Structural Disposal and Cyclical Adjustment

Non-performing Loans, Structural Transition,

and Regulatory Reform in Japan, 1997-2011[*]

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Abstract

Japan experienced falling asset prices, financial market reform, and non-performing loan reductions from the late 1990s. We examine whether it was appropriate to guide the banking sector to aggressively write off non-performing loans in the early 2000s under the shadow of regulatory reform and the structural transition of corporate financing. Our results indicate that non-performing loans could have been cyclically reduced only by a further extension of mortgage loans, as the deregulated corporate sector reduced its reliance on banking and increased its bond issuance. Structural non-performing loan disposal is justifiable to avoid another housing market bubble.

Key words: non-performing loan reduction; structural transition; regulatory reform; mortgage loan; Japan.
JEL: G18; G28; K23.

Introduction

Drastic deregulation of the financial market began in the UK and the US in the 1980s, followed by Japan and continental Europe. These reforms visibly expanded and augmented the function of the financial industry (Abiad and Mody (2005)). Strict regulations in developed countries were established largely as a response to the drastic failure of the financial market in the 1930s. While these regulations were widely diverse—ranging from strengthened transparency in the US to the entry regulations in Japan—they shared the aim of containing the moral hazard of market participants and avoiding another Great Depression. Half-a-century later, as deregulation expanded, memories had abated, and deregulation was implemented literally as *de*-regulation, unaccompanied by devices for curbing the moral hazard of market participants, such as enhanced ex-post inspection, which is thought to complement relaxed entry restrictions. In particular, the commercial banking sector continued to enjoy state protection, intended to prevent the destabilization of the real economy and protect ordinary households, while businesses were widely deregulated. Naturally, countries where deregulation was implemented, from the US to Japan, often experienced asset or housing bubbles, which burst in the US in the early 1980s and in Japan in the early 1990s. The Japanese experienced a world-record scale of non-performing loans after the bubble burst.

In 1996, the administration of premier Ryutaro Hashimoto recognized the necessity of thorough structural reform toward an even greater deregulation of market entry, with an accompanying empowered and independent monitoring authority. The structural reform planned by the Hashimoto administration removed entry restrictions, separated inspection authority from the Ministry of Finance to the newly established Financial Supervisory Agency (or FSA, later the Financial Services Agency), and allowed the liquidation of failing banks, even if they were "too big to fail" by the pre-reform standard, under transparent and strict control by the agency. Further, the reform intended to transform Japanese corporate financing from being dominated by the heavily regulated banking sector to being tilted towards bond issuance. In other words, the major banks, which were heavily regulate and protected by the government and the primary lenders to the competitive manufacturing industry, were expected to have their role in corporate financing reduced.

Meanwhile, as this structural reform was being implemented, non-performing loans piled up at the major banks as well as the regional banks. The reforms aimed at reducing their role in corporate financing worsened the nation's non-performing loan ratio (the number of non-performing loans as a proportion of total lending). The newly established independent authority thus imposed transparent and nonnegotiable measures to reduce non-performing loans. This was largely a race between the major banks reduced role and the surge in non-performing loan, which reached a peak at the beginning of this century. Under the leadership of the responsible ministers, Hakuo Yanagisawa and Heizo Takenaka, the Financial Services Agency set a bold and ambitious numerical goal for reducing the non-performing loans held by the major banks, which virtually implied a massive loan write-off from 2002 to 2004. The agency also recognized the still-critical role of the regional banks in corporate financing to for small- and medium-sized companies in local economies and the working of the relational-banking basis, as shown by Uchida, Udell and Watanabe (2008) and Kano, Uchida, Udell and Watan-

abe (2011). Thus, the agency imposed modest goals on the regional banks, allowing them to lend, continuously and relationally, to players in local real economies.

This experience—simultaneous progress both in the sweep of piled-up non-performing loans and in the structural reform toward free and direct corporate financing, done, while preserving the key role of the relational banking network managed by the regional banks in sustaining local economies and supporting small startups—is exactly the same challenge facing continental Europe. We believe that a detailed documentation of Japan's the experience will help enhance the performance of European regulator. We also provide the policy implications of this experience in the last discussion section. We investigate whether the stringent goal of writing off non-performing loans from 2002 to 2004 was an inevitable part of the ongoing structural reform or whether non-performing loans could have been cyclically reduced simply by waiting for an upturn in the economy. Our tentative conclusion is that the first option was reasonable and the second one was not feasible.

Before going into detail, we briefly summarize the a history of the Japanese financial sector.[1] In the late nineteenth century, as the modern firms of the growing industrial sectors in the new modern financial markets developed and demanded capital, they directly relied on share and bond issuance, not bank borrowing. The banking sector rather took an important role behind investment in shares and bonds. Investors borrowed from a bank by collateralizing shares and bonds they held, and borrowed money was invested in securities. These securities were collateralized by investors for next investment again. Therefore, the bank sector took a large role for highly leveraged investment. Their role, however, the reverse side of the buoyant corporate financing in the securities markets. In the obverse side, corporate financing heavily depended on securities markets. Meanwhile, large conglomerates such as Mitsubishi and Mitusi were different. They maintained closed internal capital markets until the 1920s and most important companies had not been listed. In the 1930s, they switched to the public markets, which helped securities markets grow further.

The transition to heavy regulations occurred in two steps. One was the financial crisis of 1927, followed by the Great Depression in 1929. The Bank Act, Act No. 21 of 1927, gave a greater authority to the Ministry of Finance to effect a prompt consolidation of unstable local banks (Okazaki and Sawada (2007)). In this phase, however, corporate financing was not severely affected. The direct corporate financing vehicles, the stock and bond markets, were largely free. Bond issuance regulations that required bonds to be collateralized were introduced in 1933, to protect investors. Direct corporate financing was still buoyant, and, with a consolidated banking sector, the Japanese stock market recovered as early as in 1932. The capitalization of the Tokyo Stock Exchange reached more than 120 percent of the nation's gross national product, a record high.[2]

The full-fledged invasion of China in 1937 totally changed Japan's regulatory framework. That year, the Cabinet Planning Agency, copied from the planning agency of the USSR, was put into place. The National General Mobilization Act, Act No. 55 of 1938, copied from a established Nazi equivalent, gave the state the authority to mobilize all necessary physical and

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[1]For details of the wartime origin of the regulated banking sector, see Okazaki (1999) and Hoshi and Kashyap (2001), pp. 1–14.

[2]See Hoshi and Kashyap (2001), p.39.

human assets for the war effort. By this act, property rights were severely curtailed and the stock and bond markets ceased to work. Instead, the heavily regulated banking sector took the central role in corporate financing. While the government intended to follow the command economy of the USSR, the manufacturing sector remained private. The administration imposed an artificially low saving account interest rate on all banks. The banks that collected savings according to this nationally regulated interest rate channeled them to manufacturing industries designated strategically important by the planning agency. Now that direct financing was suppressed, the manufacturing sector had no other choice but to follow the orders of the government that controlled the banking sector. Furthermore, to each firm, a specific bank was assigned as the primary channel. The allocation of savings to each bank was coordinated by the Financial Control Association composed of all banks and led by the Industrial Bank of Japan. Thus, the war strengthened a system of relational banking between the major banks and the major manufacturing companies.

The system remained an important part of the Japanese economy even after the war ended. The indirect financing system became most influential in the growth decades of the 1950s and 1960s, as it attracted public money and supplied it to the nation's capital starved sectors. This process was accompanied by strict state regulation of the capital market. Bond issuance was restricted and interest rates on bank deposits were still regulated and kept low. The legacy of this heavy regulation and heavy protection is not negligible. Even data from the 1970s indicate significant herd behavior of the Japanese bank lending (Uchida and Nakagawa (2007)). The regulated herd behavior, rather than arbitrage, became the business of the Japanese banking sector norm under heavy regulation after 1938.

However, macroeconomic changes in the 1970s nevertheless affected this regulation-based capital market. The government began to deregulate at the end of the 1970s; restrictions on corporate debt issuance were slowly relaxed, and international capital flow was liberalized in the 1980s.[3] Japan's bond issuance deregulation led major corporations to change their financial strategy from bank borrowing to bond issuance, severely damaging the banking sector. Banking regulations also loosened in the early 1980s, forcing banks to find new outlets of savings such as investment in assets if they wanted to survive, which resulted in the asset price bubble in the late 1980s. Its burst in the early 1990s created a large number of non-performing loans. It was in this context that the FSA was born in 1998.

The first section will describe the history of the Financial Supervisory Agency and Financial Services Agency, FSA, showing that the Program for Financial Revival helped reduce non-performing loans among major banksy between 2002 and 2005. Then we depict in section 2 how Japanese banks' non-performing loans evolved and how domestic corporations shifted to foreign securities issuance. In section 3, we will attempt a quantitative analysis of the Japanese banking sector's activities between 1997–2011. Panel estimations will show that non-performing loan disposal paralleled the bank portfolio shift—from capital supply for corporate finance to either government bond purchases housing mortgage supply. In the closing section, we will discuss the estimation results within the broader context such as the shift of corporate financing and suggest some of the policy implications from our analysis.

