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## **A Financial System Perspective on Japan's Experience in the Late 1980s**

**Masazumi Hattori\*, Hyun Song Shin\*\*, and Wataru Takahashi\*\*\***

### **Abstract**

This paper revisits the events of the 1980s bubble in Japan in light of the lessons learned from the subprime crisis in the United States. Our focus is on the role played by sectoral developments in the financial system in Japan. We highlight the transformation of a subset of non-financial firms (the large manufacturing firms) from being net debtors to the banks to becoming net creditors to the banks, thereby becoming part of the financial intermediary sector. In this way, large manufacturing firms in Japan played the role of surrogate wholesale banks that increased the overall supply of credit to the economy. When good borrowers already had credit and yet loose monetary conditions encouraged greater credit supply, credit availability to marginal borrowers and to real estate-related sectors increased. We discuss the role of market conditions and monetary policy in this development.

**Keywords:** Balance sheet; Commitment; Credit supply; Financial liberalization; Financial system perspective; Japan; Subprime crisis

**JEL classification:** E51, G21, G28, N22, N25

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## 1. Introduction

Financial booms and busts are complex phenomena that defy a simple explanation. The fact that such booms and busts have taken place throughout history even as financial institutions and instruments have undergone very dramatic changes over the centuries should give us pause for thought before assigning blame to any particular feature or set of economic developments in place at the time.

The global financial crisis that started with the subprime mortgage crisis in the United States in the summer of 2007 gained further momentum in 2008, engulfing not only other developed countries in Europe and elsewhere, but spreading its influence to emerging market economies also. The lessons that we are learning from the current global financial crisis provide valuable insights with which to revisit past episodes of financial booms and busts. In particular, the US mortgage crisis provides many lessons on the role of financial innovation and the importance of the increased supply of credit that results from securitization and the tapping of new sources of funding beyond the traditional deposit funding for the banking sector. Whereas retail deposits were the traditional funding source for the bank-based financial system, the shift to a market-based financial system and the securitization of financial claims enables the tapping of new sources of funding for the banking sector – both domestic and foreign.

In this paper, we offer a re-assessment of the financial boom that took place in Japan in the late 1980s in the light of the lessons learned from the subprime crisis in the United States. The empirical features of the 1980s bubble that we draw attention to have been discussed by others before us.<sup>1</sup> Our contribution is to gather them in a financial system perspective where the interlocking balance sheets of banks and non-financial firms are considered as a unified whole.

In the US subprime crisis, understanding the role of securitization in opening up new sources of funding is important in understanding the overall increase in mortgage funding to household borrowers. As we will see below, securitization enabled the increased funding to US households by increasing the overall leverage of the US financial system as a whole. In the case of Japan in the 1980s, our particular focus is on corporate lending following the sectoral changes that took place in Japan after the liberalization of both securities markets and the rules governing bank deposits.

Securities markets enabled the opening up of new funding sources – both domestic and foreign – away from traditional retail deposits. We highlight the role played by a subset of non-financial firms: the large manufacturing firms in Japan. As recently as the early 1980s, manufacturing firms in Japan received virtually all of their financing from the banking system, both for long-term investment as well as for short-term liquidity needs. However, with the liberalization of the securities market that began in the mid-1980s, non-financial companies were able to tap new sources of funding from outside the traditional banking sector. New stock, corporate bonds, warrants and commercial paper

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<sup>1</sup> For example, Borio and Lowe (2002), Borio and White (2003), Okina, Shirakawa and Shiratsuka (2001), Posen (2000) among others.

(CP) increasingly became important sources of funding for non-financial firms. The new funding was supplied by domestic savers and other non-leveraged financial institutions such as life insurance companies who purchased the bonds and other securities issued by Japanese companies. Foreign investors also figured among the new funding sources.

As new funding sources opened up, it became profitable for non-financial firms to act as financial intermediaries by raising funding in the capital markets through securities, and then supplying the new funds raised to the banking system by means of newly introduced time deposits with liberalized interest rates. The financial assets of non-financial corporations increased dramatically together with their financial liabilities in the late 1980s. For a brief period in the late 1980s, the financial assets of non-financial companies overtook their financial liabilities.

In this way, the non-financial companies became *de facto* financial intermediaries. They became financial intermediaries that drew market-based finance and supplied financing to the banking system by holding large deposit claims on the banks.

From the banks' point of view, such a development was a double blow. First, they lost their traditional customers – their traditional corporate borrowers. Second, they had to deploy their newly acquired funding from corporate deposits. Hence, the banks were under an even greater imperative to expand their lending to new borrowers. Not only had they lost their traditional corporate borrowers, there was a reversal of roles in which the corporate borrowers became creditors to the banks. They become depositors who supplied additional funding that needed to be lent out.

The imperative to expand lending meant that Japanese banks had to lower their lending standards in order to find new borrowers. Increasingly, such borrowers were the less credit worthy firms such as small and medium sized enterprises (SMEs) that were previously shut out of the credit market, and toward borrowers that relied on real estate collateral. As real estate lending increased, the property bubble gained impetus. Once the structural shift had taken place toward greater credit supply to real estate-based lending, the familiar property boom took hold.

In the rest of this paper, we will outline the argument in more detail. We begin with a conceptual framework that allows us to quantify the total credit supply to an economy by tracing the role of financial intermediaries in an interlocking system of creditor-debtor relationships. The overall supply of credit in a financial system should be seen as the outcome of many interrelated decisions of financial intermediaries in the system.

We then outline the empirical evidence on the broad sectoral developments in the Japanese financial system in the 1980s, as well as chart the role played by particular epochs of financial liberalization. We highlight in particular, the importance of securities markets, and the role played by new securities in tapping sources of financing that were traditionally off limits to borrowers and the role played by newly introduced time deposits with liberalized interest rates that helped banks to expand their liability size.

Through this exercise, we can point to several points of similarity between the US mortgage boom that led up to the crisis of 2007/2008 and the 1980s bubble in Japan. In particular, the following parallels are striking:

- In both cases, new securities increased the supply of overall credit to the economy through the tapping of new credit sources. In the US mortgage crisis, the new securities were mortgage-backed securities issued by the US government sponsored enterprises (GSEs), as well as by the private-label mortgage pools that contained subprime mortgages. In the 1980s bubble in Japan, the new securities were corporate bonds, warrants and CP issued by Japanese non-financial companies.
- In both cases, non-leveraged purchasers of the new securities were important new funding sources. In the US mortgage crisis, foreigners (especially foreign central banks) bought the mortgage-backed securities (MBSs) of the US GSEs. In the 1980s bubble in Japan, non-leveraged institutions such as life insurance companies and foreign investors were the buyers of Japanese corporate securities.<sup>2</sup>
- In both cases, the expansion of credit provided by the commercial banking sector received impetus from the integration of the commercial banking sector with the capital markets. In the US mortgage crisis, although it did not become obvious until the end of the financial boom, the balance sheet expansion of commercial banks occurred in tandem with market-based credit and the associated expansion of the balance sheets of investment banks. In the 1980s bubble, the balance sheet expansion of commercial banks was closely related to that of large non-financial firms that raised funds by tapping capital markets.

However, there are also important differences between the US mortgage boom and bust and the 1980s bubble in Japan:

- In the US mortgage crisis, the borrowers were households, while in the 1980s bubble in Japan, the borrowers were companies.
- In the US mortgage crisis, the new securities were primarily debt securities that enabled the financial system as a whole to become more leveraged. In the 1980s bubble in Japan, the credit boom coincided with a boom in the stock market so that a large proportion of the securities were equity issues and the leverage of the banking sector actually declined.

The importance of securities funding and the role of market-based financial instruments points to the importance of monetary policy in determining the overall tenor of financial market conditions and the credit spreads that sharpen the incentives of market players. This is because the incentives that govern funding and lending are ultimately driven by

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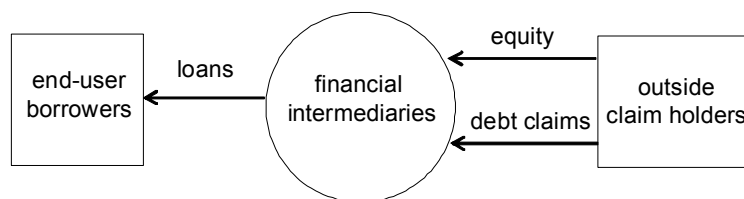
<sup>2</sup> In the Flow of Funds Accounts Statistics, the prime holders of securities issued by non-financial firms in the late 1980s were foreigners categorized as “Overseas”. However, we should be careful in interpreting statistics for “Overseas” because the amounts held by foreign subsidiaries of Japanese firms are also included in this category.

market prices. We return to this issue later in our paper, when we comment on the implications of our study for the conduct of monetary policy.

## 2. Financial System Perspective: Theory and Recent US Case

A simplified analytical framework for our analysis can be given in the diagram below. The financial intermediary sector channels funds from equity holders and ultimate lenders (“outside claim holders”) to the ultimate users of those funds (“end-user borrowers”).

The identity of the end-user borrowers depends on the particular case studied. In the US mortgage boom and bust, the end-user borrowers are households who have borrowed to buy residential property. In the case of the 1980s bubble in Japan, the group of borrowers who figure in the story will be mainly corporate borrowers.



The constituents of the financial intermediary sector itself will depend on the context. For the US mortgage boom and subsequent crisis, the intermediary sector includes the originating banks, but also includes the entities such as the GSEs and GSE mortgage pools that were involved in the securitization process.

In the case of the 1980s bubble in Japan, the financial intermediary sector includes the banking system as a whole, but we will argue below that non-financial companies became incorporated as part of the financial intermediary sector.

Irrespective of the context, at the aggregate sector level (i.e., once the claims and obligations between leveraged entities have been netted out), the lending to ultimate borrowers must be funded either from the equity of the intermediary sector or by borrowing from creditors outside the intermediary sector. To see this, consider a simplified balance sheet of an individual bank, as follows:

Assets	Liabilities
Loans to firms, households	Liabilities to non-banks (e.g. deposits)
Claims on other banks	Liabilities to other banks
	Equity

### Individual bank

By “bank” we mean any leveraged institution that could be construed as part of the financial intermediary sector. In the US context, the “banking system” therefore denotes the whole of the leveraged financial sector, which includes the traditional commercial banking sector, but also encompasses leveraged institutions such as investment banks, hedge funds and (in the United States especially) the government sponsored enterprises (GSEs) such as Fannie Mae and Freddie Mac. When we aggregate across banks, all the claims and obligations across banks cancel out. So, the aggregate balance sheet for the banking sector as a whole looks as follows.

Assets	Liabilities
↑ Total lending to Firms and households	<div style="border: 1px solid black; padding: 2px;">           Liabilities to non-banks  <b>(deposits + securitized debt)</b> </div>
	Total equity

### Banking sector

In other words, aggregate lending to end-user borrowers by the banking system must be financed either by the equity in the banking system or by borrowing from creditors outside the banking system. For any fixed profile of equity and leverage across individual banks, the total supply of credit to ultimate borrowers is larger when the banks borrow more from creditors outside the banking system. Put differently, the leverage of the financial sector is increasing as banks increase the proportion of their funding that comes from creditors outside the banking sector.<sup>3</sup>

Indeed, it is possible to derive a formula based on accounting identities alone (see Shin (2008)) in which the total lending to ultimate borrowers can be written as a function of the profile of equity, leverage and funding source of the individual financial intermediaries. In particular, when we denote:

$y_i$  : lending of bank  $i$  to ultimate borrowers plus holding of real assets

$e_i$  : equity of bank  $i$

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<sup>3</sup> See Greenlaw, Hatzius, Kashyap and Shin (2008).



$\lambda_i$  : leverage of bank  $i$  (ratio of total assets to equity)

$z_i$  : proportion of bank  $i$ 's funding that comes from outside the banking system

Then, the sum of  $y_i$  across all banks (i.e., total lending to ultimate borrowers plus holding of real assets) can be written as:

$$\sum_i y_i = \sum_i e_i (1 + z_i (\lambda_i - 1))$$

In the appendix to the paper, we derive the above formula. The point to emphasize here is that the  $z_i$  terms are crucial in determining aggregate lending to end-users. Note that  $z_i$  refers to the proportion of funding that comes from sources outside the banking sector. Even if we fix the leverage profile of individual banks, a shift in the funding source of those banks toward greater use of non-leveraged claim holders would increase the total supply of lending to end user borrowers.

One way in which  $z_i$  can increase is when banks issue securities which are then bought by non-leveraged institutions, such as mutual funds or insurance companies. In a traditional banking system that intermediates between retail depositors and ultimate borrowers, the total quantity of deposits represents the obligation of the banking system to creditors outside the banking system. However, securitization opens up potentially new sources of funding for the banking system by tapping new creditors. The new creditors are those who buy mortgage-backed securities (MBSs), claims that are written on MBSs such as collateralized debt obligations (CDOs), and (one step removed) those who buy the asset-backed commercial paper (ABCP) that are ultimately backed by CDOs and MBSs. The new creditors who buy the securitized claims include pension funds, mutual funds and insurance companies, as well as foreign investors such as foreign central banks. Foreign central banks have been a particularly important funding source for residential mortgage lending in the United States.

Although securitization may facilitate greater credit supply to ultimate borrowers at the aggregate level, the choice to supply credit is taken by the constituents of the banking system taken as a whole. For a financial intermediary, its return on equity is magnified by leverage. To the extent that it wishes to maximize its return on equity, it will attempt to maintain the highest level of leverage consistent with limits set by creditors (for instance, through the “haircuts” on repurchase agreements). As measured risk fluctuates, so will leverage itself. In benign financial market conditions when measured risks are low, financial intermediaries expand balance sheets as they increase leverage. Securitization enables the tapping of new creditors, thereby increasing the proportion of the banks’ funding that comes from creditors outside the banking sector. In this way, the leverage of the banking sector as a whole increases.

