |
| 1997 | 2,978 | 2,164 | 278 | 536 | 15,268 | 18,246 |
| 1998 | 3,508 | 2,624 | 326 | 558 | 14,327 | 17,835 |
| 1999 | 3,457 | 2,516 | 218 | 723 | 13,668 | 17,125 |
| 2000 | 5,196 | 3,453 | 764 | 979 | 13,970 | 19,166 |
| | | | | | | |
| United States | Total | Chapter 7 | Chapter 11 | | Chapter 12 + Chapter 13 | Grand Total |
| 1987 | 67,830 | 49,420 | 18,410 | | 18,021 | 85,851 |
| 1988 | 55,816 | 39,808 | 16,008 | | 10,292 | 66,108 |
| 1989 | 50,941 | 37,205 | 13,736 | | 9,488 | 60,429 |
| 1990 | 54,453 | 36,667 | 17,786 | | 10,068 | 64,521 |
| 1991 | 59,099 | 38,705 | 20,394 | | 11,045 | 70,144 |
| 1992 | 58,537 | 38,467 | 20,070 | | 13,144 | 71,681 |
| 1993 | 52,875 | 35,807 | 17,068 | | 11,955 | 64,830 |
| 1994 | 44,160 | 30,781 | 13,379 | | 10,232 | 54,392 |
| 1995 | 39,968 | 28,800 | 11,168 | | 11,039 | 51,007 |
| 1996 | 41,647 | 30,289 | 11,358 | | 11,826 | 53,473 |
| 1997 | 41,954 | 31,862 | 10,092 | | 12,263 | 54,217 |
| 1998 | 37,113 | 29,229 | 7,884 | | 9,977 | 47,090 |
| 1999 | 31,737 | 23,499 | 8,238 | | 6,858 | 38,595 |

Sources: Japan, Chusho Kigyou Jigyoudan (Japan Small and Medium Enterprise Corporation),
Kigyou Tousan Chousa Nenpou (Annual Reprt of Bunkruptcy companies), various issues.
United States, Data are supplied by Administrative Office of the United States Courts.
Notes: "Quasi Chapter 7" includes Hasan ([legal] bankruptcy) and Tokubetsu Seisan
(liquidation). "Quasi Chapter 11" include Kaisha Kosei (reorgnization and rehabilitation) and
Wagi (composition).

We take two periods in the pre-World War II era, 1924-1928 and 1936-1940. The first was after the Great Kanto Earthquake and just before the Great Depression, when stock markets were active. Stock prices rose by 19% from 1924 to 1926 and 10% higher in 1928 than in 1924. The rate of destruction of enterprises in Table 3-1, which is estimated from the difference of the rate of new creation of enterprises and that of net increase, was 6.65%, which is substantial. Thus, even in the era of booming stock exchanges, there were a sizeable number of bankruptcies in pre-war Japan.

In the 1936-40 period, which was just before World War II when war mobilisation efforts were getting started, the net increase of enterprises was almost zero. However, this was due to the

balance between a high rate of creation and a high rate of destruction. The rate of destruction in the 1936-1940 period was even higher than the 1924-28 period, climbing to almost 9% annually.

In contrast, Table 3-2 shows that the post-war rate of destruction was far lower than that in the pre-war era. The rate of destruction is the ratio of the number of bankruptcies reported in Table 1 to the number of existing enterprises listed in the *Establishment and Enterprise Census*. The rate of destruction is 1.33% in the relatively stagnant 1981-1986 period, while the rate is 0.57% in the Bubble Economy period between 1987 and 1991. These rates are substantially lower than in the pre-war era. The difference is all the more striking if one considers the 1990s when non-performing loans eventually surfaced and persisted. The rate of destruction is only marginally above its value in the Bubble Economy period, hovering at 0.75%. The picture for individual industries is very similar.

What emerges from these tables is that banks in the post-World War II era have followed a strategy of keeping enterprises alive even when they are in financial difficulty. They give time and managerial advice so that they may recover from a temporary downturn and begin to repay their debts. Even if they cannot, banks avoid liquidating them and prefer to secure their money from the owner-managers and their relatives, who are sureties liable jointly and independently for the enterprises' debts. Their collateral against such debts is usually real estate and listed-firms' stocks. As long as stock prices and, in particular, property prices increase this strategy works very well. Thus, this system of *soft* disciplinary action by banks[7] worked well when asset prices followed a sharp upward trend until the collapse of the asset markets in 1990.

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[7] 'Soft' for enterprises, but not for their owner-managers who are often obliged to pay their enterprises' debts personally. The practice of making owner-managers liable for their enterprises' debts also helps to curtail the opportunistic behaviour induced by limited liability.