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[3]See Hoshi and Kashyap (2001), pp. 219–220, 229.

1 Fifteen years of the Financial Services Agency: a descriptive retrospect

1.1 The transformation of regulations, 1998–2000

As concise accounts of Japan's financial deregulation in the 1990s have been given Hoshi and Kashyap (2001), we discuss only the regulatory transition that occurred from the 1990s to the 2000s. The Financial Supervisory Agency, expanded to the Financial Services Agency in 2000, was created on June 22, 1998 under the Prime Minister's Office, which was later expanded to the the Cabinet Office).[4]

The establishment of a supervisory and inspectorial agency independent from the Ministry of Finance was the essential intersection of two reforms designed by the Hashimoto administration, the regulatory reform for the financial markets and the administrative reform of the central government, both of which were planned to be completed in 2001.

The regulatory reform for the financial markets, dubbed "Japan's Big Bang," aimed at a more transparent financial markets where entry is free and securities issuance takes a greater role in corporate financing. The deregulation on entry to the markets is to be accompanied by the decisive implementation of transparent rules after the entry. The creation of the supervisory and inspectorial agency that directly serves the Cabinet Office was thus a critical part of the regulatory reform for the financial markets and realized as a part of the administrative reform of the central government.

Initially, the FSA's primary role was to inspect and supervise financial institutions operating in Japan; banks, securities corporations and insurance corporations, which were inherited largely from the Ministry of Finance and partly from the Bank of Japan.[5] After the creation of the FSA, a related superior organization, the Financial Reconstruction Commission, was founded in December 1998. The mission of this commission was, in practice, to prevent a possible systemic crisis due to large number of non-performing loans left after the bubble burst by prompt corrective actions such as ensuring the soundness of inspected institutions's financial positions and, if recognized as necessary, capital injection in to into the institutions.[6] The FSA was administratively subordinated to the Financial Reconstruction Commission until the end of 2000, when the commission ceased its assigned function, but worked cooperatively with it.

One of the tasks assigned to the FSA in July 1998 was the inspection of the major, 18 at that time, banks. This initiative was based on the Total Plan for Financial Reconstruction announced in July. In early 1999, the major banks and the Financial Reconstruction Commission prepared for a capital injection to the banks, then the banks submitted a plan for improving

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[4]See Financial Supervisory Agency (2000), p. 1. Please note that the time range of Financial Supervisory Agency (2000) is "Program Year 1999" (which is the subtitle of this report), which started in July 1999 and ended in June 2000.

[5]A consolidated regulatory agency that took over the role of supervision from the central bank was being formed also in the UK from 1997 and other countries. See Ferran (2011).

[6]See www.fsa.go.jp/frc/newse/ne001.html: last accessed on February 24, 2014

their business performance to the Commission.[7]

Two related acts came into force in October 1998. One was the Act on Emergency Measures for Revitalizing the Financial Functions, Act No. 132 of 1998 or Financial Reconstruction Act, which defines the procedures of handling poor-performing financial institutions including liquidation with limiting, potentially destructive, spillover effects on the financial system, such as how financial authorities manage the bankrupt institutions, how bridge banks for clearing and follow-up financing are established, and how failed banks are temporarily nationalized. The other one was the Act on Emergency Measures for Early Strengthening of Financial Functions, Act 143 of 1998, or the Early Strengthening Act, which aimed to solve the non-performing loan problem. Based on the act, the Resolution and Collection Corporation was established and was designated to purchase the stocks of failed banks and to help their reconstruction. As soon as these two acts became effective, two of Japan's long-term credit banks, which were partially state-owned and one of vehicles of industrial policies, were temporarily nationalized and liquidated in 1998 under the scheme.[8]

In 1999, 18 banks, including major ones, requested injection of public funds, which were accepted by the Financial Reconstruction Commission. These banks had to submit "Follow-Up" documents describing how they would reconstruct their business pursuant to the scheme of the Financial Reconstruction Act. The Financial Inspections Manual, the measure which the FSA inspectors applied, was also publicly announced.

In July 2000, the Financial Supervisory Agency merged with the Financial Planning Bureau of the Ministry of Finance, changing its name to the Financial Services Agency. The FSA operated under the Financial Reconstruction Commission until the beginning of 2001, when the administrative reform of the central government came into effect and the FSA then became directly subordinated to the Cabinet Office.[9]

In the policy packages issued by the administration in 2001, the still piled non-performing loans were the biggest concern, and the FSA was supposed to take its responsibility. Under the reform-minded administration of Junichiro Koizumi, the FSA was requested to proceed an "integrated resolution of the problems of the non-performing loans of banks and excessive debt of corporations" through a "drastic removal of non-performing loans from the banks' balance sheets,"[10] prompting the removal of non-performing loans from balance sheets through write-off, such as bankruptcies or debt liquidation.[11] In practice, "the major banks" were supposed to "take measures to remove non-performing loans already classified as 'in danger of bankruptcy' and below from the banks' balance sheets within the next two fiscal years. They will also take measures to remove non-performing loans newly classified as such within the next three fiscal

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[7]See Financial Supervisory Agency (1999), pp. 63–66, 131–135.

[8]See Financial Supervisory Agency (1999), pp. 70–74.

[9]The Financial Reconstruction Commission folded in 2001. See Financial Services Agency (2001), pp. 1, 213

[10]See www5.cao.go.jp/keizai1/2001/0406taisaku-e.html: last accessed on February 24, 2014.

[11]This process is called, in Japanese, "off-balance-sheet treatment" (or literally "measures that 'lead to' the off-balance-sheet"), because non-performing loans are "removed" from the balance sheets of institutions. In a sense, this is an enhanced usage of the idiom "off-balance-sheet exchange"—usually used, strictly, in the context of strategic asset management. The administration's English documents usually avoid this misleading expression, using instead words such as "removal from the balance sheets."

years."[12]

1.2 Structural reform and the Program for Financial Revival, 2001–2004

In 2001, the Council on Economic and Fiscal Policy of the Cabinet Office began to release the annual basic policies for economic and fiscal management and structural reform. The 2001 version declared that the non-performing loan problem must be solved within two or three years."[13]

The basic policy was elaborated into detail procedures by October, stating that financial institutions' loan evaluation and allowance were to keep up with the rapidly deteriorating conditions in the financial market—which meant that the FSA was going to start special inspections of Japan's major banks.[14]

In addition to the 2001 basic policies, the administration published the "structural reform and medium-term economic and fiscal perspectives" in January 2002. A plan covering the fiscal years from 2002 to 2006, which described the first two years 2002 and 2003)as an "intensive adjustment period," in which the non-performing loan problem had to be drastically solved through "strong and comprehensive measures."[15]

The FSA published the "measures for developing a stronger financial system" in April 2002 under the direction of Prime Minister Junichiro Koizumi and the Minister in charge of financial affairs, Hakuo Yanagisawa. By then, the FSA had already started its special inspections of the major banks. The results were published at the same time, stating that financial institutions were "further requested to take specific measures to dispose, in principle, one half of such loans within a year and a major part (approximately 80 %) of them within two years as concrete targets." A numerical target was set. At the same time, it was also explicitly stated that the FSA was to consider the specific importance of relational banking in local economies sustained by the regional banks when it prompted the regional banks to reduce non-performing loans. Intensity of the policy implementation was intended to be more modest for the regional banks.

In 2001, 56 financial institutions went bankrupt.[16] While most of them were small regional institutions, this series of bankruptcies convinced the administration to move more urgently.

Meanwhile, the major banks began to merge, in order to refine their management. There were about a dozen major banks at the end of the last century, but they reformed themselves into three. The Mizuho Bank consisted of Dai-ichi Kangyo Bank, Fuji Bank and the Industrial Bank of Japan; the Sumitomo Mitsui Banking Corporation consisted of Sakura Bank and Sumitomo Bank, they later establishing Sumitomo Mitsui Financial Group; the UFJ Bank consisted of Sanwa Bank, Tokai Bank and Toyo Trust and Banking; Mitsubishi Tokyo Finan-

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[12]Financial Services Agency (2001), p. 321.

[13]See Financial Services Agency (2002), p. 75.

[14]See www.fsa.go.jp/news/newsj/13/kinyu/f-20011026-3.pdf: last accessed on February 24, 2014 and Financial Services Agency (2002), p. 77.