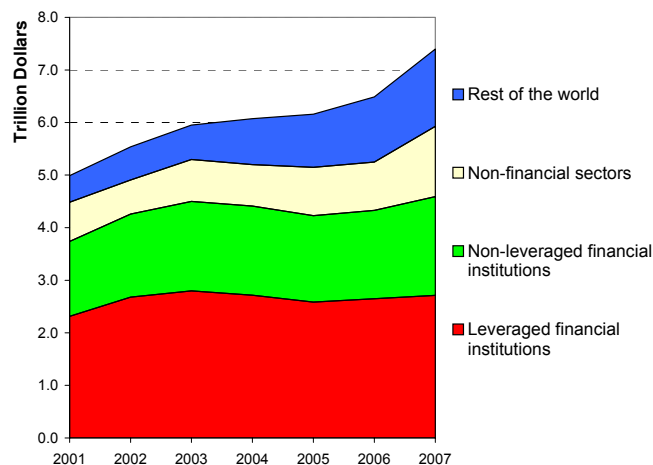
Although the intermediary could increase leverage in other ways – for instance, returning equity to shareholders or buying back equity by issuing long-term debt – the evidence suggests that they tend to keep equity intact and adjust the size of total assets (see Adrian and Shin (2007, 2008)).

As balance sheets expand, new borrowers must be found. When all prime borrowers have a mortgage, but still balance sheets need to expand, then banks have to lower their lending standards in order to lend to subprime borrowers. The seeds of the subsequent downturn in the credit cycle are thus sown.

When the downturn arrives, the bad loans are either sitting on the balance sheets of the large financial intermediaries, or they are in special purpose vehicles (SPVs) that the financial intermediaries sponsor. This is so, since the bad loans were taken on precisely in order to utilize the slack on their balance sheets. Although final investors such as pension funds and insurance companies will suffer losses, too, the large financial intermediaries are more exposed in the sense that they face the danger of seeing their capital wiped out. The severity of the credit crisis of 2007/2008 lies precisely in the fact that the bad loans were not all passed on to final investors. Instead, the “hot potato” sits inside the financial system, on the balance sheet of the largest and most sophisticated financial intermediaries.

A complete disaggregation of the funding source for the banking sector is not possible due to the lack of detailed breakdowns in the data between funding from leveraged and unleveraged creditors. However, we can gain glimpses from different perspectives. One way is to examine the identity of the holders of US agency and GSE-backed securities.

Figure 1. Holdings of GSE-Backed Securities

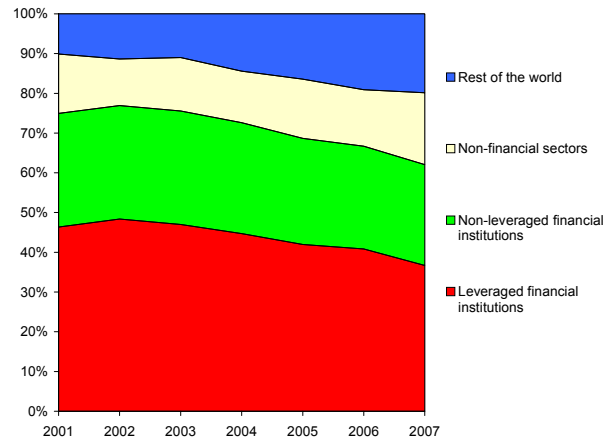


Source: Flow of Funds Accounts, Federal Reserve.

The above figure plots the total holdings of US agency and GSE-backed securities broken down according to the identity of the creditor. The data are from the US Flow of Funds Accounts (table L.210). Leveraged financial institutions include commercial banks, broker dealers and other securitization vehicles. The non-leveraged financial institutions include mutual funds, insurance companies and pension funds. The “non-financial sector” includes household, corporate and government sectors. Finally, the “rest of the

world” category indicates foreign creditors, especially foreign central banks or other official sector holders. The figure below charts the holders by percentage holdings.

Figure 2. Holdings of GSE-Backed Securities (percentages)



Source: Flow of Funds Accounts, Federal Reserve.

The key series for our illustration is the proportion held by other entities than leveraged financial institutions. US leveraged institutions have been holding a declining proportion of the total. At the end of 2002, leveraged financial institutions held 48.4% of the total, but by the end of 2007, that percentage had dropped to 36.7%. There has been a consequent increase in the funding provided by the non-leveraged sector. Notably, the holdings of the “rest of the world” category (which itself is mostly accounted for by foreign central banks) have more than tripled from \$504 billion at the end of 2001 to \$1,540 billion at the end of 2007. In this sense, foreign creditors have been an increasingly important funding source for residential mortgage lending in the United States.

According to the picture painted here, the subprime crisis has its origin in the increased supply of loans – or equivalently, in the imperative to find new assets to fill the expanding balance sheets. In this way, it is possible to explain two features of the subprime crisis: first, why apparently sophisticated financial intermediaries continued to lend to borrowers of dubious creditworthiness, and second, why such sophisticated financial intermediaries held the bad loans on their own balance sheets, rather than passing them on to other unsuspecting investors. Both facts are explained by the imperative to use up slack in balance sheet capacity during an upturn in the credit cycle.

### 3. Financing of Non-Financial Companies under Financial Liberalization: Japan's Bubble Case

As with the mortgage boom in the United States, the 1980s bubble in Japan is also linked with the development of securities markets as a funding source. The corporate bond market had started in the late 1970s, but was initially off-limits to most firms due to strict qualifying standards. However, during the 1980s, the corporate bond market became increasingly accessible.

In 1979, issuing of unsecured bonds and convertible bonds were permitted, but the criteria were so stringent that only two companies in Japan qualified (Toyota Auto and Matsushita Electric). However, by 1988, the number of firms qualifying for unsecured straight bonds increased to approximately 300, while the number of firms qualifying for convertible bonds increased to around 500.<sup>4</sup> Also, starting in 1987, the issuing of CP (unsecured short-term liabilities) was permitted for Japanese firms for the first time.

As a result of the opening up of market-based funding for non-financial companies, the relationship between the banking system and the non-financial company sector underwent a fundamental shift in the late 1980s. A subset of the non-financial companies – especially the large manufacturing firms – ceased to rely on bank financing, and tapped the capital markets instead.

Even more significantly, the non-financial companies that had good access to market financing raised surplus funding from the markets, and then deposited the surplus in the banking system in the form of time deposits with liberalized interest rates that attracted high rates of interest. The time deposits with liberalized interest rates were introduced in the process of financial liberalization in 1985.<sup>5</sup> In effect, the non-financial companies transformed their roles vis-à-vis the banking system. They went from being a *debtor* to the banks to becoming a *creditor* to the banks.

The implications for the total supply of credit to the economy as a whole can be seen from the equation:

$$\sum_{i=1}^n y_i = \sum_{i=1}^n e_i (1 + z_i (\lambda_i - 1))$$

The non-financial firms in effect became integrated into the financial system by intermediating between the capital market and the banking sector. The number of banks in the intermediary sector (given by  $n$ ) increased. They borrowed from the capital markets by issuing bonds, or raised new equity by issuing new stock. Then, they supplied this funding to the banking system by depositing the proceeds in the banks. Ultimately, these deposits would be matched by assets on the banks' balance sheets.

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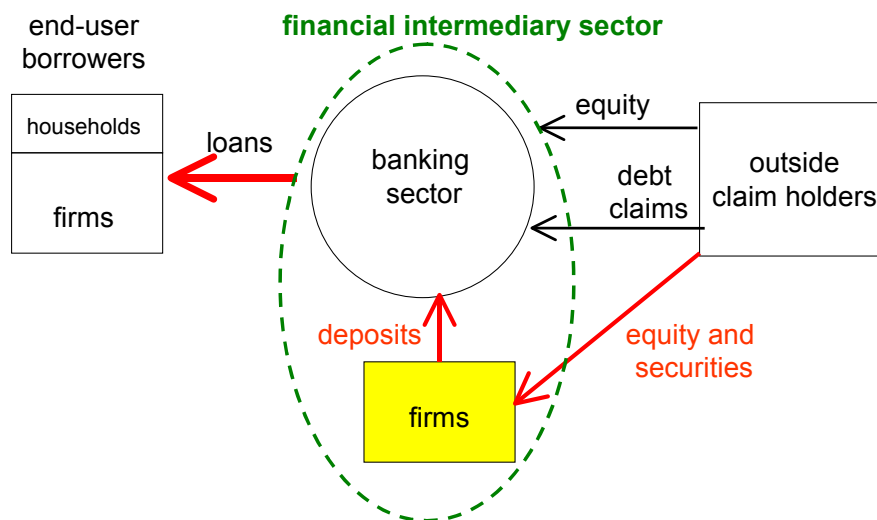
<sup>4</sup> Hoshi and Kashyap (2001, p. 229-230).

<sup>5</sup> The role played by time deposits with liberalized interest rates in the flow of funds was significant. This was not only because the financial product yielded competitive market interest rates, but also because it had flexible terms above the regulated minimum term. We discuss their role in detail in a later section.

Just as the US mortgage boom relied on high values of  $z_i$  in the equation above, the 1980s bubble in Japan rested on the appearance of new financial intermediaries who funded themselves by tapping the capital markets, and who supplied funds to the banking sector in the form of newly liberalized bank deposits. The new funding came ultimately from non-leveraged institutions such as life insurance companies and foreign investors.<sup>6</sup>

The diagram below illustrates the main structural change. A subset of non-financial firms (depicted by the colored rectangle in the diagram) underwent a transformation in its relationship vis-à-vis the financial intermediary sector. Whereas previously it was a borrower from the intermediary sector, the firms underwent a reversal of roles, to become net creditors to the banks, thereby becoming integrated into the financial intermediary sector.

Just as with the US subprime crisis, the structural change coincided with financial innovation, especially with the development of the securities market. Whereas the US subprime crisis was primarily one about debt financing through securities, the 1980s Japanese experience is also about equity financing, as well as debt financing.



The sums raised by Japanese firms in the capital markets rose very substantially in the late 1980s. For instance, in 1984, newly issued securities by all listed Japanese firms was around 5.4 trillion yen. That figure had gone up to 28.4 trillion yen in 1989. In this increase of securities funding for the Japanese financial system, foreign investors played a key role. For instance, the proportion of bonds issued outside Japan was 60% of the total in 1989. The parallel with the US mortgage boom is striking (Table 1).

<sup>6</sup> It is also notable in the late 1980s that individuals' preference for time deposits at banks over postal savings was strong and it led to increases in deposits held by individuals at banks. This can be captured as a factor increasing  $z_i$  in the equation. The related figures are shown in a later section.

Debt financing through bond offerings was not the only source of capital market financing available to Japanese firms. Listed firms were able to issue new stock and raised substantial funding through the capital markets. In 1986 the total stock financing of listed firms in Japan stood at 0.87 trillion yen. By contrast, in 1989, the total stock financing rose ten-fold to 8.8 trillion yen (Table 2).

Table 1. Securities Financing by Listed Firms, 1972-98

year	Total securities (million yen)	Distribution (%)		Foreign bonds	
		Stock	Bonds	as % total	as % total bonds
1972	1,784,689	58.4	41.6	0.0	0.0
1973	2,240,766	41.9	58.1	0.1	0.2
1974	1,741,396	31.2	68.8	3.4	4.9
1975	3,187,449	31.4	68.6	11.7	17.0
1976	2,302,001	29.9	70.1	18.1	25.8
1977	2,543,740	36.3	63.7	14.7	23.1
1978	2,972,270	30.2	69.8	16.4	23.5
1979	3,298,028	28.9	71.1	24.0	33.8
1980	2,883,285	36.5	63.5	24.1	37.9
1981	4,400,028	43.8	56.2	19.8	35.2
1982	4,084,502	33.0	67.0	27.7	41.3
1983	4,048,420	19.8	80.2	44.8	55.9
1984	5,409,408	19.3	80.7	44.0	54.5
1985	6,890,503	12.5	87.5	51.0	58.2
1986	8,395,196	10.4	89.6	48.2	53.8
1987	14,455,291	20.8	79.2	39.9	46.6
1988	17,636,098	27.1	72.9	30.5	41.9
1989	28,410,407	31.1	68.9	41.4	60.0
1990	14,441,448	26.3	73.7	35.8	48.5
1991	12,500,454	6.5	93.5	63.5	67.9
1992	9,619,910	4.4	95.6	60.2	62.9
1993	11,143,567	7.4	92.6	45.0	48.6
1994	8,499,604	11.0	89.0	22.6	25.4
1995	8,094,650	7.9	92.1	23.2	25.1
1996	13,616,878	15.2	84.8	18.3	21.6
1997	10,162,545	11.4	88.6	23.4	26.4
1998	15,906,750	9.7	90.3	10.0	11.1

Source: Hoshi and Kashyap (2001).