## Table 3-1 Creation and Destruction of Enterprises: Pre-World War II Era

| year | All Indsutries | By Industry | | | | | |
|---|---|---|---|---|---|---|---|
| | | Agriculture | Fisheries | Mining | Mamufac-turing | Commerce | Transport |
| Rate of Net Increase | | | | | | | |
| 1924-28 | 5.38% | 2.70% | 2.03% | 1.17% | 3.51% | 6.49% | 9.04% |
| 1934-40 | 0.40% | -6.55% | -0.43% | 16.62% | 3.09% | -1.88% | 2.75% |
| Rate of Creation (Rate of New Enterprises) | | | | | | | |
| 1924-28 | 10.93% | 6.30% | 8.29% | 5.34% | 9.55% | 11.98% | 13.22% |
| 1936-40 | 9.25% | 5.09% | 7.79% | 19.93% | 11.32% | 7.76% | 9.88% |
| Rate of Destruction (Estimated) | | | | | | | |
| 1924-28 | 6.65% | 3.97% | 6.70% | 4.35% | 6.80% | 6.83% | 5.69% |
| 1936-40 | 8.97% | 9.43% | 8.10% | 5.77% | 9.09% | 9.07% | 7.81% |

Source: Shoko Sho (Ninistry of Commerce and Industry), *Kaisha-Tokei (Company Statistics)* , 1929 (22-25, 258-261), 1930 (22-25, 260-263), and 1945 (22-25, 364-365).

Notes: The rate of net increase is the change in the number of existing companies at the end of the fiscal year.  The rate of creation is the ratio of newly-establised companies to the existing companies.  The rate of destruction is estimated from the rate of creation and the rate of net increase.  The rates are the average of annual rates.

## Table 3-2 Creation and Destruction of Enterprises: Post-World War II Era

| year | All industries | By Industry | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Construc-tion | Manufac-turing | Wholesale Trade | Retail Trade | Eating and Drinking Places | Services | Miscella-neous |
| Rate of Net Increase | | | | | | | | |
| 1981-86 | 2.31% | 3.17% | 1.18% | 1.97% | 1.49% | 1.23% | 5.31% | 3.08% |
| 1987-91 | 3.25% | 5.26% | 2.09% | 1.66% | 1.30% | 4.53% | 6.04% | 4.72% |
| 1992-96 | 1.41% | 3.92% | -0.30% | -1.20% | 1.80% | 1.21% | 2.87% | 1.42% |
| Rate of Creation (Estimated) | | | | | | | | |
| 1981-86 | 3.52% | 5.46% | 2.25% | 3.56% | 2.25% | 1.90% | 6.10% | 4.11% |
| 1987-91 | 3.76% | 5.98% | 2.53% | 2.48% | 1.62% | 4.80% | 6.39% | 5.28% |
| 1992-96 | 2.12% | 4.90% | 0.44% | -0.08% | 2.16% | 1.55% | 3.40% | 2.19% |
| Rate of Destruction (Bunkruptcy Rate) | | | | | | | | |
| 1981-86 | 1.33% | 2.58% | 1.12% | 1.72% | 0.82% | 0.70% | 0.97% | 1.16% |
| 1987-91 | 0.57% | 0.88% | 0.48% | 0.88% | 0.33% | 0.33% | 0.44% | 0.68% |
| 1992-96 | 0.75% | 1.14% | 0.73% | 1.07% | 0.38% | 0.35% | 0.59% | 0.82% |

Source: For, net increase and creation, Somu Cho (Management and Coordination Agency), *Jigyosho Kigyo Tokei (Establishment and Enterprise Census)* , 1981 (Vol. 3, Table 3), 1986 (Vol. 3, Part 1, Table 4), 1991 (Vol. 3, Table 4), 1996 (Vol. 3-1, Table 3).  For destruction, Chusho Kigyou Jigyoudan (Japan Small and Medium Enterprise Corporation), *Kigyou Tousan Chousa Nenpou (Annual Reprt of Bunkruptcy companies)* , 1990 (Table 14-1) and 1997 (Table 14-1).

Notes: The rate of net increase is change in the number of existing companies at the each survey date. The survey of existing companies was undertaken as of July 1 in 1981, 1986, and 1991 and October 1 in 1996. The number of destruction is calculated at the end of fiscal year. Destruction means disposition by suspension of bank credit, [legal] bankruptcy, an application for composition, a ruling of reorganization and rehabilitation or a ruling of liquidation. For destruction of enterprises with the total amount of the dept under ten million yen, 215 major cities are surveyed, while the whole country is surveyed for destruction with the total amount of the dept no less than ten million yen.  Thus, the rate of destruction is slightly underestimated since destruction in small cities may not be properly counted. The rate of creation is

## 3.4. Banking not for Profit but for the Business Community

A distinctive characteristic of Japanese banking is the strong emphasis on its role in the community. The idea that "profits are important" cannot be taken for granted in the Japanese finance industry, as can be seen from statements made by top bank managers. Former President Hiroshi Kurosawa of the Industrial Bank of Japan, for example, said: "Profit is very important. Our profit is too small. But profit is not the 100% purpose of IBJ - it is not a purely commercial bank. Our philosophy is to serve our clients and Japanese industry. There must be profit, but profit must be reasonable. If we make too much profit, we are eating our clients' profits. We do not like to maximise our profits." (*Euromoney*, February 1998). These ideas and sensibilities have been cultivated and shared by the industry for decades.

The basic conceptual framework for Japanese bank management places 'profit' and 'public-interest' in opposition, with the public nature of financial institutions often serving as an antidote to 'excessive' emphasis on profit. This emphasis on 'public interest' is clearly cited in the *Banking Law*.