[15]See www.kantei.go.jp/foreign/policy/2002/0118tenbou_e.html: last accessed on February 24, 2014

[16]See www.fsa.go.jp/frtc/kenkyu/event/20080404-1/05e.pdf: last accessed on February 24, 2014.

cial Group consisted of the Bank of Tokyo-Mitsubishi, Mitsubishi Trust and Banking, Nippon Trust Bank and Tokyo Trust Bank.[17] Then the UFJ and the Mitsubishi Tokyo Financial Group later merged into the Bank of Tokyo-Mitsubishi UFJ.

In October 2002, under the new minister in charge of financial affairs, Heizo Takenaka, the FSA announced the start of the "program for financial revival,[18] stating that (a) The FSA would set up a task force on financial issues, and it would take the initiative to solve the problem of non-performing loans with appropriate measures of the FSA and the last resort financing of the Bank of Japan; (b) the FSA would also require financial institutions with serious problems to undergo "managerial reform" and the task force will "strictly check [their] business plan"; (c) they would establish a new public funding scheme; (d) the loan problems of small- and medium-sized enterprises would be dealt with through special measures. The Act on Special Measures for Strengthening Financial Functions, Act No. 128 of 2004, was a process of financial legislation discussed in the program.[19] This act defined a new scheme for the infection of public capital to financial institutions, to allow them to conduct business more efficiently and support relational banking in local economies. Under this scheme, financial institutions could obtain a capital injection through the Deposit Insurance Corporation of Japan, which purchases shares from banks, if the business reconstruction plan they submitted to the minister was recognized as feasible. In the business reconstruction plan, banks had to clarify their business efficiency improvement goal, how they would achieve it, and how they would contribute to the revivification of local economy.[20] Thus, while the numerical goal was planned to be strictly applied on the major banks, the regional banks were differently handed to avoid a possible destruction of relational banking in local economies.

In November 2002, the FSA released a work schedule with more detail and deadlines. It created revised supervision guidelines in the end of 2002. Afterwards, it periodically reported the program for financial revival was being put into effect until the end of fiscal year 2004, when the program was planned to be completed.

Following the Financial Reconstruct Act, the non-performing loan ratio of the major banks evolved as follows: 8.4 % (March 2002), 8.1 % (September 2002), 7.2 % (March 2003), 6.5 % (September 2003), 5.2 % (March 2004), 4.7 % (September 2004), 2.9 % (March 2005).[21] The FSA and the major banks achieved the goal of reduction of the major banks' non-performing loan ratio to about half, which means that they rapidly and successfully improved their asset structure in no more than three years. The "structural reform and medium-term economic and fiscal perspectives: Fiscal Year 2004 revised version," a document issued at the end of January 2005, stated as following: "With regard to structural reform, there has been a steady progress toward normalizing the problem of non-performing loans as exemplified by the steady decline in the major banks' non-performing loans ratio in accordance with the target of halving the

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[17]Financial Services Agency (2001), p. 109.

[18]See   www.fsa.go.jp/news/newse/e20021030.pdf: last   accessed   on   February   24,   2014; www.fsa.go.jp/kouhou/kouhou_03/026_1410_1.pdf: last   accessed   on   February   24,   2014;   and www.fsa.go.jp/gaiyou/gaiyouj/daijin004/20021101-1.html: last accessed on February 24, 2014.

[19]See Financial Services Agency (2004), p. 24.

[20]See Financial Services Agency (2004), p. 268.

[21]See Financial Services Agency (2005), p. 431 and **Figure 1** below.

ratio as set by the program for financial revival.[22]

1.3 Regulations back to the normal, 2005–2013

With achieving the goal of the non-performing loan reduction planned in the 2002 program
in 2005, the FSA changed its priority from an emergency response to that with a forward
thinking aspirations by refining regulation measures.'[23]

The 2008-2009 financial crisis was a major event to the FSA. This immense shock to
capital markets severely affected the macroeconomic situation, which may also have affected
the slight increase in non-performing loan ratio of banks in 2009. However, the level of
non-performing loans never exceeded that of, for example, 2006,[24] suggesting that the FSA'
regulatory reform in the early 2000s provided banks with business discipline required to pre-
vent them from increasing their non-performing loans, during the drastic changes in the world
economy caused by the financial crisis of the late 2000s. It was nevertheless reasonable to
assume that some financial institutions might have difficulty in supplying capital to local in-
dustries and require public financial support. In December 2008, the administration therefore
decided to remain the Act on Special Measures for Strengthening Financial Functions, which
had been planned to expire in 2008, with revising it to enable more banks to use of the scheme.
The administration prepared a supplementary budget to implement the program. Several fi-
nancial institutions applied for this prolonged injection scheme.[25]

2 Transition of corporate finance and the banking sector

2.1 Reduction of non-performing loans

In this section, we will first look at the evolution of non-performing loans. We will show that
different categories of banks took different tracks of non-performing loan reduction in the past
decade.[26]

[INSERT **Figure 1** and **Figure 2** HERE]

The transitions in non-performing loans based on the Financial Reconstruction Act are
shown in **Figures 1** and **2**.[27] The non-performing loans ratio in all bank categories increased
in 2001 and early 2002 and then fell dramatically from mid 2002–2005; since then, it has been

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[22]See Financial Services Agency (2005), pp. 4-5, 83; www5.cao.go.jp/keizai2/2005/0121reform_and_perspectives.pdf:
last accessed on February 24, 2014; and www.fsa.go.jp/newse/e2004/20041224.pdf: last accessed on February
24, 2014

[23]See www.fsa.go.jp/news/newse/e20041224.pdf: last accessed on February, 2004.

[24]See Financial Services Agency (2012), p. 667.

[25]See Financial Services Agency (2009), pp. 77, 112, 381, 600.

[26]See www.fsa.go.jp/en/regulated/npl/ for annualized summary information on non-performing loans: last
accessed on February 24, 2014.

[27]As figures are based on Financial Services Agency (2007), pp. 505–507 and Financial Services Agency
(2012), pp. 482–484.

lower than it was at the end of the 1990s, except in March 2009, when the late 2008 financial crisis shocked the Japanese economy. The increase at the beginning of the 2000s reflects (1) the worsening macroeconomic condition and (2) the stricter self-assessment pursuant to the FSA's inspection.[28] The sharp increase in the non-performing ratio of long-term credit banks seen in September 2002 might be a result of the emergence of Mizuho Bank, created when the Industrial Bank of Japan,a long-term credit bank, merged with two city banks in April 2002. The downward slope corresponds to the program for financial revival, which aimed at halving the major bank's non-performing loans ratio reduced. The regional banks reduced their non-performing loans in this period as well, but more slowly than the major banks did.

2.2 The shrinking major banks

The rapid reduction in non-performing loans, led in particular by the write-off of the major banks in the early 2000s, was accompanied by a shrinkage in the banking sector as a whole (See **Figure 3**), representing the nation's total credit excluding government bond purchases and non-performing loans. In the early 2000s, the banking sector shrank rapidly, with the reduction in the non-performing loans barely catching up with this trend. Then, the business cycle hit a trough and the Japanese economy enjoyed a modest but long upturn until 2007.

[INSERT **Figure 3**, **Figure 4**, and **Figure 5** HERE]

However, the situation faced by the major and regional banks were strikingly different. **Figure 4** tracks the same numbers as in **Figure 3**, but only for the major banks, while **Figure 5** deals with only the regional banks. During the long expansion of the economy, the regional banks increased their total credit except in purchases of government bonds (see **Figure 5**). In the mid-1990s, amid the downturn and the just-launched reform, hangover from the 1980s bubble and suddenly tightened regulations were seen to cause a serious credit crunch (Watanabe (2007)). In hindsight, however, the long-term shrinkage since then has been more serious than what could have been expected from just a burst bubble. The major banks' total credit rapidly decreased, except for purchases of government bonds, and has never recovered. The shrinkage includes the short-term effect of regulatory reform, which was asymmetrically strict on the major banks, resulting in an asymmetric reduction in major bank lending (Imai and Takarabe (2011b)). However, this short-term effect cannot explain the long-term tendency. The corporate sector in Japan's 2000s expanding economy had no recourse to the major banks to finance their businesses, pushing the major banks to purchase government bonds (**Figure 6**).

[INSERT **Figure 6** HERE]

Meanwhile, maintaining relational banking networks during the same period was still in demand, as shown by Uchida et al. (2008). The major banks upon which the corporate sector became less reliant had no other choice but to continuously purchase government bonds. At

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[28]Such was also the Cabinet Office's interpretation. See footnote 6 of www5.cao.go.jp/j-j/wp/wp-je01/wp-je01-00201.html.

exactly this moment, Japan's fiscal deficit skyrocketed. This exploding budget deficit was financed by the major banks, which sustained record low long-term interest rates in a nation whose budget deficit was, and is, much larger than it was during the Second World War in the relative term with GDP.