Table 2. Stock Financing by Listed Firms, 1972-98

Year	Total (million yen)	Distribution (%)		
		Public offering	Warrant exercise	Other
1972	1,041,409	63.9	0.0	36.1
1973	939,266	60.2	0.0	39.8
1974	544,007	51.0	0.0	49.0
1975	1,001,104	22.1	0.0	77.9
1976	688,723	70.9	0.0	29.1
1977	922,601	65.4	0.0	34.6
1978	896,653	63.1	0.0	36.9
1979	953,439	65.9	0.0	34.1
1980	1,052,076	83.7	0.0	16.3
1981	1,926,415	72.5	0.0	27.5
1982	1,349,335	79.5	0.2	20.3
1983	801,757	58.8	3.8	37.4
1984	1,043,132	78.1	6.3	15.6
1985	859,113	58.9	16.0	25.2
1986	872,514	45.8	42.7	11.4
1987	3,013,048	46.3	35.6	18.1
1988	4,782,307	54.0	27.4	18.6
1989	8,848,608	65.9	24.7	9.4
1990	3,792,439	52.1	17.9	30.0
1991	807,733	15.6	44.6	39.8
1992	419,907	1.0	48.4	50.7
1993	822,790	0.9	75.0	24.1
1994	935,740	14.6	48.2	37.2
1995	638,413	5.2	46.9	47.9
1996	2,073,967	14.7	32.5	52.8
1997	1,162,369	11.0	31.7	57.3
1998	1,540,397	18.5	5.7	75.8

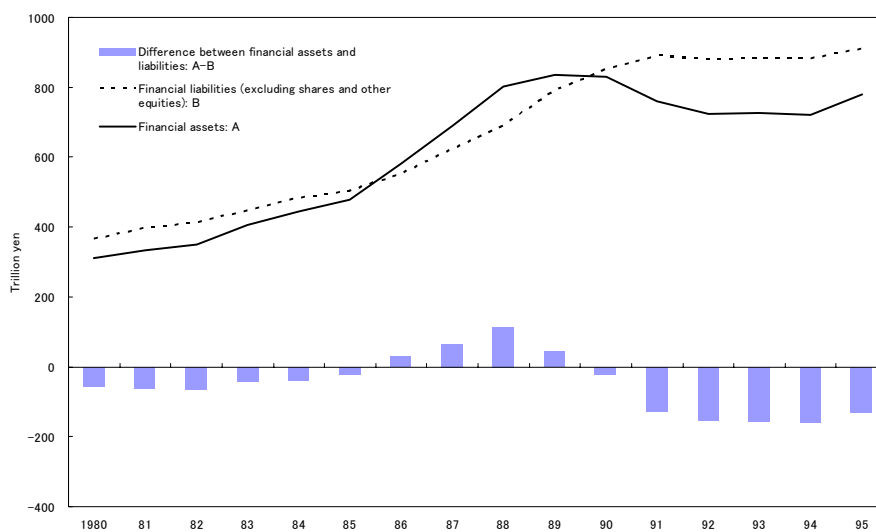
Source: Hoshi and Kashyap (2001).

#### 4. Financial Intermediation by Non-Financial Companies

As a result of the increased access of non-financial companies to the capital markets, the nature of the balance sheets of these companies began to undergo fundamental changes.

First, in aggregate terms, the role of private non-financial companies in their relationship with the rest of the economy changed from being net debtors to net creditors. The change can be seen in the following figure, obtained from the Flow of Funds Accounts for Japan.

Figure 3. Net Financial Position of Private Non-Financial Corporations



Note: End of fiscal year. Source: Flow of Funds Accounts, Bank of Japan.

We can see from this figure that the financial assets of Japanese non-financial firms increased rapidly in the late 1980s. In 1986, financial assets exceeded financial liabilities for the first time, and this difference continued to increase. The peak came in 1988, when the excess financial assets of non-financial firms reached 29 % of nominal GDP.

The nature of the financial assets is crucial for the rest of our argument, as we will show now that the non-financial firms were raising capital market funds, and then channeling such funding into the banking system.

One indicator is the liquidity ratios for non-financial firms, as measured by the sum of “cash and deposits” and “securities in liquid assets (hereafter, “securities”)”. We first examine the “liquidity ratio”, which is defined as follows:

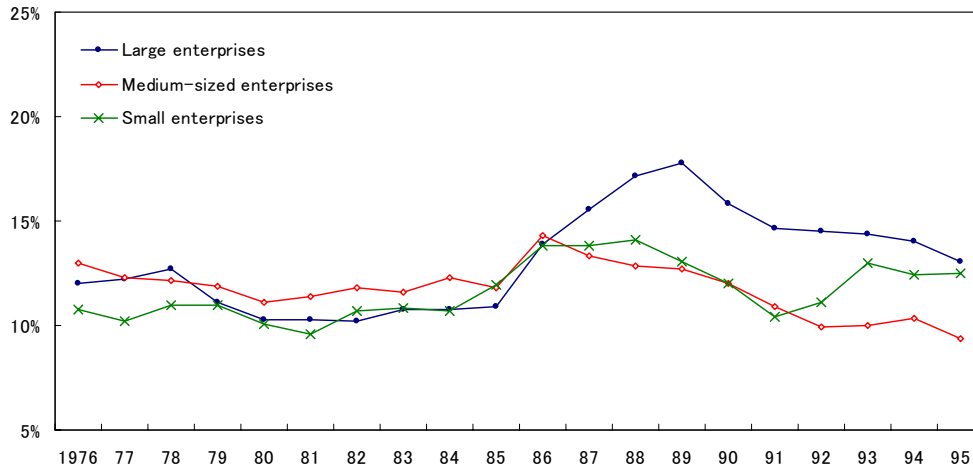
$$\text{Liquidity Ratio} = (\text{cash and deposits} + \text{securities assets}) / \text{sales}$$

In this ratio, “sales” are used as the standardizing variable so that we gain an indication of the holding of cash and deposits as a transactions buffer in the course of everyday business. A high liquidity ratio indicates aggressive financial investments by that firm.

The figure for all industries by size shows the liquidity ratio was high for all size groups in the bubble period, but was especially pronounced for large enterprises (Figure 4). These were the companies that had the best access to the capital markets, and so it indicates that they were the most aggressive in re-cycling such funding to the banking sector.



Figure 4. Liquidity Ratio of All Industries by Size

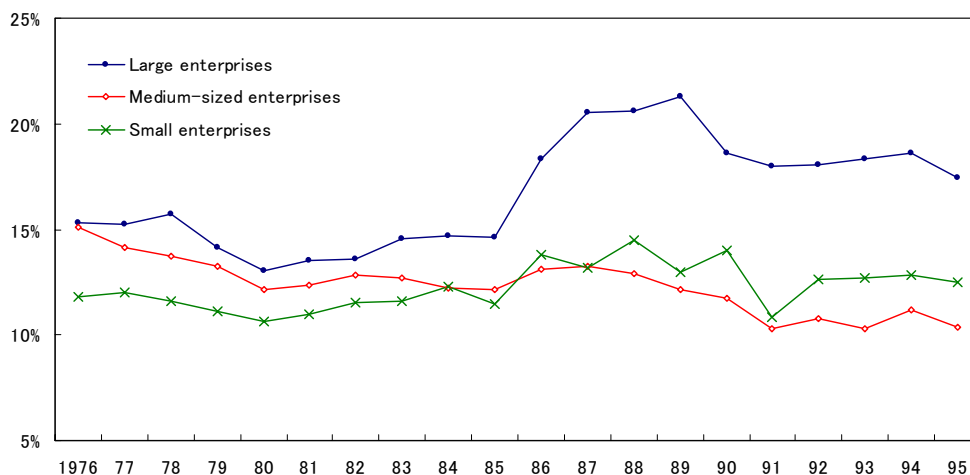


Source: Financial Statements Statistics of Corporations by Industry, Ministry of Finance.

Looking at the manufacturing and non-manufacturing enterprises separately, we have the following observations (Figures 5 and 6):

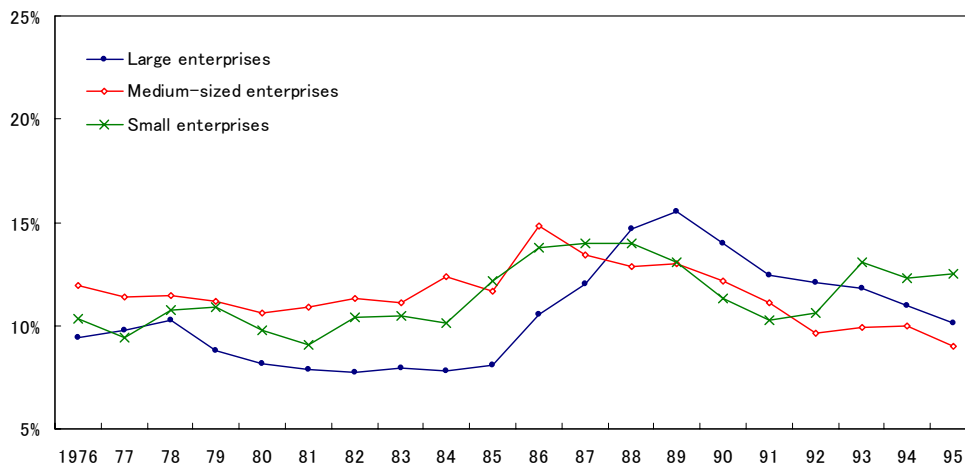
- Non-manufacturing enterprises of all sizes increased their liquidity ratio.
- Large enterprises had larger increases in the liquidity ratio in the bubble period.
- Large manufacturing enterprises had achieved the highest liquidity ratio.
- Medium-sized and small manufacturing enterprises did not have large increases in the liquidity ratio.

Figure 5. Liquidity Ratio of Manufacturing Firms by Size



Source: Financial Statements Statistics of Corporations by Industry, Ministry of Finance.

Figure 6. Liquidity Ratio of Non-Manufacturing Firms by Size

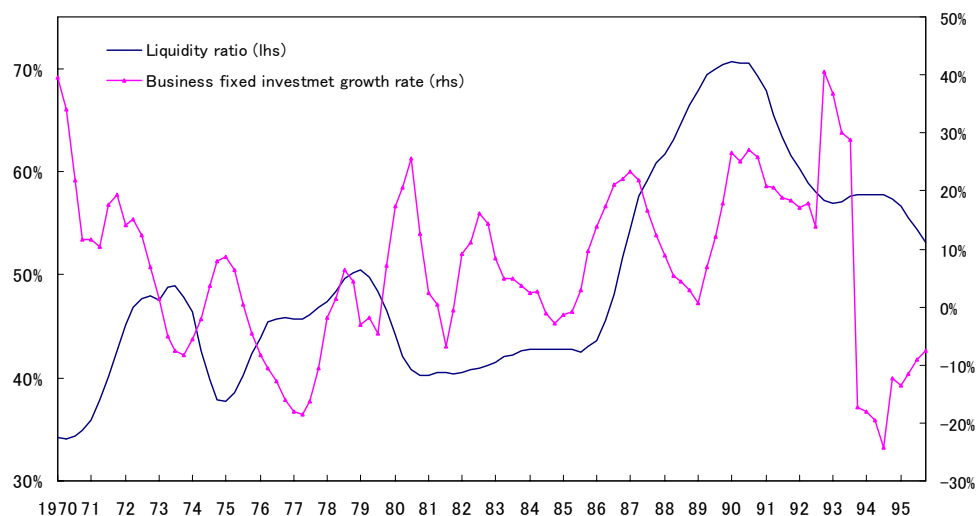


Source: Financial Statements Statistics of Corporations by Industry, Ministry of Finance.

In effect, a high liquidity ratio is indicative of a type of “carry trade” conducted by the non-financial firms. The transaction is a purely financial one in which funds are raised in the capital markets by issuing securities, and then deposited in the banking sector in the form of deposits.

The purely financial aspect of the transaction can be verified also by looking at changes in correlation between liquidity held by non-financial firms and the timing of their business fixed investments (Figure 7). In the 1970s, there was a negative correlation between the liquidity ratio and the lagging growth rate of business fixed investments by non-financial firms. It means that liquidity holdings decreased when they were used for the disbursements for business fixed investments. But, in the 1980s, the negative correlation started becoming much weaker. Eventually, it virtually vanished with a large increase in the liquidity ratio in the second half of the decade.

Figure 7. Liquidity Ratio and Business Fixed Investment Annual Growth Rate



Note: Large enterprise. Four-quarter backward moving average. The 4th lag for business fixed investment annual real growth rate. Quarterly data. Source: Financial Statements Statistics of Corporations by Industry, Ministry of Finance.

The reason for the collapse of the negative correlation between the liquidity ratio and business fixed investments can be attributed to the introduction of time deposits with liberalized interest rates. Before the financial product was available, Japanese firms could not hold the funds in their deposit accounts yielding competitive market interest rates. Therefore, the opportunity cost of holding unused liquidity was so high that the firms needed to carefully schedule the timing of fund raising and the disbursements for business fixed investments to avoid timing mismatches. The introduction of time deposits with liberalized interest rates enabled the firms to raise funds by tapping capital markets without paying much attention to the timing of the disbursements. The reason was twofold. First, as already noted, interest rates of time deposits with liberalized interest rates were as high as competitive market interest rates and the opportunity cost of holding unused liquidity effectively vanished. Second, the term of time deposits with liberalized interest rates could be chosen flexibly by depositors, provided that it was longer than the minimum term set by the regulation. The regulated minimum term was gradually shortened, contracting from three months to one month in late 1987. The flexibility in the term of time deposits and their competitive interest rates enabled non-financial firms to raise funds in the capital markets and keep them in the form of time deposits without opportunity cost for potential disbursements for business fixed investment in the future.<sup>7</sup>

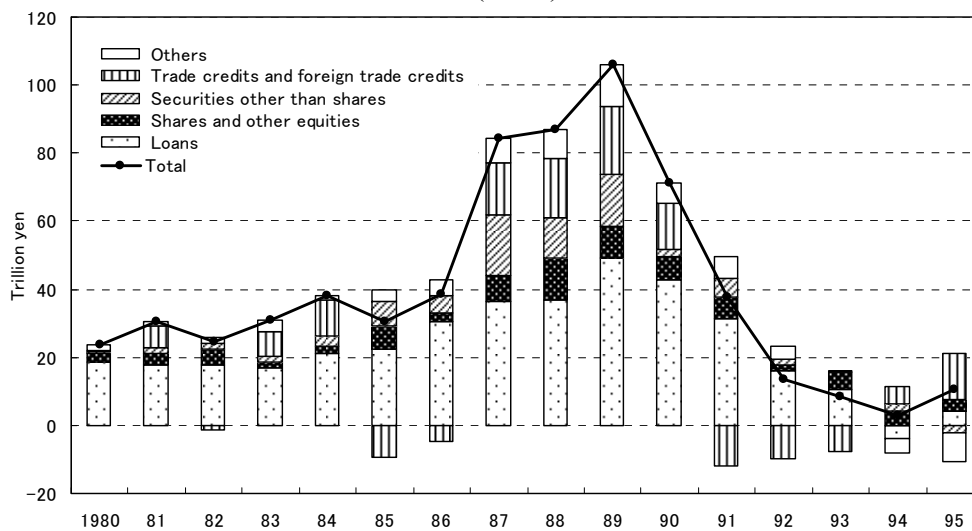
We next examine a more detailed picture of the composition of the corporate balance sheets in an aggregate form from the Flow of Funds Accounts.