*Article 1, Paragraph 1* of this law states, "In light of the public nature of the banking business, the purpose of this law is to provide for sound and appropriate management of banking services and to contribute thereby to the sound development of the national economy by maintaining trust and protecting depositors so as to facilitate finance." The emphasis is clearly on banking safety and the public interest. *Paragraph 2* attempts to harmonise the public nature of banking with the private nature of banking companies: "The administration of this law shall take care to respect self-directed efforts in the management of the banking business." The need to assure public interest and safety in banking while maintaining the nature of banks as private companies is behind the extraordinarily ambiguous and cryptic phrase "take care to respect."

The textbooks that new bank employees use to study for the certificate examination on "basic banking operations" also touch on the public nature of banks, but do so only in the most nebulous and vague terms. One textbook[8] says: "These three principles, public interest, safety and profitability, have aspects that contradict each other. Therefore, banks must be managed in ways that harmonise the three principles. The specific ways in which this is done will change according to changing economic and financial circumstances." In another section, it comments, "In other words, past practice was to give primary emphasis to assuring the public nature and safety of banking by placing restrictions on the scope of business in which banks could engage, with respect to the types of financial products and services they could offer, and the ways in which they set their

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[8] Kinyu Ginou Kentei Senta (Center for Testing Banking Skills), editor, Kinyu Keizai no Kihon (*The Basics of Banking*), 1990, p.170.

prices." It goes on to cite recent changes such that: "In recent years, however, there has been a growing tendency to respect the self-directed efforts of banks. The stiff regulations of the past have been loosened and new freedom and flexibility have been brought to banking supervision and the banking industry. When the banking business was subject to a plethora of regulations, business results were judged in terms of amounts of deposits and loans. Recently, however, more weight in the evaluation of business results is being placed on earnings, profit margins and other elements that have to do with profitability." However, the tone of this quote still vague and does not clarify whether banks as private enterprises should maximize profits or, equally, shareholder value.
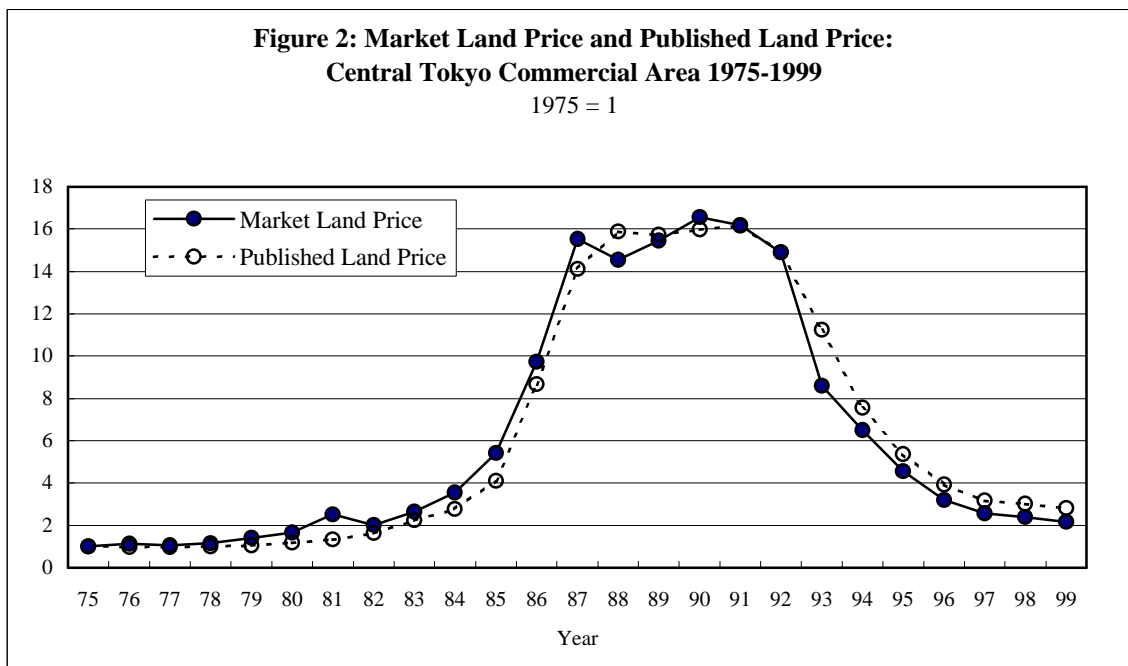
This strong emphasis on 'public interest' versus profit in Japanese banking is in stark contrast to banking in other countries. In the United States, banks are regulated to ensure that they provide safe and sound banking, monetary and financial stability, an efficient and competitive financial system, and protection of consumers from abuse by financial institutions, as exemplified in the Banking Act of 1933: "An act to provide for the safer and more effective use of the assets of banks, to regulate interbank control, to prevent the undue diversion of funds into speculative operations, and for other purposes." However, no clause places 'public interest' above profit in importance. The same is true in France and Germany, with the possible exception of the regional savings banks law *Sparkassengestz*. These banks are obliged to serve public interest and be non-profit organisations. However, they are not private but public banks, and Brussels has now decided to abolish them.