2.3   Transformation of corporate financing

Why did the major banks become less desirable to the corporate sector? The answer lies in the transformation in corporate financing that occurred during this period. Anderson and Makhija (1999) and Hoshi and Kashyap (2001) showed that bank lending was largely replaced by bond issuance, particularly, off-shore, from the 1980s to the 1990s. This tendency never ceased, even from the 2000s. Although hit by the global financial crisis in 2007 and 2008, the corporate sector increased its off-shore stock and bond issuance (see **Figure 7**). Making corporate financing direct-financing-dominated and open to international markets were exactly the goals of the reforms pursued by the Hashimoto and Koizumi administrations. The corporate sector did not fail to take advantage of those reforms and structurally transformed itself. Through deregulation, businesses have left the banking sector that had been heavily regulated and protected by the state as a policy instrument since 1938, when the National Total Mobilization Act was enacted amid the invasion of China and preparations to attack the US, until the deregulation of the 1990s.

[INSERT **Figure 7** HERE]

3   Was cyclical reduction an alternative?

3.1   Data

We now analyze the relationship between the evolution of non-performing loans and that of possible determinants of the evolution of non-performing loans observed on the balance sheets of Japanese banks, such as return on equity (ROE), loan–deposit ratio (LON/DPS) and mortgage–loan ratio (MRG/LON), with controlling for other macroeconomic conditions, such as gross prefectural product (GPP) and regional land prices (LP), which potentially affect the banking performance.

   We created panel data consisting of bank-specific variables and macroeconomic indices, spanning from fiscal years 1997 to 2011, denoted by t. Most of the bank-specific annual series are cited from the dataset of Japan Bankers Association (each year), with adding a few other annual series from that of Japan Financial News (each year). The dataset of Japan Bankers Association (each year) consists of the balance sheet data of the city banks, the (former) long-term credit banks, trust banks, regional banks I, regional banks II, and other banks.[29] For the cross-section ID number i, we used the Financial Institution Common Code defined by the Japan Bankers Association. In this ID system, when a merger or acquisition occurs, the new

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[29]Other banks included in our panel data are Citibank Japan, Norinchukin Bank, and Seven Bank.

banks will retain the same number used by the surviving banks.[30] We thus assumed that banks did not change their individual patterns of behavior after a merger or acquisition.

Let us describe the bank classifications mentioned above. The long-term credit banks, under the direction of the government, issued bonds to supply long-term loans to various industries in Japan from the 1950s to the 1970s but ceased in the late 1990s. Regional banks I are banks which are members of the Regional Banks Association of Japan, while regional banks II belong to the Second Association of Regional Banks.[31] As of April 2013, there are five city banks, 16 trust banks, two former long-term credit banks, 64 regional banks I, and 41 regional banks II.[32] For the macroeconomic indices, gross prefectural product is based on data reported by the Cabinet Office (each year), and land prices are cited from the announcement of the Ministry of Land, Infrastructure, Transport and Tourism (each year). The panel has 1996 bank-year observations.

We use a definition of "non-performing loans," drawn from the Financial Reconstruction Act. Loans are, under this system, which classifies loans into four categories: (1) bankrupt or de facto-bankrupt, (2) doubtful, (3) special attention, and (4) normal. Bankrupt or de facto-bankrupt loans are those to "debtors who are legally and formally bankrupt, i.e., in the process of liquidation, reorganization, and rehabilitation, or virtually bankrupt with no prospects of resuscitation." Doubtful loans are those to "debtors who have not gone bankrupt but are in financial difficulties, and thus whose lenders are unlikely to receive the principal and interest concerned on due dates." Special attention loans are those "whose interest and/or principal payments are in arrears by 3 months or more, and restructured assets with changes in terms and conditions." Normal loans are "all loans to debtors who have no particular problems with their financial conditions" and that are not classifiable among the first three non-performing loans.[33]

Aside from the classification above, there are two other asset categorization systems in Japan; one is used for risk management loans and the other is banks' asset self-assessment. The former is almost the same as the Financial Reconstruction Act classification but is based on a different law. Banks use the latter to prepare for write-offs or provisions.[34]

3.2 Estimation model

Louzis, Vouldis and Metaxas (2012) discuss the possible determinants of the non-performing loans issued by Greece's nine largest Greek banks in the 2000s. Determinants of non-performing

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[30]Mizuho Bank, for example, inherited the Common Code 0001 from Dai-Ichi Kangyo Bank.

[31]Some of the antecedents of the former were established in the 1870s and were among Japan's first modern banks in Japan, while some of the latter have their origins in ROSCA-style local financial meetings. Most of the latter are usually smaller than the former, but not always.

[32]Data on only four of the trust banks are used in the calculation of **Figures 1** and **2**.

[33]See www.fsa.go.jp/news/newse/e20030207-1/r02.pdf: last accessed on February 24, 2014.

[34]Different authors use different English words to refer to these non-performing loan classifications. One official translation (though provisional) can be found at: www.fsa.go.jp/news/newse/e20030207-1/r01.pdf: last accessed on February 24, 2014; www.fsa.go.jp/news/newse/e20030207-1/r02.pdf: last accessed on February 24, 2014; www.fsa.go.jp/news/newse/e20030207-1/r03.pdf: last accessed on February 24, 2014; and www.fsa.go.jp/news/newse/e20030207-1/r04.pdf.

loans are largely categorized into two, the macroeconomic conditions and the bank-specific elements. Louzis et al. (2012) used both categories of variables as regressors and estimated their impact on the change in the non-performing loan ratio.[35] Louzis et al. (2012) introduce several hypotheses about the coefficient signs of the estimation. It is reasonable to assume that GDP growth has a negative impact on the non-performing loan ratio because, in expansionary periods, this ratio is relatively low, as both households and firms can service their debts, but excessive lending in boom periods, even to low-quality debtors, will increase non-performing loans when a recession period hits. Meanwhile, ROEs may affect non-performing loans negatively since ROE, as an index of past performance, can be negatively associated with increases in future non-performing loans.

The dependent variable is non-performing loan ratios, $FRR_{i,t}$ of bank i at the end of fiscal year t, as a percentage, using the definition of "non-performing loan" that appears in the Financial Restoration Act.[36] Dividing this sum by the total loan amount yields our dependent variable.

We control for two series of macroeconomic determinants: gross prefectural product, $GPP_{j,t}$, and land prices in residential areas $LP_{j,t}$, at prefecture j in year t, which are assumed to be proxies for regional economic conditions. For the bank-specific variables, aside from the lagged values of the dependent variable, we also controlled for the ROEs of the banks, $ROE_{i,t}$, which is assumed to be an indicator of their performance and thus to affect $FRR_{i,t}$ negatively as high performance leads to a rapid reduction in non-performing loans. As we have seen, the progress of non-performing loan reduction in Japan has paralleled an overall decrease in lending to the business sectors. Banks in turn seem to start two kinds of investment—sovereign bond, i.e., Japanese government bond, "JGB," holding and housing mortgage lending. This hypothesis on the shift in bank portfolios can be expressed as a positive effect of the loan–deposit ratio ($LON_{i,t}/DPS_{i,t}$) and the negative effects of Japanese government bond–deposit ratio ($JGB_{i,t}/DPS_{i,t}$) and mortgage–loan ratio ($MRG_{i,t}/LON_{i,t}$) on the dependent variable (where $LON_{i,t}$ denotes total loan, $DPS_{i,t}$ total deposit, $JGB_{i,t}$ total Japanese government bond holding and $MRG_{i,t}$ total housing mortgage of bank i in year t).

Other possible determinants are as follows. (a) Management inefficiency, $INEF_{i,t}$, is defined as the ratio of operating costs over operating income; its increase may increase the non-performing loan ratio. (b) Equity ratio, $EQR_{i,t}$, is the ratio of owned capital over total assets, i.e., the overall size of the balance sheet. Louzis et al. (2012) suggest that a decrease in equity ratio may cause a moral hazard problem of bank managers—because thinly capitalized banks tend to make more-than-optimal risky investment—, increasing non-performing loans.

The dependent variable in our least square estimation model is the first difference of the non-performing loan ratio ($\Delta FRR_{i,t}$) because we cannot reject the hypothesis that the level series has individual unit roots.[37] In addition, we introduced dummy variables for the time-

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[35] They also estimated for different types of non-performing loans, i.e., consumer loans, mortgages, business loans. Such detailed information is not available for Japanese banks, so we used data on non-performing loans for all types of debtors.

[36] We sum up the loans that are categorized as "bankrupt or de facto bankrupt ("bankrupt or quasi-bankrupt" in the other translation) "doubtful" and "special attention" (or "needs attention" or "substandard"), of which "bankrupt or de facto bankrupt" is the most risky category.