<sup>7</sup> A more detailed discussion is provided in Bank of Japan (1991a).

We begin with the liabilities side of the corporate balance sheet, and in particular the flows of new liabilities (Figure 8). A notable difference between the period before 1987 and the bubble period (say, 1987 to 1989 or 1990) is the funding raised by “shares and other equities” and “securities other than shares”. Also notable is the large item classified as “loans”.

Since we are examining the aggregate corporate series, we have put together companies that tap the securities markets with those that rely on bank financing. What is notable is how both market-based and bank-based funding increased during the bubble period in the late 1980s.

Figure 8. Fundraising by Private Non-Financial Corporations (Total)



Source: Flow of Funds Accounts, Bank of Japan.

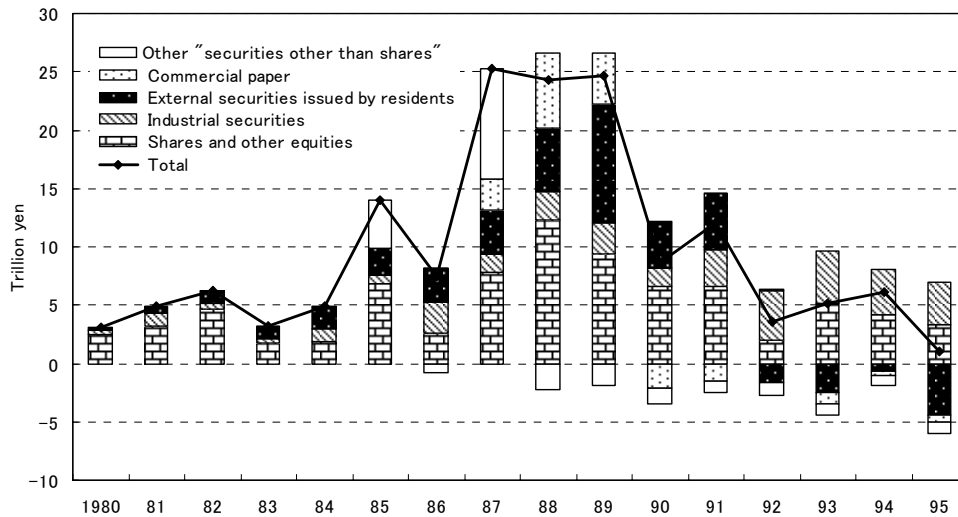
Still on the liabilities side of the corporate balance sheet, a more detailed breakdown of the “securities” category can be seen in Figure 9, below.

Securities here mean “shares and other equities” and “securities other than shares” that are a component in Figure 8. Some features are noticeable. First, it is notable how the funds raised through the securities market increased in the late 1980s. This confirms our discussion earlier on the increased importance of capital market funding for Japanese companies in the late 1980s.

Note also the emergence of CP as a funding source for companies. CP was permitted in November of 1987, and saw a rapid adoption by the corporate sector.

One feature that distinguishes the 1980s bubble in Japan from the US mortgage boom is the increased use of equity financing. We can see that the funding raised from “shares and other equities” was very substantial in the bubble period.

Figure 9. Fundraising by Private Non-Financial Corporations  
(Securities)

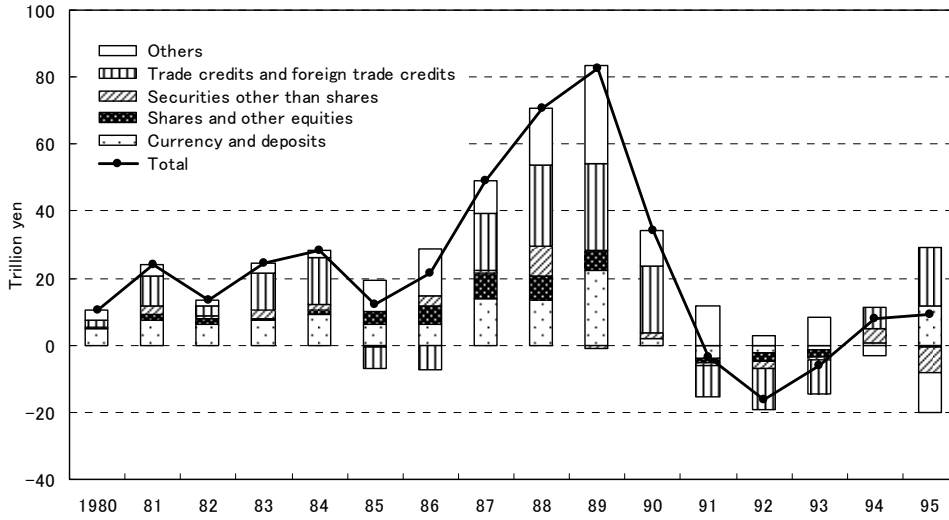


Source: Flow of Funds Accounts, Bank of Japan.

We now turn to the asset side of the balance sheet, and examine how the firms used the funding that they raised in the capital markets. The most notable feature is the “carry trade” mentioned above, in which funds raised in the capital markets were reinvested in the banking system through deposits. Note in Figure 10 that the inflows into deposits in 1987 to 1989 were very high.

The deregulation of bank deposit interest rates can be expected to have played a key role in this development of the “carry trade”. In 1985, time deposits with liberalized interest rates were introduced. The increase in deposits picked up more noticeably later in the decade. The role of market interest rates and the stance of monetary policy are crucial in understanding those trends, and we will return to this issue in a later section.

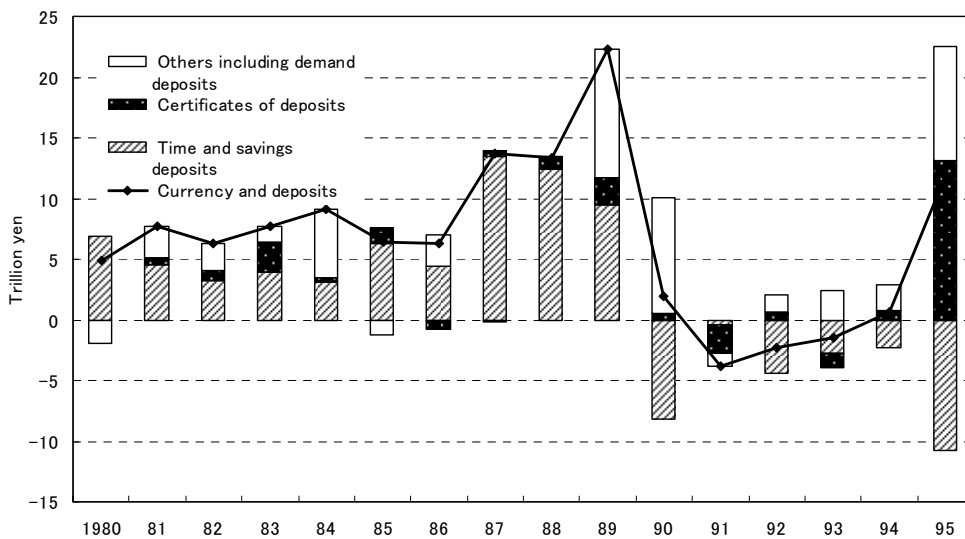
Figure 10. Financial Investments by Private Non-Financial Corporations  
(Total)



Source: Flow of Funds Accounts, Bank of Japan.

A more detailed breakdown of the currency and deposits category can be seen in Figure 11. We see that the biggest increases in the deposits took the form of time deposits that earned the highest interest rates. During the midst of the bubble period, almost all of the increase in bank deposits took the form of time deposits. In 1990, once the bubble had burst, time deposits were drawn down substantially by firms that withdrew cash for their own use.

Figure 11. Financial Investments by Private Non-Financial Corporations  
(Currency and Deposits)

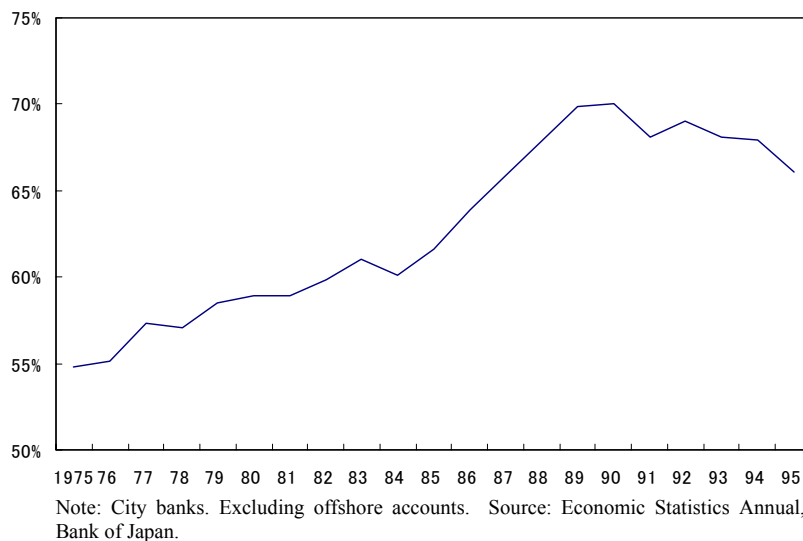


Source: Flow of Funds Accounts, Bank of Japan.

It should also be remembered that during the bubble period, household savers also preferred time deposits at banks to postal savings. This was due to the higher interest rate paid to time deposits at banks that were based on market interest rates, as opposed to regulated postal saving rates. In 1980-84, 41% of the increase of individuals' time and saving deposits including postal savings went to postal savings. In 1985-89, that share was down to 35.7%. In 1990-94, it rose again, to 45.6%.

Figure 12 below shows that time deposits at city banks as a share of total deposits increased from about 60% to 70% during the bubble period.

Figure 12. Share of Time Deposits in Total Outstanding Deposits



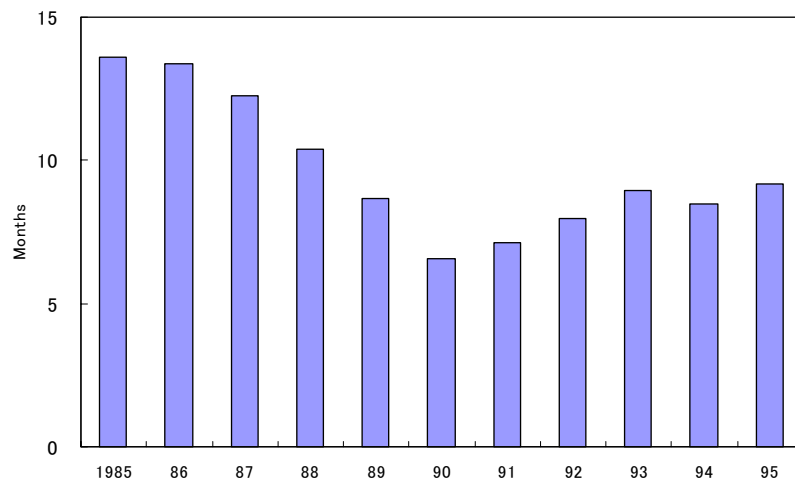
Market interest rate-based time deposits as a share of total time deposits at city banks increased dramatically in the late 1980s. It was 8.4% in 1985, rising to 88.0% in 1990. Over the same period, the share of market interest rate-based time deposits as a proportion of total deposits at city banks increased from 5.2% to 61.6%.

The effect of the increase in the share of market interest rate-based time deposits was twofold. First, it raised the cost of deposit funding for banks in comparison with regulated deposit interest rates. Second, it gave banks the flexibility to raise deposits without increasing the number of branch offices and resorting to non-price, labor-intensive competition measures at branch offices, such as frequent visits to customers. It is plausible that it became easier for city banks especially to increase deposits via their wholesale business because large-sized time deposits with liberalized interest rates were typically from companies. They could get such deposits at the wholesale sections of the main office and existing branch offices.

Concurrent with the increased proportion of time deposits in the deposit base for the banking sector, there was also a shortening of maturities, reflecting the greater short-term

nature of the deposits held by the companies. The “carry trade” interpretation of the deposit claims appears consistent with this evidence. Figure 13 below shows the average maturity of the deposits at all banks. There is a conspicuous shortening of maturities during the bubble period. By accepting time deposits with shorter terms, banks could lower the cost of deposits. As we have already seen, the minimum term of market interest rate-based time deposits was gradually shortened and this deregulation enabled banks over the years to accept time deposits with increasingly short terms.

Figure 13. Average Maturity of Time Deposits



Source: Economic Statistics Annual, Bank of Japan.

A more detailed picture of the maturity structure of time deposits can be seen in Table 3.