Although this 'public interest over bank profit' attitude of Japanese banks is hard to explain in terms of the arm's length banking of other countries, it clearly has value in the long-term-relationship banking described in Section 2 that produces rational rigidity. By not constraining themselves to maximise profits, banks can show that they have no intention of taking advantage of their debtors' ignorance and can persuade them to renegotiate long-term implicit contracts when market conditions change. In the rapidly changing economic conditions seen in the growth era of Japan, such renegotiation is likely to be the rule rather than the exception.

## 4. Were Japanese Banks Paralysed in the 1990s?

The collapse of stock and real estate markets around 1990 and the subsequent stagnation of the economy posed a serious problem for the rational rigidity of Japanese banking based on long-term relationships. As discussed in the previous section, a growing economy (that encourages more borrowing by entrepreneurs) and rising asset prices (that make write-offs of bad loans possible without imposing outright bankruptcy on failing enterprises) are two pillars that support the banks' rational rigidity. These two pillars collapsed simultaneously on a dramatic scale.

The magnitude of the stock market's collapse is well documented, but that of property prices may be grossly underestimated. As of March 2002, the Nikkei index stands at less than one-third of the peak it hit in 1990. According to the published land price officially reported by the Land Agency (now the Ministry of Land, Infrastructure and Transport), the average land price also shows a similar drop. However, these official published price data tend to underestimate the changes in transaction prices. The average land price based on this data source (and similarly appraisal-based price data sources) conceals the severity of the downturn in commercial areas where collateral properties (so important in Japanese banking as explained) are usually located. Figure 2 compares the hedonic price index based on actual transaction prices and the index based on published prices in the central Tokyo commercial area. The magnitude of the decline is even more striking and the underestimation of the change in the official price data is apparent. The transaction-price index is now *one-eighth* of its peak value of 1990, though the published price index is one-fifth of its peak value. These officially published prices are misleading and are one reason why the severity of

**Figure 2: Market Land Price and Published Land Price:
Central Tokyo Commercial Area 1975-1999**

1975 = 1



non-performing loans was overlooked in the early stages of the banking crisis.[9] The dramatic collapse of the asset markets coupled with a very weak real economy in the 1990s is responsible for rapidly deteriorating bank profit as exemplified in Figure 1 in the Introduction.

A logical question arises: did this profit pressure disrupt long-term relationship Japanese

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[9] This is clearly stated in the Study Project on the Effect of Balance Sheet Adjustments (2001).

banking?   In other words, did the non-performing loan problem paralyse Japanese banks and cause a serious problem in industrial adjustment in the 1990s?   We look at this question in the following section.

It should be noted that we are not concerned with large corporations but with all enterprises: simply looking at firms listed on major stock exchanges[10] is not enough.   To do this, we use the *Kigyou Katsudou Kihon Chousa (The Basic Survey of Japanese Business Structure and Activities)*[11] micro-database.   This is, in fact, a truncated census that covers *all* enterprises that employ 50 workers or more and have paid capital of 30 million yen or more, in mining, manufacturing, the wholesale and retail trade, and the restaurant industry.   From this survey, we develop a longitudinal (panel) dataset between 1991 and 1998 (latest version of published data), based on each firm's permanently assigned number.   This allows us to trace the evolution of each enterprise, especially its entry and exit (to and from the population of enterprises we consider) and switch from one industry to another.   There are roughly 25,000 enterprises each year.

Table 4 reports the enterprise dynamics of the Japanese economy.   It reveals a remarkably different picture of the vitality of Japanese industries from the one inferred from the very low rate of creation and destruction of enterprises reported in Table 3.   Entries and exits are very frequent and switches from one industry to another are very common; industries do not stand still.   This is the picture of real industry dynamics in Japan: enterprises are very active in entry, exit and switching.   Therefore the picture painted of extremely stable Japanese industries in Table 3 is deceptive: it only accounts for births and deaths, but once born enterprises engage actively in industrial dynamics.

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[10] Several studies to do this have emerged in recent years.   For example, see Kobayashi et al (2002).

[11] This survey is conducted by the Research and Statistics Department, Minister's Secretariat, Ministry of Economy, Trade and Industry (METI).   It was first conducted in 1991, again in 1994, and has been conducted annually since then.   Financial information (simple versions of balance sheets) is available for each firm as well as revenue, employment and cost data.   The strength of the survey is its (even if truncated) census coverage and the reliability of its figures.   We drop firms that have missing values in employment, tangible assets, and capital statements.