[37] The results of the unit root test (individual intercept) are as follows. For $FRR_{i,t}$, the augmented Dickey–

fixed or cross-section fixed effect. We defined the basic form of our model as follows.

$$\Delta\text{FRR}_{i,t} = \left(\beta_0 + \beta_1 \Delta\text{FRR}_{i,t-1} + \sum_{j=0}^{1} \beta_{2j} \Delta\text{ROE}_{i,t-j} + \beta_3 \text{GPP}_{i,t} + \beta_4 \text{LP}_{j,t} \right) +$$
$$(1)$$
$$\beta_5 \Delta X_{i,t} + \sum_{u=1}^{T} \beta_{6u} \text{FIX}_{tu} + \sum_{j=1}^{N} \beta_{7j} \text{FIX}_i + \varepsilon_{i,t} \quad (i = 1, \dots, N; j = 1, \cdots, 47; \ t = 1, \dots, T),$$

where $X_{i,t}$ denotes the bank-specific variables in each model, FIX_{tu} ($t = 1, \dots, T$) stands for time fixed-effect dummy variables equal to 1 if $t = u$ and 0 otherwise, and FIX_i ($i = 1, \dots, N$) are the cross-section fixed-effect dummy variable. $\text{LP}_{j,t}$ is the land price at prefecture j in year t. The terms in parentheses thus comprise our baseline model; and we substituted $X_{i,t}$ with bank-specific variables (i.e., $(\text{LON/DPS})_{i,t}$, $(\text{JGB/DPS})_{i,t}$, $(\text{MRG/LON})_{i,t}$ $\text{INEF}_{i,t}$ and $\text{EQR}_{i,t}$) to formulate different models.

3.3 Empirical results

As a benchmark, specifications 1-1 and 1-2 in **Table 1** regress growth in non-performing loans ($\Delta\text{FRR}_{i,t}$) to its own first-order lag, growth in ROE ($\Delta\text{ROE}_{i,t}$) and first-order lag in growth in ROE. To control for regional exogenous shocks, gross prefectural product ($\text{GPP}_{j,t}$) and land prices ($\text{LP}_{j,t}$) of prefecture j in year t are inserted as regressors. With the period-fixed effect, specification 1-1 indicates that variances in profitability affected reductions in non-performing loans, which indicates that it had some trend even with controlling for cyclical effects through the time-fixed effects. With fixed cross-sectional effect, specification 1-2 shows that this tendency was robust even after controlling for time-invariant bank factors.[38] Cyclical effects might be captured by stock price indices as well as gross prefectural product. Specification 1-3 includes average prices indices of all companies listed at the Tokyo Stock Exchange, in December of each year, as a regressor (TPX_t).[39] Specification 1-3 also includes the spread of

Fuller Fisher χ^2 statistic is 348.105 with $p = 0.0035$, and the Phillips–Perron Fisher χ^2 statistic is 289.308 with $p = 0.3383$ (the optimal lag length based on Schwarz Information Criteria is 0 to 2). For $\Delta\text{FRR}_{i,t}$, the augmented Dickey–Fuller Fisher χ^2 statistic is 801.567 and the Phillips–Perron Fisher χ^2 statistic is 863.036, both with $p = 0.0000$ (the optimal lag length based on Schwarz Information Criteria is 0 to 1).

[38]We performed the redundant fixed effect and Wu–Hausman random effect estimations in specification 1-2. In the former, the cross-sectional F statistic is 1.7405 with a degree of freedom 143, 1208 and $p = 0.0000$, indicating that we can reject the hypothesis that the fixed effect specification is inappropriate. The latter, on the other hand, yields the cross-sectional random χ^2 statistic of 131.185521, with a degree of freedom of 5 and $p = 0.0000$, implying that we can reject the hypothesis that the random effect is suitable. These results justify our cross-section fixed-effect specifications. We tried other definitions of the cross-section identification number i to test for the effect of mergers and acquisitions among banks. As shown in **Tables 1** and **2**, banks established through mergers or acquisitions retain the number used by the surviving banks. In our new definitions, we assigned new IDs to the banks created after mergers and acquisitions. We created two new versions, one reflecting only major mergers and the other comprising information on minor mergers. We tested the same estimation specifications with these two ID systems. Neither version yielded significant results, suggesting that banks may not have changed their individual business policies after their mergers.

[39]The series are calculated by the Tokyo Stock Exchange and called TOPIX, available at http://www.tse.or.jp/market/topix/data/index.html: last accessed on March 24, 2014.

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the yield of Japanese government bonds over the US treasury bonds, which was called then "Japan premium" (JPN_t). Then we see that gross prefectural product ($\text{GPP}_{j,t}$) is insignificant, which indicates that gross prefectural product ($\text{GPP}_{j,t}$) and the stock prices (TPX_t) were correlated. Hereafter we use gross prefectural product ($\text{GPP}_{j,t}$) to control for business cycles instead of the stock prices, because the former can control for regional differences of business cycles. The positive coefficient of the "Japan premium" (JPN_t) indicates that an increase in international borrowing costs might have increased non-performing loans. However, because causality between the number of non-performing loans and the "Japan premium" is not obvious, we drop this variable in estimations below.

[INSERT **Table 1** HERE]

Fixed effect specifications 1-4, 1-5 and 1-6 in **Table 1** reflect the banks' equity ratio over total asset ($\text{EQR}_{i,t}$) and the operating costs ratio over revenue ($\text{INEF}_{i,t}$). As asserted in Louzis et al. (2012), the equity ratio is sometimes linked to the "moral hazard hypothesis," which predicts that the lower the equity ratio, the weaker shareholders' monitoring of managements resulting in more-than-optimal leverage and, eventually, larger non-performing loans. However, this link may not be relevant for major commercial banks operating under the strict requirement of certain equity ratio by national agencies following the Bank of International Settlement. Higher equity ratios were often the target of monitoring agencies seeking to prevent insolvencies. Moreover, Japan's major banks were strictly required to meet the equity ratio targets set by the FSA. If these could not be met, state capital injection, and hence, direct intervention by the authority, particularly replacement of the current management, was always an option. Thus, $\text{EQR}_{i,t}$ should be taken as a measure of the banks' ability to meet higher equity ratios requested by the FSA instead of the likelihood of the principal agent problem between shareholders and bank managers. Meanwhile, the running cost ratio over revenue ($\text{INEF}_{i,t}$) can be interpreted as a proxy of management inefficiency. Since we ran fixed effect estimations, the management inefficiency ($\text{INEF}_{i,t}$) expected to capture additionally increased in efficiency of the sample banks during the sample period, with the time invariant efficiency through the period being controlled for by the fixed effect.

We find that, while an increase in bank equity ratio ($\text{EQR}_{i,t}$) significantly decreases the non-performing loan ratio in specifications 1-3 and 1-5, efficiency improvement ($\text{INEF}_{i,t}$) is insignificant when controlling for equity ratio ($\text{EQR}_{i,t}$). The banks' defensive efforts to cut their operating costs did not significantly reduce non-performing loans. The issue was thus much larger than improvement of daily routines could manage.

[INSERT **Table 2** HERE]

Table 2 breaks down the growth of non-performing loans ($\Delta\text{FRR}_{i,t}$) into several factors using the cross-section fixed effect specifications. Specification 2-1 shows that growth in the ratio of loans over deposits ($\Delta(\text{LON}_{i,t}/\text{DPS}_{i,t})$) increased non-performing loans. This result is not necessarily surprising; recent research shaws that, in Japan's post-deregulation banking sector, depositors have disciplined the banks and thus higher deposits imply a stronger

discipline, although this is not necessarily accompanied by higher profits (Uchida and Satake (2009)).

Specifications 2-2 and 2-3 show that the ratio of mortgage loans over total loans ($\Delta(\mathrm{MRG}_{i,t}/\mathrm{LON}_{i,t})$) had a negative impact, i.e., reduced non-performing loans. As a robustness check, we inserted the equity ratio ($\mathrm{EQR}_{i,t}$) and the operating costs over revenue ratio ($\mathrm{INEF}_{i,t}$) in specifications 2-4 and 2-5. The ratio of mortgage loans over total loans ($\Delta(\mathrm{MRG}_{i,t}/\mathrm{LON}_{i,t})$) still has positive coefficients with controlling for equity ratio $\mathrm{EQR}_{i,t}$, and efficiency improvement $\mathrm{INEF}_{i,t}$ does not have a significant impact with controlling for other factors. In short, a strict stress test that requires a higher equity ratio might reduce non-performing loans, but the impact is dominated by the effect of increased mortgage loans. Mere daily efficiency improvements do not help reduce accumulated non-performing loans.