Table 3. Breakdown of Time Deposits by Term

Ordinary Time Deposits						Maturity-designated Time Deposits	Total
Corporations	1 month or more but less than 3 months	3 months or more but less than 6 months	6 months or more but less than 1 year	1 year or more	Sub-total		
1985		4.2	6.5	88.0	98.7	1.3	100.0
1986		8.6	6.0	84.3	98.9	1.1	100.0
1987		19.8	6.9	72.4	99.1	0.9	100.0
1988	16.3	18.8	7.0	57.2	99.3	0.7	100.0
1989	24.5	24.8	6.7	43.4	99.4	0.6	100.0
1990	38.9	28.3	8.2	24.2	99.6	0.4	100.0
1991	38.2	30.5	9.8	21.1	99.6	0.4	100.0
1992	41.0	26.1	8.2	24.1	99.5	0.5	100.0
1993	39.0	23.4	7.4	29.8	99.6	0.4	100.0
1994	42.0	21.2	9.6	26.9	99.6	0.4	100.0
1995	37.2	23.7	11.0	27.8	99.7	0.3	100.0

Ordinary Time Deposits						Maturity-designated Time Deposits	Total
Individuals	1 month or more but less than 3 months	3 months or more but less than 6 months	6 months or more but less than 1 year	1 year or more	Sub-total		
1985		2.4	3.0	44.7	50.2	49.8	100.0
1986		1.9	2.6	42.5	47.1	52.9	100.0
1987		2.3	2.8	41.9	47.0	53.0	100.0
1988	1.4	2.6	2.8	41.8	48.6	51.4	100.0
1989	4.4	4.2	3.4	37.2	49.2	50.8	100.0
1990	11.5	13.0	8.2	35.3	68.1	31.9	100.0
1991	11.1	16.8	13.5	41.9	83.3	16.7	100.0
1992	12.1	13.3	8.1	42.1	75.7	24.3	100.0
1993	7.9	8.9	6.8	49.5	73.2	26.8	100.0
1994	9.2	8.4	8.3	48.0	73.9	26.0	100.0
1995	6.3	8.0	9.8	56.6	80.7	19.3	100.0

Source: Economic Statistics Annual, Bank of Japan.

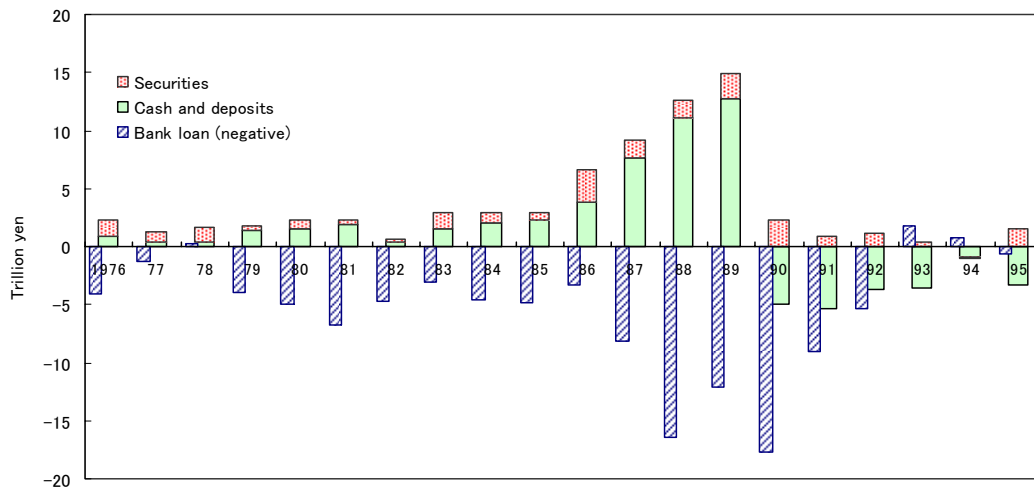
A more direct indication of the “carry trade” nature of financial intermediation of the non-financial corporate sector can be seen from the annual changes in liquidity (cash and deposits, securities in liquid asset on the balance sheet) versus the amount of bank borrowings.

Large enterprises as a group expanded their balance sheets by increasing their financial integration with the banking sector, in the following sense. When the sector balance sheet is taken as whole, the asset side of the aggregate balance sheet grew through increases in holdings of cash, bank deposits, and liquid securities, while the liabilities side increased through greater bank borrowing. Thus, the large enterprise sector as a whole both borrowed and lent more to the banking sector. Figure 14 below should be read as follows: Liabilities enter with a negative sign. Therefore, bank loan (borrowing) are shown as negative bars. We see that both assets and liabilities increased simultaneously, whereby firms (collectively) increased their claims on banks through deposits, and then received loans from the banks through increased loans.

The plausible interpretation is that the banking system was used as the conduit between different classes of firms, where some firms acted as net lenders while others acted as net borrowers. In aggregate, the firms increased both their borrowing as well as their lending

vis-à-vis the banks. These “double-sided transactions” were a well-known phenomenon observed in the bubble period.

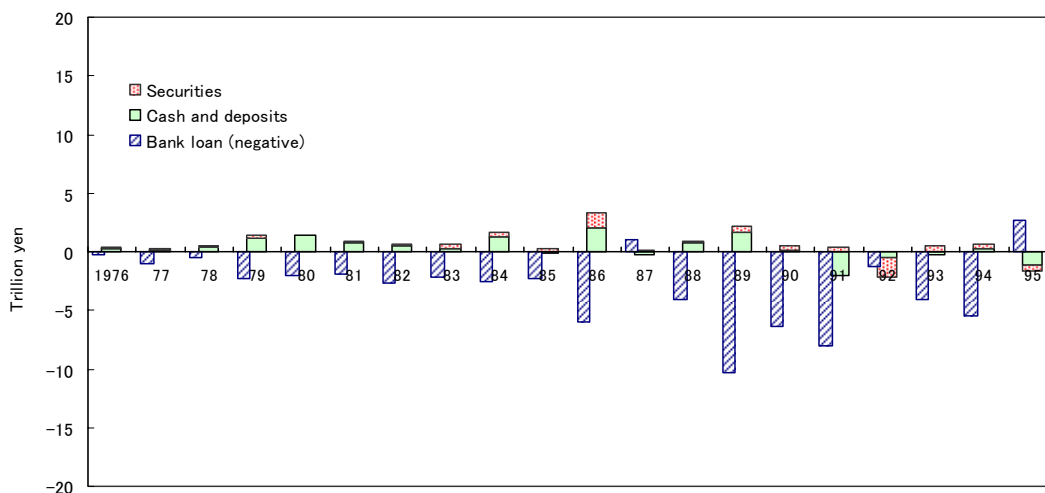
Figure 14. Assets and Liabilities  
(Large Enterprises, All Industries)



Note: Changes from the previous year. Source: Financial Statements Statistics of Corporations by Industry, Ministry of Finance.

As for medium-sized enterprises, the double-sided transactions were observed in 1986 but were not obvious in other years. Indeed, for these firms, their relationship with the banking system took on the more standard appearance of a debtor relative to the banking system. Medium-sized firms were primarily borrowers from the banks, rather than lenders to the banks. The difference between large and medium-sized firms can be attributed to the fact that only large firms had easy access to the capital markets in raising funds. Medium-sized firms had to rely on the traditional bank-based financing (Figure 15).

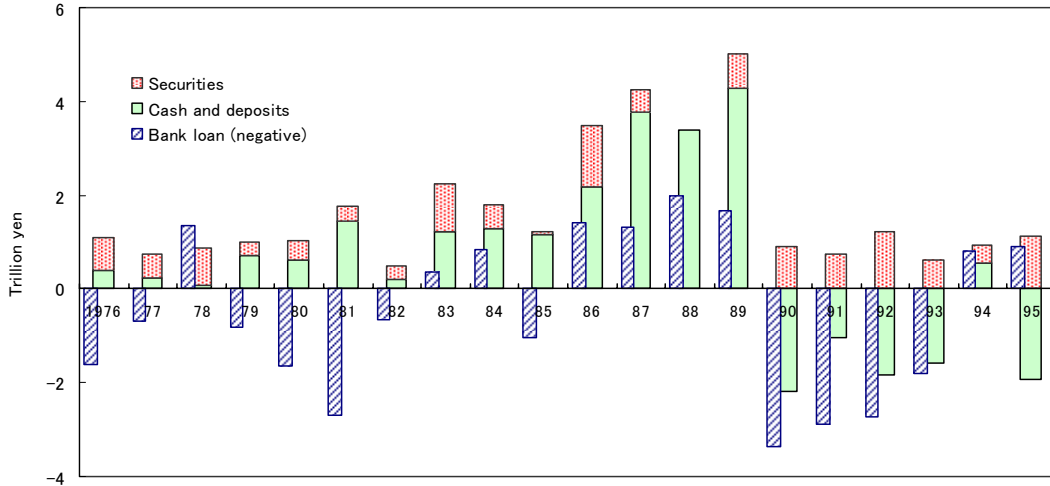
Figure 15. Assets and Liabilities  
(Medium-Sized Enterprises, All Industries)



Note: Changes from the previous year. Source: Financial Statements Statistics of Corporations by Industry, Ministry of Finance.

We can also detect a difference between manufacturing and non-manufacturing firms. The large manufacturing enterprises actually were paying back their bank borrowing. This is shown as the positive value in Figure 16 below (remember, the bank loan figure is converted as a negative value.) At the same time, they increased liquid assets on their balance sheets. Those observations are consistent with the fact that large manufacturing enterprises had achieved the highest liquidity ratio in the bubble period, and were engaged in the “carry trade” of borrowing from the capital markets in order to lend to the banks through deposits.

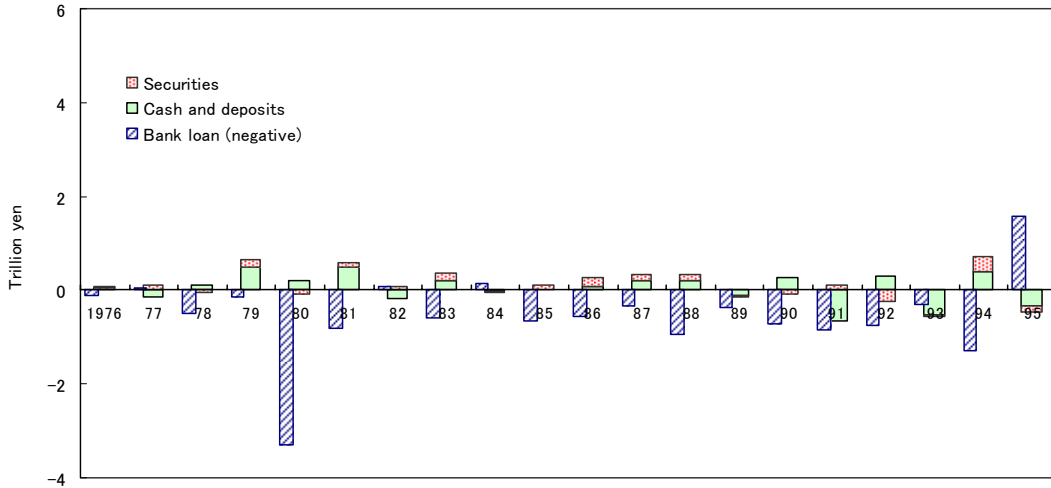
Figure 16. Assets and Liabilities  
(Large Enterprises, Manufacturing Firms)



Note: Changes from the previous year. Source: Financial Statements Statistics of Corporations by Industry, Ministry of Finance.

As for medium-sized enterprises, they performed the double-sided transactions in 85, 86, 87 and 88 (Figure 17).

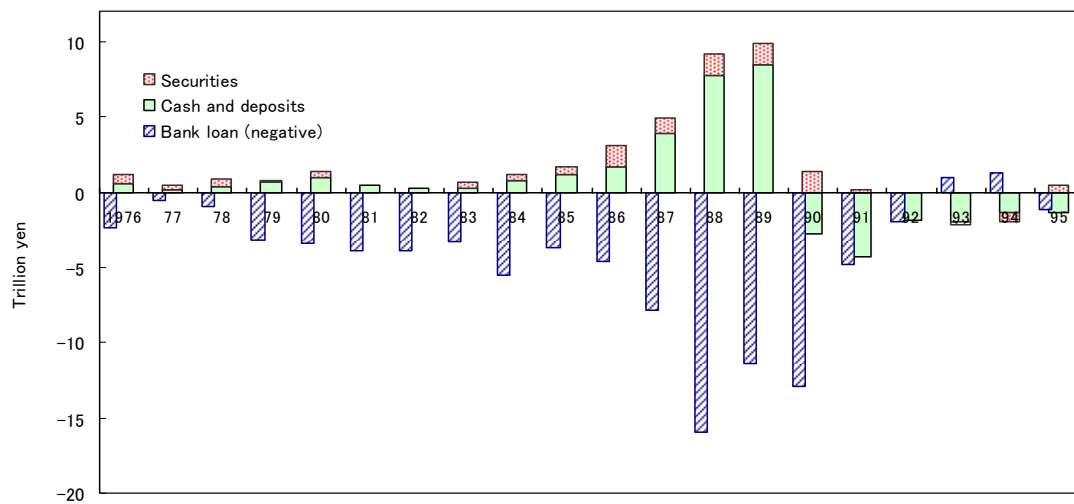
Figure 17. Assets and Liabilities  
(Medium-Sized Enterprises, Manufacturing Firms)



Note: Changes from the previous year. Source: Financial Statements Statistics of Corporations by Industry, Ministry of Finance.

Non-manufacturing enterprises behaved in a different way (Figure 18). Large non-manufacturing firms borrowed a lot as well as increased their liquid assets. The double-sided transactions were distinguished at large non-manufacturing enterprises. Note that the scale of the vertical axis is bigger in the chart for large non-manufacturing enterprises than the one for large manufacturing enterprises.