## Table 4 Entry and Exit Patterns of Japanese Enterprises 1991-1998
### Non-Financial Firms Employing 50 or More
### Total and Major SNA Industries

| | Ratio of Entry to End-of-Period Total (annual rate) | | | Ratio of Exit to Beginning-of-Period Total (annual rate) | | |
|---|---|---|---|---|---|---|
| **1991-94** | Entry total | | | Exit total | | |
| Industry | | from other industries | from outside | | from the industry | to outside |
| All industr | 6.1% | --- | 6.1% | 5.2% | --- | 5.2% |
| Food prod | 7.8% | 2.0% | 6.0% | 7.6% | 2.0% | 5.8% |
| Textiles | 6.5% | 1.9% | 4.8% | 8.7% | 2.6% | 6.6% |
| Chemicals | 6.0% | 2.4% | 3.8% | 5.4% | 2.3% | 3.2% |
| Fabricated | 10.3% | 5.2% | 5.6% | 10.5% | 6.5% | 4.6% |
| General m | 8.8% | 4.2% | 4.9% | 8.6% | 4.3% | 4.5% |
| Electrical | 8.3% | 3.9% | 4.7% | 8.0% | 3.1% | 5.1% |
| Transporta | 8.0% | 3.6% | 4.6% | 6.9% | 2.7% | 4.2% |
| Constructi | 19.7% | 4.6% | 16.3% | 12.4% | 4.0% | 5.2% |
| Wholesale | 8.5% | 2.6% | 6.1% | 8.2% | 2.7% | 5.7% |
| Retail trad | 8.4% | 2.8% | 5.9% | 7.8% | 2.8% | 5.2% |
| | | | | | | |
| **1995-98** | Entry total | | | Exit total | | |
| Industry | | from other industries | from outside | | from the industry | to outside |
| All industr | 5.9% | --- | 5.9% | 6.1% | --- | 6.1% |
| Food prod | 7.4% | 1.6% | 6.0% | 7.1% | 1.8% | 5.5% |
| Textiles | 6.4% | 1.6% | 4.9% | 9.9% | 2.0% | 8.4% |
| Chemicals | 5.0% | 2.0% | 3.1% | 6.0% | 2.1% | 4.1% |
| Fabricated | 8.6% | 4.0% | 5.0% | 8.8% | 3.5% | 5.7% |
| General m | 8.4% | 3.6% | 5.2% | 8.4% | 3.3% | 5.4% |
| Electrical | 7.6% | 2.3% | 5.5% | 8.0% | 3.2% | 5.1% |
| Transporta | 6.9% | 2.7% | 4.4% | 6.9% | 2.7% | 4.4% |
| Constructi | 8.4% | 4.9% | 3.9% | 10.3% | 3.5% | 7.5% |
| Wholesale | 8.0% | 2.6% | 5.7% | 8.7% | 2.3% | 6.7% |
| Retail trad | 8.7% | 2.3% | 6.6% | 8.4% | 2.5% | 6.2% |

Source: Authors' calculation from individual enterprise data in *Kigyou Katsudo Kihon Chousa (Basic Survey of Japanese Business Structure and Activities)*, 1991, 1994-1998.

Notes: All non-financal enterprises employing no less than fifty employees are counted. "Entry" of an enterprise is new appearance of the particular firm. "Exit" of an enterprise is its disapperance. Industry classifications here are based on twenty-three SNA industry classifications.

The active movement of enterprises is not possible without finance. This suggests that Japanese banks may play an important role in making these very active industrial dynamics possible. In fact, for small to medium-sized enterprises, entry and switching would be difficult without bank financing.

dependent varaible = rate of return on tangible assets (ROA)

| | Pulp, paper and paper products | Chemicals | Petroleum and coal products | Fabricated metal products | Precision machinery | Construction | Wholesale trade | Real estate | Transport and communications |
|---|---|---|---|---|---|---|---|---|---|
| Only Finance-Related Dummy Variaibles Are Shown Below | | | | | | | | | |
| EFD× Switch | -1.572 | -1.535 | -0.476 | 0.731 | 1.491 | 6.389 | 6.447 | -1.411 | -1.833 |
| | [0.06] | [0.53] | [0.08] | [0.08] | [0.37] | [0.19] | [0.51] | [0.57] | [0.60] |
| DFD×Switch | -0.595 | 7.274*** | -0.213 | -5.174* | -2.200* | -11.133 | -0.791 | 1.053 | 2.321 |
| | [0.05] | [7.24] | [0.11] | [1.71] | [1.94] | [0.95] | [0.23] | [0.68] | [1.31] |
| WDFD×Switch | -0.633 | 0.727 | 12.487*** | 1.493 | -0.928 | 88.454*** | -2.82 | -0.181 | |
| | [0.02] | [0.28] | [3.08] | [0.22] | [0.37] | [2.85] | [0.45] | [0.49] | |
| EFD×Restruct. | 0.681 | 0.025 | -0.011 | 0.246 | -1.653 | -2.403 | -0.285 | | 1.589 |
| | [0.06] | [0.02] | [0.00] | [0.05] | [1.20] | [0.15] | [0.08] | | [0.56] |
| DFD×Restruct. | 5.589* | 0.473 | -0.062 | 0.201 | 0.164 | -0.754 | 1.973* | 0.183 | 2.381*** |
| | [1.87] | [1.47] | [0.09] | [0.15] | [0.39] | [0.14] | [1.74] | [0.91] | [2.95] |
| WDFD×Restruct. | 2.215 | 0.204 | 2.443 | -2.431 | -0.327 | -34.396*** | 3.767** | | 0.133 |
| | [0.27] | [0.16] | [1.35] | [0.82] | [0.33] | [3.29] | [2.31] | | [0.03] |
| EFD×Switch ×LargeFirm | | 1.736 | 0.894 | 0.81 | -2.292 | 16.094 | -31.442 | | |
| | | [0.34] | [0.09] | [0.03] | [0.33] | [0.22] | [1.60] | | |
| DFD×Switch ×LargeFirm | | -7.145*** | -0.119 | 5.299 | 8.792 | 17.974 | 64.343*** | | -2.778 |
| | | [2.62] | [0.02] | [0.40] | [1.07] | [0.35] | [5.99] | | [0.60] |
| WDFD×Switch ×LargeFirm | | | | | | | 4.963 | | |
| | | | | | | | [0.11] | | |
| EFD×Restruct. ×LargeFirm | 1.756 | 0.006 | 0.167 | 0.411 | 1.502 | -19.907 | 2.411 | | -1.426 |
| | [0.10] | [0.00] | [0.04] | [0.06] | [0.54] | [0.45] | [0.35] | | [0.29] |
| DFD×Restruct. ×LargeFirm | -5.003 | -0.286 | -0.372 | -0.016 | -0.529 | -4.722 | 4.875 | -1.399*** | -2.105 |
| | [0.58] | [0.49] | [0.19] | [0.00] | [0.44] | [0.25] | [1.33] | [3.73] | [1.10] |
| WDFD×Restruct. ×LargeFirm | | 1.293 | | 4.376 | | 26.618 | -6.495 | | |
| | | [0.27] | | [0.13] | | [0.35] | [0.49] | | |
| Observations [number of firms times time periods] | 1649 | 3608 | 2634 | 3709 | 1300 | 1722 | 24785 | 92 | 296 |
| Number of firms | 540 | 1114 | 901 | 1336 | 466 | 654 | 8694 | 46 | 113 |
| R-squared | 0.23 | 0.57 | 0.11 | 0.39 | 0.26 | 0.38 | 0.1 | 0.99 | 0.01 |