From **Table 2**, we know that a further extension of mortgage loans might have further reduced non-performing loans. Then, where was and is a frontier? Before the financial deregulation began in the 1980s, mortgage loans to households were almost monopolized by the Government Housing Loan Corporation, a state-owned institution. In that period, a custom was formed. Different from the US, income tax of employed workers are withhold at source and workers request income tax refund in the early next year if they are eligible. For this procedure, employers issue a certificate of tax deducted through the year in January of the next year to every employee. Thus, financial institutions can confirm an applicant's employment income just by checking the certificate of tax deducted. The Government Housing Loan Corporation used the the certificate of tax deducted to lend mortgage as a cheap monitoring device. This custom was shared by banks after they entered the mortgage loan markets. Still now, in the mid 2010s, there is discontinuity of access to mortgage loans between employed applicants and self-employed applicants. Therefore, if any frontier in mortgage loan markets, it is for self-employed applicants. **Table 3** includes ratio of employed workers over self-employed workers ($\mathrm{EMP}_{k,t}$) in region k in year t and the interaction term between the mortgage loan ratio and ratio of self-employed workers over employed workers ($\Delta(\mathrm{MRG}_{i,t}/\mathrm{LON}_{i,t}) \times \Delta(1/\mathrm{EMP}_{k,t})$) as regressors of the growth of non-performing loans ($\Delta\mathrm{FRR}_{i,t}$), where the ratio of employed workers over self-employed workers ($\mathrm{EMP}_{k,t}$) is calculated per region as as a unit.[40]

[INSERT **Table 3** HERE]

It is not puzzling that the employed worker ratio ($\mathrm{EMP}_{k,t}$) has a positive significant. The ratio is higher in metropolitan regions where major firms and government offices are located

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[40]The data are available at the Statistics Bureau, Ministry of Internal affairs and Communications, http://www.stat.go.jp/data/roudou/longtime/03roudou.htm: last accessed on March 27, 2014. The 47 prefectures are bundled into 9 regions. The Hokkaido region includes the Hokkaido prefecture, the Tohoku region includes the Aomori, Iwate, Akita, Miyagi, Yamagata, and Fukushima prefectures, the Minami Kanto region includes the Chiba, Siatama, Tokyo, and Kanagawa prefectures, the Kita Kanto and Koshin region includes the Ibaragi, Tochigi, Gunma, Yamanashi and Nagano prefectures, the Hokuriku region includes the Niigata, Toyama, Ishikawa, and Fukui prefectures, the Tokai region includes Shizuoka, Aichi, Gifu and Mie prefectures, the Kinki region includes Shiga, Kyoto, Wakayama, Kyoto, Osaka and Hyogo prefectures, the Chugoku and Shikoku region includes Shimane, Tottori, Yamaguchi, Okayama, Hiroshima, Kagawa, Ehime, Tokushima and Kochi prefectures, and the Kyushu and Okinawa region includes the Fukuoka, Saga, Nagasaki, Oita, Kumamoto, Miyazaki, Kagoshima and Okinawa prefectures.

and the metropolitan regions were the most reversely affected by the collapse of real estate markets. Then, we focus on the interaction term between the mortgage loan ratio and the self-employed worker ratio ($\Delta(\mathrm{MRG}_{i,t}/\mathrm{LON}_{i,t}) \times \Delta(1/\mathrm{EMP}_{k,t})$), which has a negative coefficient of a large absolute value. Thus, if a bank could increase mortgage loan in a region where self-employed people relatively increased, it could contribute to non-performing loan reduction a lot. Roughly, an extension of mortgage loans in rural markets was a frontier that led to non-performing loan reduction.

For the results in **Tables 2** and **3**, we might not be able to exclude a possibility of endogeneity when a bank determines volume of mortgage loans. Specifications 4-1 and 4-2 in **Table 4** shows a robustness check for specifications 2-3 and 2-4 by panel generalized method of moments. Specification 4-1 appears to indicate that the negative impact of an increase in mortgage loan on the non-performing loan might not be robust. However, once we control for the ratio of employed/self-employed ratio ($\mathrm{EMP}_{k,t}$), which captures a long-lasting structure of each regional economy and hence whose error term seems to be hardly correlated with the first difference of banks' annual performance in every year, as instrument variables in specifications 4-3 and 4-4, the negative impact of mortgage loan on the volume of non-performing loans is quite significant. We can conclude that an increase in mortgage loan effectively reduced non-performing loans after controlling for different structures of regional economies.

Discussion

The question of whether non-performing loans are due primarily due to cyclical factors or to structural factors is always nontrivial. The answer will dictate whether financial regulatory policies should contain structural elements or not. The ratio of non-performing loans over total standing loans and other stress-resilience indicators must be standardized, consistent, and transparent, and must not be discretionary in any way. However, the exact threshold of "unhealthiness" depends on the discretionary decisions made by relevant authorities, and its strictness inevitably depends on how authorities believes has caused the accumulation of non-performing loans—whether structural or cyclical factors. If cyclical factors seem dominant, considering the diseconomy of financial distress, authorities can be as cautious as possible and wait as long as they wish, as the threshold of non-performing loan ratio will be set higher. If structural factors such as past vested rent or drastic changes in the economy's driving-force industry seem dominant, the sooner the intervention, the better, even if the banks that had made structural mistakes are consolidated, as the threshold of non-performing loan will be at lower.

Japan's non-performing loans accumulated in the 1990s more or less due to structural factors. Bond market deregulation prompted the manufacturing sector, the source of Japan's economic growth, to move from indirect financing to direct financing, typically bond issuance in international markets. The deregulation of the banking sector and enhanced competition eliminated the vested rents enjoyed by the banking sector.

The question is whether these structural downward pressures could have been offset by structural upward pressures. Given its historical path, Japanese banking sector has several

choices. First, it could back to the corporate financing of small- and medium-sized companies. The heavy regulations of the wartime and postwar corporate financing enabled the major banks to retain major manufacturing firms, which could have gone out to the bond market, as their best clients. When they were released through the bond market deregulation, the major banks might have been able to find new business opportunities in firms that had been before classified as lower. While the major banks' total credit except for JGB purchases was been stagnant or even slightly declined over the last decade, the regional banks' credit slowly grew. Financing smaller firms is indeed a business. However, the loan–deposit ratio of the regional banks in this period never grew. Thus, the corporate financing market for smaller firms is saturated, and the entry of major banks, with their much higher salaries and shallow experience, would not be feasible.

These findings are related to a few policy implications. Major banks embedded in international markets are inevitably more exposed to exogenous shocks from international markets (Peek and Rosengren (1997) and Imai and Takarabe (2011a)). Then, they were faced with these international shocks, they asymmetrically withdrew credits to local economies with which they did no relational businesses (Hoffmann and Okubo (2013)). Asymmetrical financial distresses were reported in the global context (Dell'Ariccia and Rajan (2008)), and similar events occurred when deregulated German banks and other European banks asymmetrically withdrew from peripheral European economies beginning in 2008. The welfare implications of the rapid penetration into local economies of the deregulated major banks being avoided by blue-chip companies into local economies should be carefully examined.

Second, the banks could find a new business. If the banking sector could find another upward structural momentum, it could compensate for the downward momentum. Let us then examine the contribution of new loan growth to non-performing loan growth. An obvious result is that mortgage loans strongly reduce non-performing loans, while non-mortgage loan increases non-performing loans. The redistribution from risky corporate financing to risky consumer financing, perhaps contributing to profits, does not imply reduction in non-performing loans. Meanwhile, consumer mortgage loans serve as a powerful drive of non-performing loan reduction. In fact, housing market as the last frontier after deregulation was suggested as a way to be "emulate" the British experience (Lomax (1994)).

Although it was intensified in Japan because of its own historical path, the structural reduction of indirect corporate financing is not unique to Japan. The development of information and communication technologies has produced capital markets far more transparent and resilient than those of the 1920s, before the Great Depression. Deregulation since the 1980s has thus prompted the banking sector to find new profit sources, as corporate sector went back to these capital markets. The two greatest post-deregulation financial crises in the US both in the early 1980s and the mid-2000s had their roots in consumer mortgage loans. As long as they are carefully handled by the banking sector and regulation authorities, these will likely continue be a profitable alternative in matured industrial economies with the well-established and transparent capital markets. Japan was and is not an exception in this rule.

This does not mean, however, that the consumer mortgage loan can be a panacea for an excessively large banking sector. With populations, particularly those of working age, rapidly shrinking, consumer mortgages are being saturated. Therefore, the structural re-orientation of

the banking sector toward the consumer mortgage loan could not compensate for the structural reduction of corporate financing to the competitive manufacturing sector.

After all, the structural the amount of reduction of corporate financing by banks to the manufacturing could not have been compensated for by the structural increase to another channel. Massive bank consolidation was, may still be, inevitable. If so, a lower threshold of non-performing loan ratio in the stricter investigation and evaluation of non-performing loans is justified even at the risk of a structural reorganization of the banking sector. The strict measures taken by Yanagisawa and Takenaka, which forced banks to write off their non-performing loans as quickly as possible, was the best wisest option.

Moreover, the estimation results shown in **Table 2** reveal that the holding government bonds did not help reduce non-performing loans. Thus, the 2002-2004 implementation structural non-performing loan disposal on the major banks was bound to occur at sometime within the last decade.