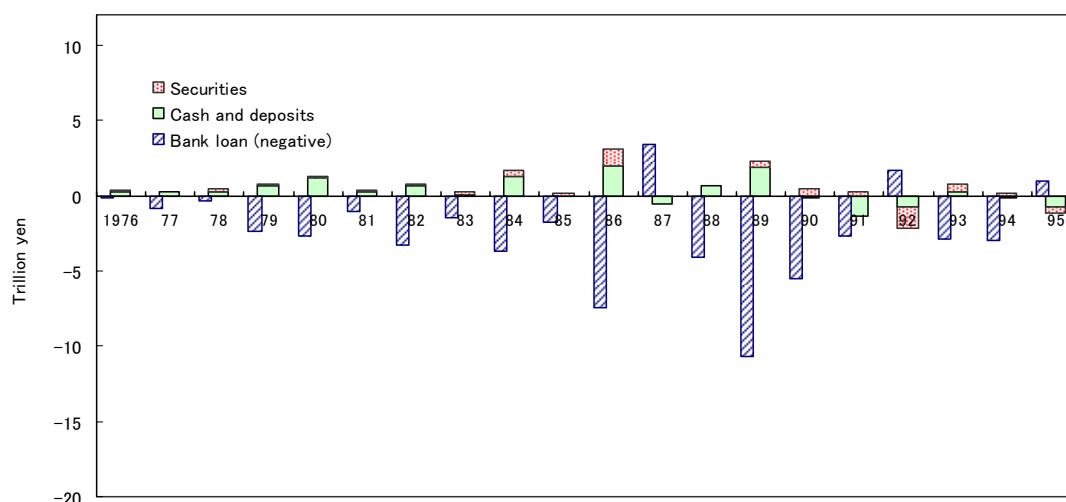
Figure 18. Assets and Liabilities  
(Large Enterprises, Non-Manufacturing Firms)



Note: Changes from the previous year. Source: Financial Statements Statistics of Corporations by Industry, Ministry of Finance.

The medium-sized enterprises increased borrowings (Figure 19). In some years in the bubble period, they performed the double-sided transactions but by and large they increased borrowings more than liquid assets.

Figure 19. Assets and Liabilities  
(Medium-Sized Enterprises, Non-Manufacturing Firms)



Note: Changes from the previous year. Source: Financial Statements Statistics of Corporations by Industry, Ministry of Finance.

## 5. Shifts in the Composition of Bank Lending

The developments highlighted so far had an impact on the banking sector in several ways. An inevitable consequence of the increased financial intermediation role played by non-financial companies was that the banks were pressured on both sides of their balance sheets.

On the asset side, the banks lost many of their traditional borrowing customers. In particular, large non-financial companies that previously relied on the banking systems to supply credit could turn to the capital markets to raise funds.

The increased role of capital market funding by non-financial companies also had repercussions for the banking sector through the liabilities side. The “carry trade” engaged by the non-financial companies resulted in the increased funds available for use by the banks through the increased time deposits with liberalized interest rates.

Banks faced higher costs of funding through market interest rate-based deposits. In comparison with the regulated deposit rates, market interest rate-based deposit rates resulted in higher rates. The share of funds raised without regulation in the total funds at city banks rose from about 17% in 1980 to about 70% in 1990 (Bank of Japan (1991b)). According to an estimate in the Bank of Japan report (Bank of Japan (1991c)), this change in the composition of deposits meant that the average deposit rate was 150 bps higher in 1990 than it would have been assuming that all deposits were raised under regulated interest rates in the same year.

These changes meant a less favorable earnings environment for banks than before. Indeed, the short-term deposit and lending rate spread shrunk from about 300 bps in the first half of the 1980s to about 160 bps later in the decade. Nonetheless, the profit of the Japanese banking sector in the second half of the 1980s broke historical records. The reasons for this are instructive. Pressured on both sides of their balance sheets, the banks had to search for new borrowers, both in order to replace their traditional borrowing customers, but also to utilize the new funding resources supplied to them by corporate depositors. The natural response of the banks was to lower their lending standards so that they would attract more business (Bank of Japan (1991c)).

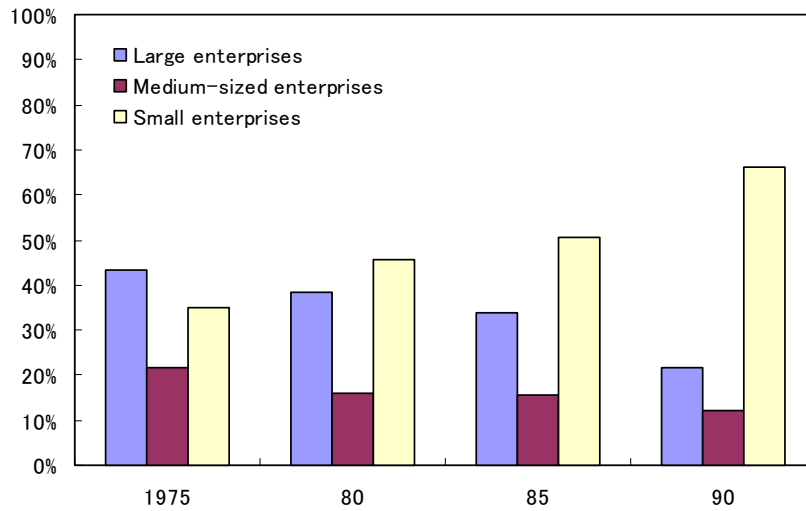
The response by the banks was reflected on the asset side of their balance sheets in terms of the changed composition of loans. The banks increasingly resorted to riskier loans along three dimensions:

- First, they began to lend more to smaller firms that were previously shut out of the credit market.
- Second, they resorted to longer-term loans.
- Third, they increased loans to real estate-related sectors.

We consider these three issues in turn.

The size profile of corporate borrowers from the banks can be seen in Figure 20. At the end of 1975, large enterprises accounted for more than 40% of total loans to domestic corporations, but this figure decreased to about 20% at the end of 1990. Conversely, the share of loans to small enterprises increased from about 35% to about 65% over the same period. At the same time, loans to individuals as a share of total outstanding loans also rose, from 7.9% to 16.3%.

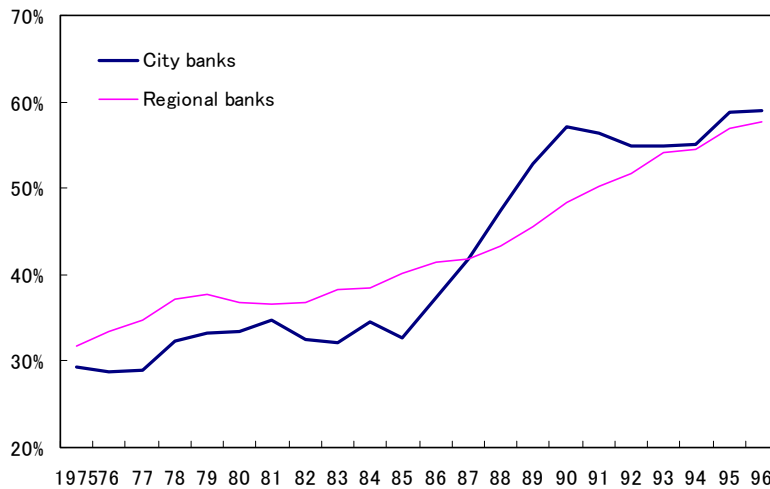
Figure 20. Breakdowns of Corporate Borrowers by Size



Note: Total outstanding loans used for calculations are outstanding loans and discounts to domestic corporate borrowers excluding overdrafts. Large enterprises are corporations with capital of 1 billion yen or more and more than 300 regular employees. For the wholesale trade industry, the criterion for the number of regular employees is more than 100 persons. For the retail and service industries, it is more than 50 persons. Small enterprises are unincorporated enterprises as well as corporations with capital of 100 million yen or less or with regular employees of 300 persons or fewer. For the wholesale trade industry, the definition is corporations capitalized at 30 million yen or less or with 100 regular employees or fewer. For the retail trade and service industries, it is corporations capitalized at 10 million yen or less or with 50 regular employees or fewer. Outstanding loans for medium-sized enterprises are calculated by excluding those for small enterprises and large enterprises from total outstanding loans. Source: Economic Statistics Monthly, Bank of Japan.

The increased maturity of loans can be seen in the following figure (Figure 21), which plots the proportion of loans with maturities longer than one year. We can see that the loan portfolio lengthened dramatically during the bubble era, especially for city banks.

Figure 21. Ratio of Long-term Loans in Total Outstanding Loans

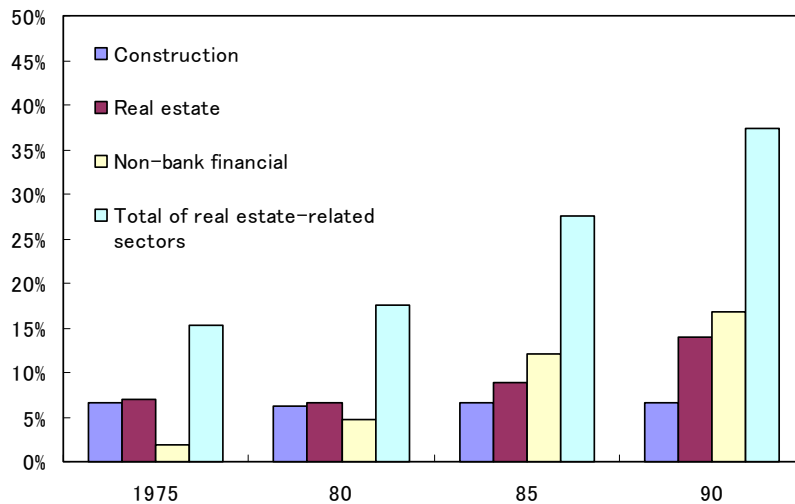


Note: Long-term loans are loans with maturity longer than 1 year. Source: Economic Statistics Annual, Bank of Japan.



An increased weighting was placed on lending to real estate-related sectors (construction, real estate, non-bank financial), as shown in Figure 22. The non-bank financial intermediaries engaged mainly in lending to the real estate industry, and so was a prime channel through which increased credit fuelled the property bubble. In this way, the composition of bank portfolios shifted toward riskier, speculative activity.

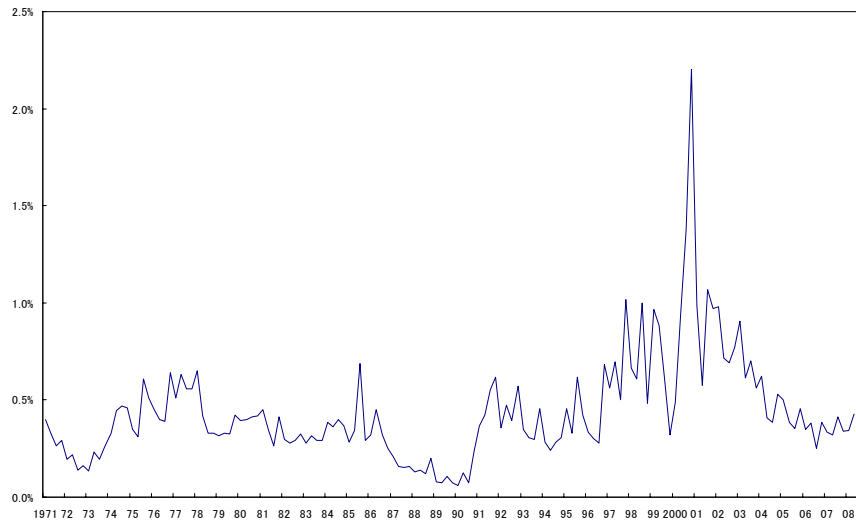
Figure 22. Bank Lending to Real Estate-Related Sectors



Note: Real estate-related sectors include real estate, construction, and non-bank financial. Total outstanding loans used for calculations are outstanding loans and discounts to domestic corporate borrowers excluding overdrafts. Outstanding loans to the non-bank financial industry are the sum of those to the other financial industry and the lease industry. Source: Economic Statistics Monthly, Bank of Japan.

Nevertheless, bank profitability remained high, due to the benign macroeconomic conditions and the economic boom that was an integral part of the lending boom that resulted. The parallels with the US mortgage boom in the early years of this decade are striking. Measured loan quality remained very high during the bubble era, as seen in Figure 23 below that shows the quarterly series of ratios of the total debts of defaulted firms to total bank loans outstanding to all industries.

Figure 23. Default Rate

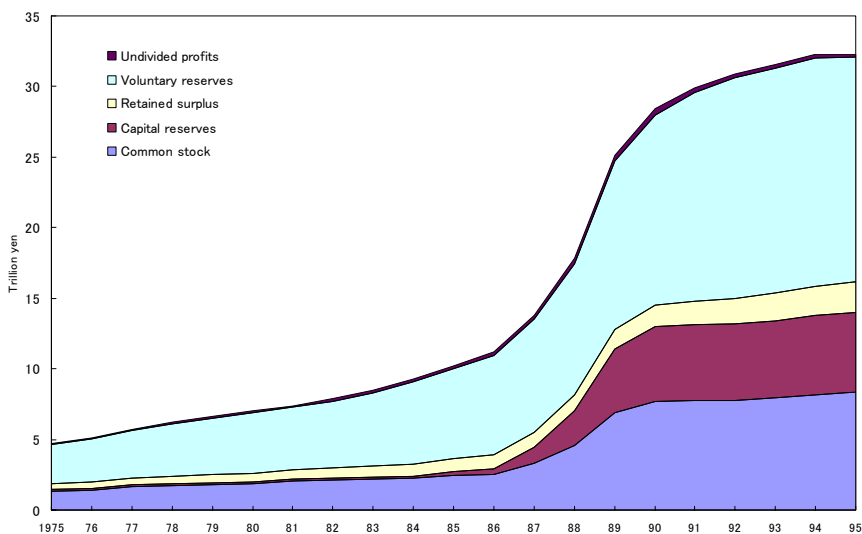


Note: The ratio of total debt of defaulted firms to total outstanding loans of all banks. Quarterly data. Source: Tokyo Shoko Research, Economic Statistics Monthly, Bank of Japan.

According to these statistics, the default rate of loans was lower in the bubble period than it was in other periods. The default rate also continued to fall from 1987 to the end of 1990.

Bank profitability remained high during this period, resulting in a strong accumulation of surpluses at the banks. In accordance with this, the capital position of the banks in the late 1980s period strengthened dramatically. The following figure (Figure 24) shows the time series of the capital composition at the banks.