Source: Individual enterprise data in Kikyou Katsudo Kihon Chosa (Basic Survey of Japanese Business Structure and Activities) between 1994 and 1998.

Notes: 1) Absolute values of t-statistics are in brackets. *, **, *** indicate significant at 10%, 5% and 1%, respectively.  2) EFD = Equiity-Financed Investment dummy, DFD = Debt-Financed Investment dummy, WDFD = Debt-Fianced Working-Capital dummy (when (gross) investmet is equal to zero). They take value of 1 if they are observed one year before, 0 if otherwise. 3) Swtich dummey is 1 if the enterprise switched from one industry to another one year before, and 0 if otherwise.  Restructuring dummy is 1 if the value of tangible assets decrease, and 0 if otherwise.  4) LargeFirm dummy takes the value of 1 if the enterprise has more than 10 billion yen in paid capital and 0 if otherwise. 5) Other explanatory variables included in the regression analysis but not shown here are L/K, root of K, Enterprise Age, Foreign Equity Share, Debt-Capital Ratio, Year Dummies of 1996, 1997, and 1998, and Constant, where L is the number of workers and K is the value of tangible assets. 6) Industries having statistically signififcant coefficients in some of dummy variables are shown. 5) Mehtod: Fixed-Effect Intstrument Variable Estimation with L/K(t-1) and K^(1/2)(t-1) used as instruments.

To examine this, we construct a panel of enterprises having sufficient financial data from the previous panel of enterprises, and examine whether the rate of return on tangible assets (ROA) is influenced by the way investment is financed (equity-financed, debt-financed (= bank financed), or internally financed).[12]

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[12] The base case is internal financing.  We consider an equity-financing dummy (EFD) and a debt-financing (bank-financing) dummy (DFD) in the case of positive gross investment, and a

The results are shown in Table 5.   Because of limited space, we only report industries showing statistically significant differences in the effect of various financing.   There are two major findings.

First, banks seem to have a positive impact on enterprises that are changing their product mix (and thus switching from one industry to another) and those that are 'restructuring' themselves in certain industries.   Here 'restructuring' means a decrease in the value of the tangible assets that the enterprises possess and includes activities such as sales of plants and buildings.

The table shows that the cross-term of the debt-financed-investment dummy and the industry-switch dummy is positive and statistically significant in Chemical, while the cross-term of the debt-financed investment and the restructuring dummy is positive and statistically significant in Pulp, Paper and Paper Products, Wholesale Trade, and Transportation and Communications.   This is remarkable since one quarter of all non-financial firms under consideration (fifty workers or more with paid capital of 30 million yen or more) are Wholesale Trade enterprises.   Moreover, the cross-term of debt-financed-working-capital dummy and industry-switch dummy is positive and statistically significant in Petroleum and Coal, and Construction.   These results suggest that the positive effects of long-term relationships persisted even in the difficult 1990s.

However, there are also downsides.   The cross-term of the debt-financed-working-capital dummy and the industry-switch dummy is negative and statistically significant in Fabricated Metal and Precision.   The cross-term of the debt-financed-working-capital dummy and the restructuring dummy is negative and statistically significant in Construction.   This shows that the banking sector has uneven results in encouraging its debtors to make sensible decisions.