The estimation results shown in **Tables 2** and **3** suggest that increases in personal house mortgage loans could have helped cyclically reduce non-performing loans by improving profitability of the banking sector. Indeed, the US, Spain, and Ireland, whose financial markets had been structurally reformed, experienced a rapid expansion in their deregulated mortgage loan markets, a boost in housing prices, and improved banking sector profitability in the mid-2000s. The result was another pile of non-performing loans. Unless a novel, innovative way of regulating the mortgage loan market is found, maintaining strict mortgage loan regulation is advisable. Our tentative evaluation of the rapid 2002-2004 non-performing loan disposal has thus been justified. Our view is more pessimistic than that put forward by Hoshi (2011), who argues that a more properly tailored regulatory reform could have avoided the stagnation in the major banking sector. We admit that our result is rather a tentative and that further inquiry into the feasibility of such an optimistic alternative view, with a rigorous linkage with the real economy, is required.

We can summarize lessons from the Japanese experience as follows. First, it was inevitable that corporate financing's dominance by the heavily regulated and protected banking sector, in effect, since the Great Depression and the war would dissolve, and that a transition would occur to corporate financing for listed companies overwhelmed by direct financing. Second, relational banking for small- and medium-sized companies, many of which are not listed and hence cannot access the bond market, is desirable even in a mature economy. Third, strict monitoring and guidance during major banks' down-sizing is appropriate, as was decisively implemented in Japan from 2002 and 2004, while the asymmetrical treatment of the regional banks providing relational banking to startups and small- and medium-sized companies is reasonable. We also intend to investigate the implications of the Japanese experience for the financial regulation and its asymmetric impact on large companies and small- and medium-sized companies (Millet-Reyes (2000) and Bertrand, Schoar and Thesmar (2007)), as well as both core and peripheral regions (Koetter and Wedow (2010)).

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Table 1 Trends of non-performing loan reduction.

Independent variables	1–1 coefficient	1–1 t statistic	1–2 coefficient	1–2 t statistic	1–3 coefficient	1–3 t statistic	1–4 coefficient	1–4 t statistic	1–5 coefficient	1–5 t statistic	1–6 coefficient	1–6 t statistic
Estimation method	panel least squares											
Dependent variable	$\Delta \text{FRR}_{i,t}$		$\Delta \text{FRR}_{i,t}$		$\Delta \text{FRR}_{i,t}$		$\Delta \text{FRR}_{i,t}$		$\Delta \text{FRR}_{i,t}$		$\Delta \text{FRR}_{i,t}$	
Cross-section	pooled		fixed		fixed		fixed		fixed		fixed	
Period (year)	fixed		pooled		pooled		pooled		pooled		pooled	
c	-0.2310	-2.7382 ***	-2.4751	0.0010 ***	-2.2754	-3.0590 ***	-1.8645	-2.8817 ***	-2.5810	-3.4505 ***	-2.0181	-3.1390 ***
$\Delta \text{FRR}_{i,t-1}$	-0.0529	-2.2743 **	-0.1071	0.0000 ***	-0.1295	-5.1013 ***	-0.0622	-2.8183 ***	-0.1182	-4.6087 ***	-0.0720	-3.2518 ***
$\Delta \text{ROE}_{i,t}$	-0.0024	-2.8624 ***	-0.0032	0.0004 ***	-0.0032	-3.4875 ***	-0.0011	-1.4115	-0.0031	-3.4394 ***	-0.0005	-0.6365
$\Delta \text{ROE}_{i,t-1}$	-0.0013	-1.9380 *	-0.0015	0.0247 **	-0.0015	-2.2224 **	-0.0010	-1.6611 *	-0.0014	-2.1179 **	-0.0006	-1.0391
$\text{GPP}_{j,t}$	0.0000	-2.0316 **	0.0000	0.0326 **	0.0000	-1.5828	0.0000	-2.1475 **	0.0000	-1.3906	0.0000	-1.3123
$\text{LP}_{j,t}$	0.0000	1.0394	0.0000	0.0000 ***	0.0000	4.2857 ***	0.0000	6.9096 ***	0.0000	6.5872 ***	0.0000	5.9389 ***
ΔTPX_t					-0.0009	-4.5935 ***						
JPN_t					0.2379	2.6693 ***						
$\Delta \text{EQR}_{i,t}$							-0.5862	-20.1895 ***			-0.6093	-20.0836 ***
$\Delta \text{INEF}_{i,t}$									0.0262	2.2298 **	0.0132	1.3006
cross-sections included	144		144		144		144		144		144	
periods included (years)	11 (2000–2010)		11 (2000–2010)		11 (2000–2010)		11 (2000–2010)		11 (2000–2010)		11 (2000–2010)	
included observations	1,357		1,357		1,357		1,357		1,357		1,357	
adjusted R^2	0.1209		0.0899		0.1125		0.3191		0.0402		0.2924	
Log likelihood	-2,808.4302		-2,761.0478		-2,742.9053		-2,563.6317		-2,558.4779		-2,363.2866	
F statistic	13.4309 ***		1.9053 ***		2.1455 ***		5.2652 ***		1.3638 ***		4.5626 ***	

Notes :   ***, **, and * respectively denote significance at 1, 5, and 10 percent levels.

Table 2 Factors of non-performing loan reduction.

Independent variables	2–1 coefficient	2–1 t statistic		2–2 coefficient	2–2 t statistic		2–3 coefficient	2–3 t statistic		2–4 coefficient	2–4 t statistic		2–5 coefficient	2–5 t statistic		2–6 coefficient	2–6 t statistic	
Estimation method	panel least squares			panel least squares														
Dependent variable	$\Delta \mathrm{FRR}_{i,t}$			$\Delta \mathrm{FRR}_{i,t}$			$\Delta \mathrm{FRR}_{i,t}$			$\Delta \mathrm{FRR}_{i,t}$			$\Delta \mathrm{FRR}_{i,t}$			$\Delta \mathrm{FRR}_{i,t}$		
Cross-section	fixed			fixed			fixed			fixed			fixed			fixed		
Period (year)	pooled			pooled			pooled			pooled			pooled			pooled		
c	-1.3851	-1.9637	**	-2.4421	-3.9042	***	-2.2518	-3.6780	***	-2.1487	-3.4376	***	-1.9272	-3.1719	***	-2.0344	-3.3757	***
$\Delta \mathrm{FRR}_{i,t-1}$	-0.0796	-3.3552	***	-0.0161	-0.7225		-0.0202	-0.9144		-0.0192	-0.8663		-0.0282	-1.3042		-0.0377	-1.7409	*
$\Delta \mathrm{ROE}_{i,t}$	-0.0038	-4.4731	***	-0.0034	-4.3311	***	-0.0036	-4.5635	***	-0.0036	-4.5999	***	-0.0021	-2.6713	***	-0.0018	-2.2036	**
$\Delta \mathrm{ROE}_{i,t-1}$	-0.0018	-2.8048	***	-0.0016	-2.6956	***	-0.0016	-2.7872	***	-0.0016	-2.8396	***	-0.0013	-2.2804	**	-0.0010	-1.8903	*
$\mathrm{GPP}_{j,t}$	0.0000	-4.0771	***	0.0000	-2.0108	**	0.0000	-2.4769	**	0.0000	-2.6248	***	0.0000	-2.4245	**	0.0000	-1.6515	*
$\mathrm{LP}_{j,t}$	0.0000	8.8464	***	0.0000	8.4418	***	0.0000	8.7123	***	0.0000	8.7710	***	0.0000	7.9009	***	0.0000	6.8594	***
$\Delta(\mathrm{JGB}_{i,t}/\mathrm{DPS}_{i,t})$	-4.1033	-4.1792	***	-1.3861	-0.8908					-1.4305	-0.9258		-1.4382	-0.9585		-2.2710	-1.4943	
$\Delta(\mathrm{LON}_{i,t}/\mathrm{DPS}_{i,t})$	10.9751	13.2431	***				4.4629	4.2151	***	4.4412	4.1914	***	4.0021	3.8844	***	3.9538	3.5270	***
$\Delta(\mathrm{MRG}_{i,t}/\mathrm{LON}_{i,t})$				-3.2725	-2.1592	**	-3.2197	-2.1404	**	-3.1779	-2.1113	**	-2.9926	-2.0471	**	-2.4864	-1.7518	*
$\Delta \mathrm{EQR}_{i,t}$													-0.4390	-8.4850	***	-0.4319	-6.3699	***
$\Delta \mathrm{INEF}_{i,t}$																0.0077	0.7985	
cross-sections included	140			140			140			140			140			140		
periods included (years)	11 (2000–2010)			11 (2000–2010)			11 (2000–2010)			11 (2000–2010)			11 (2000–2010)			11 (2000–2010)		
included observations	1,355			1,324			1,326			1,324			1,324			1,247		
adjusted R^2	0.2128			0.1139			0.1256			0.1262			0.1760			0.0842		
Log likelihood	-2,658.4845			-2,478.4664			-2,472.5180			-2,468.6501			-2,429.2821			-2,236.1762		
F statistic	3.4395	***		2.1650	***		2.3041	***		2.3000	***		2.9089	***		1.7739	***	

Notes : ***, **, and * respectively denote significance at 1, 5, and 10 percent levels.