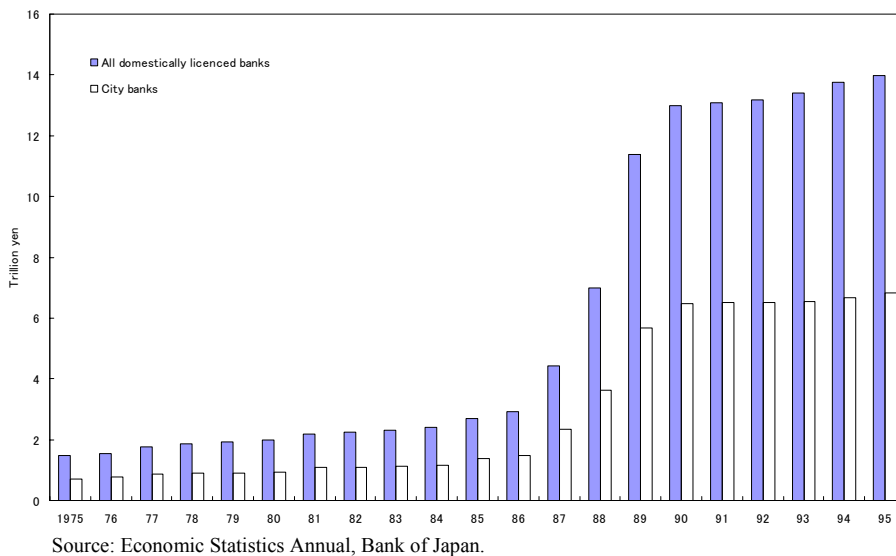
Figure 24. Compositions of Bank Capital



Source: Economic Statistics Annual, Bank of Japan.

The increased profitability of the banks bolstered their common stock. The banking sector itself was able to raise new equity financing on the back of the buoyant stock market. Just as non-financial firms were able to raise more equity funding, so were the banks able to tap the same market. An increased flow of equity funding by issuing new stocks was seen. Part of the increased capital raising was associated with the impending BIS capital regulation. Figure 25 shows the evolution of common stock plus capital reserves. The capital raised by issuing new stocks is eventually booked either as common stock or capital reserves. As can be seen, it increased during the bubble era.<sup>8</sup>

Figure 25. Common Stock and Capital Reserves

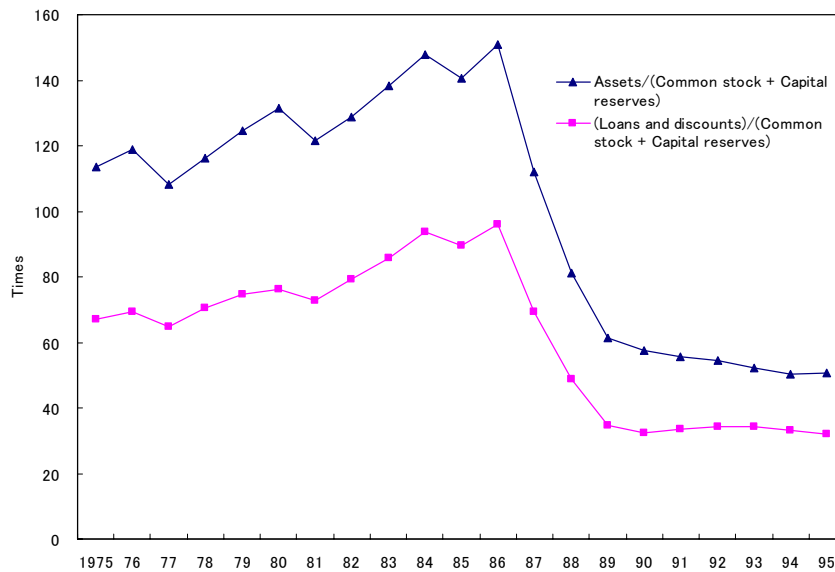


A consequence of the strong capital position was the low leverage ratio of the banks. This is another important instance in which the 1980s bubble period in Japan differs from the US mortgage boom of the early years of this decade. Whereas the market-based financial intermediaries based in the United States increased their leverage sharply in the years immediately prior to the current financial crisis, this was not the case for banks in Japan in the 1980s bubble.

The following (Figure 26) is the time series of leverage for Japanese banks from 1980 to 1995, where leverage is defined as the ratio of “assets” (or “loans and discounts”) on aggregated city bank balance sheet to the sum of “common stock” and “capital reserves” on the balance sheet. As we can see, the leverages went down during the bubble era. This is one respect in which the outward appearance of the 1980s bubble in Japan differed from the recent boom and bust cycle among US financial intermediaries – especially the market-based intermediaries such as the investment banks.

<sup>8</sup> After the bubble era, it was stable until the government injected public money into the capital of ailing banks.

Figure 26. Leverage



Note: City banks. Source: Economic Statistics Annual, Bank of Japan.

The fact that leverage went down is an indication of the rapid pace of new equity issuance, as we have discussed already. Some of the new stock issues had a regulatory dimension, associated with the impending adoption of the Basel capital accord of 1988. Banks had a heightened sense of concern about the BIS capital regulation and possible change of official attitude toward the banking sector. The concern was the weakening of the implicit guarantee in place before the financial liberalization of the 1980s. Ironically, however, the buoyant nature of the stock market in Japan during the bubble era created a favorable environment in which the banks could ease the severity of the capital constraint on their lending activities. Instead, the banks continued to extend riskier loans to SMEs based on lower collateral standards, as well as to the non-bank financial intermediaries that provided real-estate financing.

## 6. Short-Term Interest Rate Spreads

To this point, we have not explained why non-financial firms had the incentive to engage in their “carry trade” by borrowing in the capital markets and then lending to the banks via time deposits with liberalized interest rates. However, as with any “carry trade”, the interest rate differential is all important in determining the profitability of the trade, and hence the incentive to engage in such trades.

The final piece in the jigsaw puzzle that will complete our argument is thus to show that the short-term interest rate spreads were such that the carry trade was profitable. The particular interest rate spread of interest to us is the difference between the market

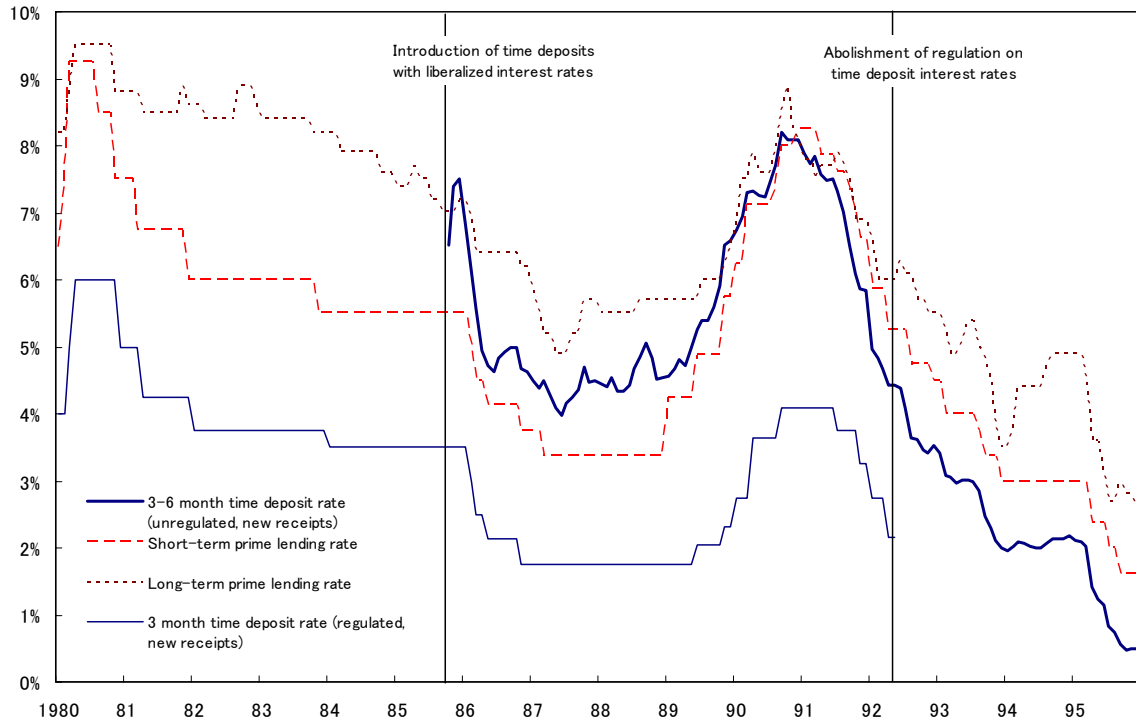
interest rate in the capital markets at which non-financial firms could borrow, and the bank deposit interest rate at which the non-financial firms could lend. For the carry trade to be profitable, the deposit rate should be higher than the capital market rate.

Unfortunately, appropriate data on capital market interest rates for short-term instruments such as CP in the bubble period are not available now. But, there are some reports pointing to the profitability of the arbitrage between such instruments and bank deposits in the period. The Bank of Japan (1989) refers to the fact that large non-financial firms could gain interest rate margins by issuing CP and depositing the raised funds at banks as time deposits with liberalized interest rates. It concludes that this arbitrage opportunity worked toward the rapid expansion of the CP markets in the bubble period to a great degree. De Brouwer (1996) similarly notes that a positive spread between the interest rate on certificates of deposit (CD) and CP gave firms an incentive to borrow at the low CP rate and deposit the proceeds in CDs at a higher rate.

We can show a more striking fact illustrating how anomalous the bubble period was. The figure below (Figure 27) shows time deposit interest rates (regulated and unregulated) and prime lending rates (short-term and long-term). From 1985 when time deposits with liberalized interest rates were introduced to the middle of 1990, the 3-6 month time deposit rate (unregulated, new receipts) was consistently higher than the short-term (less than 1 year) prime rate for the highest credit quality borrowers.

Indeed, for some of the time, the time deposit rate was even higher than the long-term prime lending rate. This happened just after the introduction of the deposit product and just before 1990 – the peak of the bubble. So it was possible for high credit quality borrowers (presumably large firms and borrowers with good collateral), to profit by borrowing funds at the short-term prime lending rate from banks and depositing the borrowed funds at banks as time deposits with liberalized interest rates. This arbitrage opportunity remains even after the introduction of the new short-term prime lending rate in January 1989 that was determined by reference to actual funding costs for banks rather than the official discount rate.

Figure 27. Time Deposit Rates and Prime Lending Rates



Note: The “3-6 month time deposit rate (unregulated, new receipts)” is the average interest rate on newly received time deposits with unregulated interest rates of terms between 3 and 6 months. “3 month time deposit rate (regulated, new receipts)” is the interest rate set by the regulation on newly received 3 month time deposits. Source: Economic Statistics Annually, Bank of Japan

A very natural question is why the banks themselves did not raise short-term funding from the capital markets directly – for instance, by issuing market-based bills or CP.<sup>9</sup> An answer here is that the banks were not permitted to issue CP or other such bills due to regulatory hurdles until much later.<sup>10</sup> Thus, the interest rate spread that gave rise to the “carry trade” was itself part of the regulatory landscape. Another reason is that banks offered favorable terms on time deposits for large non-financial firms, aiming to expand the potential customer base in businesses that they would enter in the future. We believe this business expansion motive is the most plausible explanation for the anomalous pricing of deposit and lending rates.

<sup>9</sup> The three long-term credit banks issued medium term bank debentures.

<sup>10</sup> While non-financial corporations were permitted to issue commercial paper in 1987, banks were not permitted to do so until 1998.

## 7. Macroeconomic Background

The financial system perspective adopted in this paper provides a useful approach to understanding the process of aggregate credit expansion. The perspective allows us to pin down the relationship between funds from non-leveraged institutions in the interlocking system of balance sheets with leveraged financial institutions, the equity of leveraged financial institutions, the leverage of leveraged financial institutions in the financial system, and the total credit produced in the financial system. We have so far discussed the case of the United States and Japan in light of the financial system perspective and illuminated the mechanisms behind the observed phenomena.

However, the financial system perspective is incomplete without an explanation of what motivated the leveraged institutions in the system to expand their capacity and thereby lend so aggressively. It is here that we believe that the macroeconomic backdrop in terms of monetary conditions and the reform of the regulatory landscape play key roles.

### *Financial Liberalization*

As already discussed, the funds raised by large non-financial firms flowed into the banking sector and this led to the expansion of credit provided by the banks in the late 1980s in Japan. Although monetary policy easing and the increase in asset prices contributed to the credit expansion, it is difficult to explain the credit expansion in the bubble period without the role played by deregulation in the capital markets that relaxed existing restrictions on bond issues and by the introduction of time deposits with liberalized interest rates.

The key feature of financial liberalization in Japan was its gradual implementation. The liberalization process was initiated in the late 1970s and was not completed until the so-called Financial Big Bang in 1998. The whole process thus took a full twenty years.

There were three main strands to the financial liberalization, namely (1) the deregulation of deposit and lending interest rates, (2) relaxation of the separation of business between banking and securities firms, and (3) the integration of domestic financial markets into the global capital markets. In the late 1980s, the deregulation of deposit interest rates was in its final stages. As for the deregulation of the separation of business between banks and securities firms, the process got underway in the 1980s: securities firms started sales of medium-term government bond funds in 1980 that was an equivalence of NOW account in the United States, and banks started sales of public sector bonds to customers. With expectations of further deregulation to come, banks had a strong incentive to augment the foundations of the securities business they would launch in the future.<sup>11</sup> The internationalization of financial markets also made significant progress. For example, the real demand requirements for forward exchange transactions and the restrictions on

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<sup>11</sup> The discussion on the deregulation of the separation of business between banks and securities firms began in the 1980s and was once materialized as the Financial System Reform Law legislated in June 1992, which allowed banks and securities firms to enter each others' business via subsidiaries. It took six more years to complete the whole process as the "Financial Big Bang" in 1998.

banks' net short spot positions in foreign currencies were both eliminated, in April and June 1984, respectively.

Rather than focusing on innovations to their business model that kept pace with the changes in financial landscape, banks focused instead on profit maximization via expansion of the balance sheets.<sup>12</sup> The behavior of Japanese banks was not only the result of inertia in their business model under the regime of regulated interest rates.