Second, there is evidence that the benefit of long-term relationships is not felt in large corporations and there is a strong indication that banks are simply pumping money into failing large firms.   The cross-term of the debt-financed-investment dummy and the industry switch dummy is negative in Chemicals, while the cross-term of the debt-financed-investment dummy and the restructuring dummy is negative and statistically significant in Real Estate.   These results are consistent with the casual observation that banks are extending loans to keep failing Construction and Real Estate industries afloat.   However, it should also be noted that banks seem to play a

debt-financing working-capital dummy (WDFD) in the case of zero investment, and try to discern the effect in conjunction with an industry switch dummy (Switch) and restructuring dummy (Restruct).   We also consider the effect of large corporations by the cross-term with a Large Firm dummy.   They are all one-period back dummies.   We also include labor-to-capital ratio, the root of the size of tangible assets, age of enterprise, foreign equity share, debt-capital ratio, and year dummies to control macroeconomic factors.   It is a fixed-effect model estimated by the instrument variable method taking account of possible simultaneity problems.

positive role for large Wholesale Trade corporations.

It is not, therefore, true that Japanese banking was paralysed in the 1990s and failed in all industries to materialise the benefits of long-term relationships. In some industries banks have a productive influence on their debtors. Unfortunately, problems in Construction and Real Estate are so pronounced that this positive effect is often overlooked.

# 5. Conclusion

One of the most perplexing factors in Japanese financial crises is the *persistence* of the apparently non-optimal and non-rational behaviour of Japanese banks. We have provided a rational explanation for this behaviour based on the long-term relationships between banks and small to medium-sized entrepreneurs that result in rational rigidity in lending. We have found that three clear implications of rational rigidity – a low lending rate, a low bankruptcy rate, and an institutional pledge of no profit maximization – prevail in the Japanese banking system. We have also argued that rational rigidity banking was sustainable when the economy expanded and asset prices went up, which was the case before the asset markets crashed in 1990. Thus, the stagnation and free-falling asset prices of the 1990s imposed serious strains on Japanese banks. However, we have also found that banks continued their rational rigidity into the 1990s, although there are indications that they failed to restructure failing large corporations in industries such as construction and real estate. So, the problem was not that paralysed banks were blocking recovery (although this might be true in some of the industries mentioned above), but that their current rational rigidity is no longer sustainable as private enterprises in the market economy suffer from asset price deflation and economic stagnation. Major institutional change, therefore, seems inevitable.

To gauge the magnitude of the problem, we calculate possible losses that the present practices inflict on bank profits via the following procedure: we assign enterprises to appropriate credit rate classifications and estimate the distribution of loan balances over these classifications. Then we apply the rates on distribution reported in Table 1 and calculate possible gains and losses (the amount of spread income (or loss) between the actual lending rate and the credit-cost rate), *assuming that Standard and Poor's global default rate is the true rate in Japan*. The result is staggering. The possible losses due to insufficient spread (or, to be precise, negative spread) over the credit cost rate amount to some 3.5 trillion yen!

This figure is tentative, and admittedly grossly overstated, since we assume that Standard and Poor's global rate is *the* Japanese rate. This clearly ignores the difference in business practices between Japan and other countries. However, the magnitude of losses is unlikely to disappear even if we adjust the numbers to current Japanese circumstances. We are in a stagnant economic

situation that prevents profitable lending and are facing asset price deflation that makes recovery of non-performing loans through the sale of property collateral difficult.

It is clear that institutional change is necessary to make Japanese banks profitable. This should include the major modification of rational rigidity banking practices, if not their outright abolition. At the very least, the range of these practices should be substantially reduced and possibly relegated to non-profit organizations (or banks engaging in such activities should become non-profit organizations). In the majority of lending, banks should move from rational rigidity banking to market-oriented arm's length banking. The present number of banks is not required in this field of banking and it should be greatly reduced over time. Simply bailing out the banks with injections of public money will not resolve the problem unless it brings about a major shake up in current banking practices.

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# APPENDIX

Here we briefly explain the model of long-term rigidity in the text, which is a re-interpretation of the long-term labour-market rigidity model of Nishimura and Tamai (2001). Consider a bank in a long-term relationship with a set of entrepreneurs. The bank has a monopoly of supplying funds to these entrepreneurs. It is a going concern with infinite horizons, while entrepreneurs live in two periods. Generations of entrepreneurs overlap, and at one point in time there are young and old entrepreneurs. Otherwise entrepreneurs are homogeneous, so that we consider representative entrepreneurs. In the two periods of their existence, the representative entrepreneur borrows one unit of funds from the bank at the beginning of each period, buys one unit of materials with this fund, produces products using these materials, sells them at price $P$ to consumers, repays all his debts with interest at the end of the period, and then consumes all his profits.

The key assumption here is that (1) the quantity of products that both young and old entrepreneurs produce using one unit of materials depends on their current "efforts", and that (2) the old entrepreneur's cost is substantially lower if his efforts are higher in learning various advices of the bank in the previous period. The latter assumption signifies the importance of experience or learning by doing. We assume that there is a social norm dictating that the proceeds of this learning by doing are shared between the entrepreneurs and the bank. The bank's share is $1-q$ and the entrepreneur's is $q$, where $q$ is determined by the social norm. The bank can obtain its portion of these proceeds through various commissions charged to the entrepreneur.

Assume that the level of the representative entrepreneur's efforts can be measured by the quantity he produces using one unit of funds. Let $X_i$ be the production quantity, where $i$ = young or old, which is also the level of his efforts. Thus, the young entrepreneur's profit is

$$\text{Profit}_{young} = PX_{young} - C_{young} - (1 + r_{young})$$

where $C_{young}$ is the cost of transforming one unit of materials into products (which is assumed to be constant), and $(1 + r_{young})$ is the debt repayment. The old entrepreneur's profit is

$$\text{Profit}_{old} = PX_{old} - (C_{young} - Pd\overline{X_{young}}X_{old}) - (1 + r_{old}) - (1-q)Pd\overline{X_{young}}X_{old}$$

where the term $d\overline{X_{young}}X_{old}$ is the reduction of cost in terms of the entrepreneur's products and $1-q$ is the bank's share of the benefit from this reduction $Pd\overline{X_{young}}X_{old}$.

Let $W_i$ be the "reward" of the entrepreneur's efforts in production such that, for $i$ = young or old

$$W_i = \frac{PX_i - (1 + r_i) - C_{young}}{X_i}.$$

Choosing an appropriate non-linear interest rate schedule $r_i$, the bank can choose any value of $W_i$. So in the following discussion, we assume that *the bank determines* $W_i$ instead of the interest rate schedule $r_i$. Then, the entrepreneur's profits are given by

Profit of the young entrepreneur = $W_{young} X_{young} - C_{young}$

Profit of the old entrepreneur = $W_{old} X_{old} + \mathbf{q} P \mathbf{d} \overline{X_{young}} X_{old} - C_{young}$

The generation-$t$ entrepreneur's lifetime utility is

$$u_t = \left\{ Z_{t0} - f_1 X_{t0} - \frac{f_2}{2} (X_{t0})^2 \right\} + \mathbf{b} \left\{ Z_{t1} - f_1 X_{t1} - \frac{f_2}{2} (X_{t1})^2 \right\}$$

where $f_1 > 0$ and $f_2 > 0$. Here $Z$ denotes the consumption of goods, whose price is assumed to be unity, and $\mathbf{b} < 1$ is the discount factor. Here the subscript $t$ denotes the generation, and the subscript 0 [1] indicates the value when he is young [old]. The lifetime budget constraint of the entrepreneur is

$$Z_{t0} + \mathbf{b} Z_{t1} = W_{t0} X_{t0} + \mathbf{b} \left( W_{t1} + \mathbf{q} \mathbf{d} P \overline{X_{t0}} \right) X_{t1}.$$

The entrepreneur maximises the lifetime utility with respect to $X_i$ for given $W_i$ under the constraint of the lifetime budget constraint.

Let us turn to the bank. For simplicity's sake, we assume that the bank's cost of funds is constant and equal to zero. Then, the bank's profit in period $t$ is

$$\text{BankProfit}_t = r_{old} + r_{young}$$
$$= \left( P - W_{young} \right) X_{young} + (P - W_{old}) X_{old} + (1 - \mathbf{q}) P \mathbf{d} \overline{X_{young}} X_{old} - \left[ 2C_{young} + 2 \right]$$

The bank maximises the discounted present value of this period profit

$$\sum_{t=0}^{\infty} \mathbf{b}^t \text{BankProfit}_t$$

We consider two contracts: long-term and spot. In the long-term contract, the bank pledges $(W_{t0}, W_{t1})$ for generation-$t$ entrepreneurs. Thus, the bank pledges that $W_{t1}$ is the next period's reward, as well as the current reward $W_{t0}$. In the spot contract, the bank only offers the current reward. $W_{t0}$.

In the context of learning by doing, the bank always has an incentive to renege on the long-term contracts of its current entrepreneurs if subsequent entrepreneurs will believe that the bank will not renege on their contracts. This can be explained in the following way. In calculating the optimal long-term contract, the bank wants to encourage learning by doing in the current period by raising the reward for current efforts. However, in the next period, the efforts of the previous period are history, so the bank does not have to worry about the adverse effect of reducing the current reward on the old entrepreneur's decision based on the effort level in the previous period.

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However, such an action is likely to cause an adverse effect on future generations of entrepreneurs and we assume that they will no longer believe in the bank's pledges. Consequently, the bank can only offer spot contracts in which the entrepreneur makes limited efforts and there is insufficient learning by doing, resulting in low profits for the bank.

The bank keeps its pledge and long-term contracts when the long-term loss of reneging on the contract exceeds the short-term gain. In our framework, Nishimura and Tamai (2001) show that this is the case if

$$\frac{2f_2}{P\sqrt{b(2q+1)+\dfrac{b^2q^2}{2b-1}}} - d > 0$$

holds true. However, there are other ways to prevent such an action, such as establishing "institutional rigidity" in banking practices. The text has examined some of them in detail.