Banks were highly motivated to expand the potential business base of securities business, as well as fee businesses such as the cash management service, in advance of their entry into the securities business after further deregulation of the separation of business between banks and securities firms. Taking their entry into the potentially profitable business into account, the banks were trying to keep or strengthen the business relationship with large non-financial firms by providing financial products with competitive market interest rates vis-à-vis capital market products, namely time deposits with liberalized interest rates. As we have already seen, these liabilities were deployed on the asset side of the banks' balance sheets and this resulted in expansion of their balance sheet size.

Another phenomenon observed in the late 1980s was the reduced stringency of some policy measures implemented in the regime with regulated interest rates. Under the regime, increases in deposits and loans outstanding almost directly led to increases in bank profits. This feature stemming from the regulatory framework motivated banks to expand their balance sheets as much as possible and this motivation would have resulted in excessive lending. One policy measure for decelerating volume expansion was the regulation on the establishment of new branch offices by the Ministry of Finance that effectively put a curb on the availability of deposits for banks. In the process of financial liberalization, banks found new ways to raise funds, such as time deposits with liberalized interest rates, and the effectiveness of the regulation on new branch office establishment decreased. Moreover, as part of financial liberalization, the regulation was operated in a more flexible or less stringent way than before.

With respect to the asset side of the balance sheet of banks, the window guidance by the Bank of Japan had the role of decelerating balance sheet expansion by banks. The window guidance "had the function to complement interest rate policy for monetary policy implementation" (Suzuki (1984)). However, in the process of financial liberalization, the Bank of Japan started respecting more autonomy for banks to choose the level of loans outstanding and the window guidance was eventually abolished in 1991. Hoshi et al. (1993) pointed out that the window guidance did not work as a measure to curb loans outstanding in the late 1980s.

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<sup>12</sup> A report published by the Bank of Japan summarizes its assessment of risk management by banks in the late 1980s as "There were many cases in which the evaluation of collateral such as real estate was not strict enough in an environment of rising land and stock prices. Moreover, identification of the purpose of the funds and evaluation of the borrowers' ability to repay, etc. were not appropriate in many loan contracts. On the whole, it is hard to deny that some slackness in each step of the loan practice, i.e., prior examination, interim-monitoring and loan asset protection, was observed." (Bank of Japan (1991)).



Actually, the role of the window guidance was wider than mere lending volume controls, and it worked as a means of communication on macro credit demand between the Bank of Japan and private banks. Although the window guidance has often been criticized as a discretionary policy measure against market principles, the measure could have been used to send an effective warning (“moral suasion”) to the banking sector directly about its excessive behavior. In other words, the policy measure could have been used for macro prudential policy communication.

#### *Expectation of Continuation of Monetary Policy Easing due to the Government Policy Commitment*

It has been noted that monetary policy was accommodative for longer than was necessary and that this was a fundamental factor in the appreciation of asset prices and the expansion of credit in the late 1980s. However, a noteworthy fact concerning monetary policy in this period was the emergence of expectations of continued monetary policy easing. The background to this was the government’s commitments in the international policy coordination pledged in the period.<sup>13, 14</sup>

One of the primary policy issues in the late 1980s was the increasing current account surplus, especially with respect to the United States. The current account was almost in balance at the beginning of the 1980s, but it had moved into a substantial surplus of 3.7% of GDP in 1985. The government policy stance to curb the increase in the current account surplus was to introduce policy measures designed to bolster imports through an expansion of domestic demand, rather than by restricting exports. This policy stance would have been interpreted as a commitment to a continuation of monetary policy easing as a measure to expand the domestic demand as long as a significant current account surplus existed.<sup>15</sup>

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<sup>13</sup> Okina, Shirakawa, and Shiratsuka (2001) points to the expectations of continued monetary policy easing by referring to the yield curve flattening in the late 1980s in Japan.

<sup>14</sup> It has been noted that the so-called *Mayekawa Report* (Report of Studies Group on the Structural Adjustment for International Coordination) published by the government in April 1986 was a symbolic manifestation of the government’s commitment to the international policy coordination in this period. Moreover, the Mayekawa Report has often been referred to as the government’s firm commitment to keeping eased monetary policy as a means of expanding domestic demand. This understanding of the report is not correct. In fact, the main message in the report was the need to reform the structure of the economy with low income elasticity of imports and high income elasticity of exports, so as to reduce the current account surplus. The proposed policy direction in the report was increasing imports through deregulation and improved access to the domestic markets, rather than by restricting exports with protectionist measures such as quantity controls. The emphasis in the report on the importance of domestic demand-led growth was a reflection of the policy consensus in Japan and the report carefully pointed to the importance of eliminating obstacles for increasing domestic demand in various aspects. For example, it warned that a rapid appreciation of housing prices would hinder housing purchases and that warning proved to be correct.

<sup>15</sup> In the formation of expectations of a continuing real estate price boom, the “public information” disseminated by the government would have contributed to a great degree although we can not call it a “commitment” pledged by the government. Yoshikawa (2002) claims that the estimates on the scarcity of office space in Tokyo reported in the “Metropolitan Reconstruction Plan” (1985) and “The 4th National Comprehensive Development Plan” (1987) by the National Land Agency worked to form bullish expectations held by banks on future demand for real estates, and large increases in bank lending to real

After the Plaza Accord in September of 1985, the Japanese yen appreciated considerably. As a result, the current account surplus in terms of quantity started decreasing although the decrease was not large. In contrast, it took more time for the current account surplus in nominal terms to begin decreasing, because of the so-called J-curve effect. Actually, it reached 4.2% of GDP in 1986 and it was still 2.1% of GDP in 1989. On top of the slow pace of reduction of the current account surplus, the monetary policy easing in some developed countries following the plunge of stock prices in October of 1987 (“Black Monday”) strengthened expectations that monetary policy easing would continue in Japan.

## **8. Lessons for Monetary Policy**

### *Need for a More Comprehensive Assessment of Financial Institutions*

In liberalized modern financial markets, the intermediation of funds is through numerous channels. The inflow of international funds into the financial sector via mortgage-backed securities in the US case shares similarities with the Japanese experience in the 1980s bubble, which saw inflow of funds raised in the capital markets by large non-financial firms into time deposits with liberalized interest rates at banks. In both cases, the structure of the financial system was undergoing rapid change. In these circumstances, previously reliable indicators of the soundness of financial institutions such as capital asset ratios and liquidity ratios may not remain effective indicators that ring alarm bells. In the US case, although the liquidity ratio was deteriorating, the capital asset ratio was thought to be satisfactory. In the Japanese case, neither ratio warned of any serious future problems in the midst of the bubble. Those experiences suggest that policy authorities should be wary of the complacent belief that existing indicators of financial conditions are still always reliable. In particular, new approaches to assessing financial conditions should be adopted as the financial system evolves. To the extent that funds raised in the capital markets play an important role, market-based liability figures may be more useful, as argued by Adrian and Shin (2007, 2008). In the Japanese case, qualitative aspects in lending activities like loan standards and collateral evaluation could have been very indicative.

### *Role of Prudential Policy Communication*

It will be important for the policy authorities to point to some excesses in financial markets and the behavior of financial institutions as part of their communication strategy. If market functions lack self-correcting mechanisms for certain forms of excess, active warnings about such excess from the policy authorities will have value. In the case of Japan, in the ongoing financial liberalization, interventions by the policy authorities were reduced significantly. The effectiveness of some policy measures for prudential policy communication such as the window guidance by the Bank of Japan, which worked as a

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estate projects in addition to the aggressive behavior of real estate developers accelerated the real estate price appreciation.

moral suasion measure, decreased and there could be a larger role to be played by such measures.

### *Reconsidering the effect of “Commitment”*

For both the US and Japanese cases, monetary policy easing was a factor behind the excesses of financial institutions and the flow of funds that backed their behavior. Moreover, in both instances, the monetary policy stance was assessed to be based on a commitment to the continuation of loose monetary policy. The announced measured pace of future policy changes in the United States and the emphasis in Japan on increasing domestic demand as a commitment in international policy coordination seemed to lead to this perception.

It is true that “commitment” to a future path of monetary policy helps to increase transparency of monetary policy, but the experiences in the United States and Japan discussed in this paper give us pause for thought on the desirability of commitment, especially on the unintended side-effects of forward-looking policy statements. To the extent that such forward-looking statements reduce the uncertainty surrounding future central bank actions, the risk premiums will be artificially compressed relative to a situation in which the central bank does not issue forward-looking statements on the future direction of short-term policy interest rates.

### *Role of Short Term Interest Rate for Funding Cost for Financial Institutions*

When financial intermediaries are placed explicitly in the monetary policy transmission through credit supply, short-term interest rates take on significance for monetary policy. This perspective on the importance of the short-term interest rates as a price variable is in contrast to current monetary thinking, where short-term interest rates matter only to the extent that they determine long-term interest rates, which are seen as being risk-adjusted expectations of future short-term interest rates. Alan Blinder (1998, p.70) in his book on central banking puts it in the following terms:

“central banks generally control only the overnight interest rate, an interest rate that is relevant to virtually no economically interesting transactions. Monetary policy has important macroeconomic effects only to the extent that it moves financial market prices that really matter – like long-term interest rates, stock market values and exchange rates.”

For this reason, current models in monetary economics emphasize the importance of managing market expectations. By charting a path for future short rates and communicating this path clearly to the market, the central bank can influence long rates and thereby influence mortgage rates, corporate lending rates, and other prices that affect consumption and investment. The “expectations channel” has become an important consideration for monetary policy, especially among those that practice inflation targeting. In contrast, the role of the short-term interest rate in regulating credit supply

suggests that short-term interest rates have significance as a price variable in their own right.<sup>16</sup>

In the context of the Japan's 1980s bubble, low short-term interest rates gave banks the incentive to increase deposits by using newly introduced time deposits with liberalized interest rates. In a sustained environment of low short-term interest rates, banks resorted to maturity transformation between liabilities (deposits) and assets (loans) to increase their profits. In relation with the role of commitment discussed in the last subsection, when an expectation emerges that short-term interest rates will remain low, there will be greater motivation for this behavior because the funding cost for rolling over the liabilities is expected to be low. Therefore, the role of the short-term interest rate *level* and *expectations about its continuation* will both have a role that does not explicitly appear in current models in monetary economics.

## 9. Conclusions

This paper has offered a perspective on the 1980s bubble years in Japan in the light of the experiences of the subprime credit boom in the United States and its subsequent unwinding in the current financial crisis. The incremental contribution of our account has been to offer a financial system perspective with an emphasis on the supply of credit.

The ingredients that make an appearance in our discussion (such as the lending to real estate-related sectors, the increase in lending to SMEs) have been discussed by many others before us. Our contribution is to bring them together in a systems perspective.

Our main argument is that as new funding sources opened up to non-financial firms, it became profitable for them to act as financial intermediaries by raising funding in the capital markets through securities, and then supplying the new funds raised to the banking system by means of newly introduced time deposits with liberalized interest rates. The financial assets of non-financial corporations increased dramatically together with their financial liabilities in the late 1980s. In this way, the non-financial companies became *de facto* financial intermediaries. They became financial intermediaries that drew market-based finance and supplied financing to the banking system by holding large deposit claims on the banks.

We have also emphasized how the boom in the stock market contributed to the lending boom by increasing the funding available both to financial and non-financial firms. Thus, the stock market boom and the lending boom can be seen as intimately linked. The financial system perspective offers many insights which may have applicability in other contexts.

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<sup>16</sup> Adrian and Shin (2008) explore these issues further.

## Appendix

### Relationship between Loans to End-Users and Aggregate Balance Sheets

There are  $n$  entities in the financial system that we will call “banks” for convenience. We gather together all non-leveraged players such as mutual funds and insurance companies as one entity and give it the label “ $n+1$ ”. Thus, apart from entity  $n+1$ , all other entities are leveraged financial institutions of one sort or another.

Bank  $i$  has two types of assets. First, there are loans to end-users such as corporates or households. Denote the loans by bank  $i$  to such end users as  $y_i$ . Next, there are the claims against other financial institutions. Call these the “interbank” assets, although the term covers all claims on other intermediaries. The total interbank assets held by bank  $i$  are

$$\sum_j x_j \pi_{ji}$$

where  $x_j$  is the total debt of bank  $j$  and  $\pi_{ji}$  is the share of bank  $j$ 's debt held by bank  $i$ . Since “bank”  $n+1$  is not leveraged, we have  $x_n = 0$ . The balance sheet identity of bank  $i$  is given by

$$y_i + \sum_j x_j \pi_{ji} = e_i + x_i$$

The left-hand side is the total assets of the bank. The right-hand side is the sum of equity and debt. Letting  $x = [x_1 \ \cdots \ x_n]$  and  $y = [y_1 \ \cdots \ y_n]$ , we can write in vector notation the balance sheet identities of all banks as

$$y + x\Pi = e + x$$

where  $\Pi$  is the matrix whose  $(i, j)$ th entry is  $\pi_{ij}$ . Solving for  $y$ ,

$$y = e + x(I - \Pi)$$

Define leverage as the ratio of total assets to equity, given by

$$\frac{a_i}{e_i} = \lambda_i$$

Then defining  $\Lambda$  as the diagonal matrix with  $\lambda_i$  along the diagonal,

$$y = e + e(\Lambda - I)(I - \Pi)$$

where  $\Pi$  is the matrix of interbank liabilities. By post-multiplying the above equation by the unit vector

$$u = \begin{bmatrix} 1 \\ \vdots \\ 1 \end{bmatrix}$$

We can sum up the rows of the vector equation above, and we have the formula in the text, namely that

$$\sum_i y_i = \sum_i e_i (1 + z_i (\lambda_i - 1))$$

where  $z_i$  is the proportion of liabilities that come from outside the intermediary sector, and is given by the  $i$  th row of  $(I - \Pi)u$ .

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