Table 3 Impact of mortgage loan with controlling for self-employed house holds.

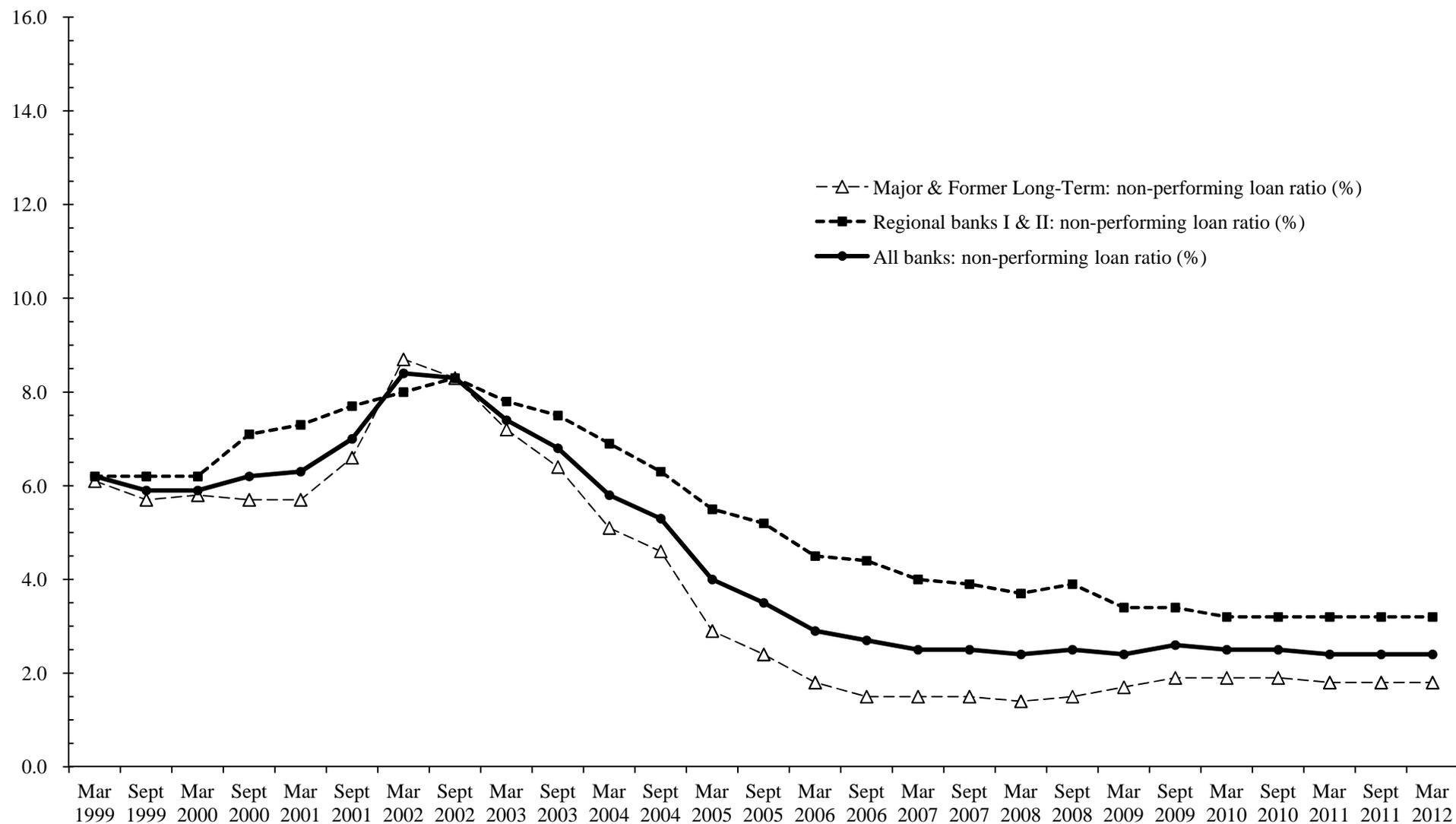|	3–1		3–2		3–3		3–4		3–5		3–6	
Estimation method	panel least squares											
Dependent variable	$\Delta\,\mathrm{FRR}_{i,t}$		$\Delta\,\mathrm{FRR}_{i,t}$		$\Delta\,\mathrm{FRR}_{i,t}$		$\Delta\,\mathrm{FRR}_{i,t}$		$\Delta\,\mathrm{FRR}_{i,t}$		$\Delta\,\mathrm{FRR}_{i,t}$	
Cross-section	fixed		fixed		fixed		fixed		fixed		fixed	
Period (year)	pooled		pooled		pooled		pooled		pooled		pooled	
Independent variables	coefficient	t statistic	coefficient	t statistic	coefficient	t statistic	coefficient	t statistic	coefficient	t statistic	coefficient	t statistic
c	-2.1784	-3.5311 ***	-1.9236	-3.1823 ***	-1.8623	-3.0336 ***	-2.1316	-3.4717 ***	-1.8897	-3.1386 ***	-1.8623	-3.0336 ***
$\Delta\mathrm{FRR}_{i,t-1}$	-0.0224	-1.0191	-0.0257	-1.1775	-0.0269	-1.2355	-0.0242	-1.1043	-0.0269	-1.2403	-0.0269	-1.2355
$\Delta\mathrm{ROE}_{i,t}$	-0.0034	-4.3517 ***	-0.0035	-4.5966 ***	-0.0036	-4.7481 ***	-0.0035	-4.5039 ***	-0.0036	-4.7191 ***	-0.0036	-4.7481 ***
$\Delta\mathrm{ROE}_{i,t-1}$	-0.0015	-2.7143 ***	-0.0016	-2.8247 ***	-0.0016	-2.9281 ***	-0.0016	-2.7973 ***	-0.0016	-2.8932 ***	-0.0016	-2.9281 ***
$\mathrm{GPP}_{j,t}$	0.0000	-2.5469 **	0.0000	-3.1552 ***	0.0000	-3.0433 ***	0.0000	-2.4573 **	0.0000	-3.0502 ***	0.0000	-3.0433 ***
$\mathrm{LP}_{j,t}$	0.0000	8.0186 ***	0.0000	8.3345 ***	0.0000	8.2781 ***	0.0000	7.9632 ***	0.0000	8.2677 ***	0.0000	8.2781 ***
$\Delta\mathrm{EMP}_{k,t}$	1.2213	6.2839 ***	1.2201	6.3554 ***	0.8492	3.8135 ***	0.8168	3.6477 ***	0.8513	3.8335 ***	0.8492	3.8135 ***
$\Delta(\mathrm{JGB}_{i,t}/\mathrm{DPS}_{i,t})$	-0.5412	-0.3521			-0.4718	-0.3103	-0.4176	-0.2730			-0.4718	-0.3103
$\Delta(\mathrm{LON}_{i,t}/\mathrm{DPS}_{i,t})$			4.4433	4.2661 ***	4.1490	3.9840 ***			4.1781	4.0156 ***	4.1490	3.9840 ***
$\Delta(\mathrm{MRG}_{i,t}/\mathrm{LON}_{i,t})$	-3.7428	-2.5064 **	-3.6779	-2.4825 **	-9.4204	-4.1013 ***	-10.0590	-4.3625 ***	-9.4086	-4.1020 ***	-9.4204	-4.1013 ***
$\Delta(\mathrm{MRG}_{i,t}/\mathrm{LON}_{i,t})/\Delta(1/\mathrm{EMP}_{k,t})$					-1,689.1921	-3.2812 ***	-1,850.0182	-3.5821 ***	-1,677.3799	-3.2634 ***	-1,689.1921	-3.2812 ***
cross-sections included	140		140		140		140		140		140	
periods included (years)	11 (2000–2010)		11 (2000–2010)		11 (2000–2010)		11 (2000–2010)		11 (2000–2010)		11 (2000–2010)	
included observations	1,324		1,326		1,324		1,324		1,326		1,324	
adjusted R^2	0.1420		0.1539		0.1611		0.1505		0.1608		0.1611	
Log likelihood	-2,456.6031		-2,450.1664		-2,440.5228		-2,449.4129		-2,444.1944		-2,440.5228	
F statistic	2.4892 ***		2.6396 ***		2.7056		2.5839 ***		2.7152		2.7056 ***	

Notes : ***, **, and * respectively denote significance at 1, 5, and 10 percent levels.

Table 4 Robustness check for possible edogeneity of morgage loan.

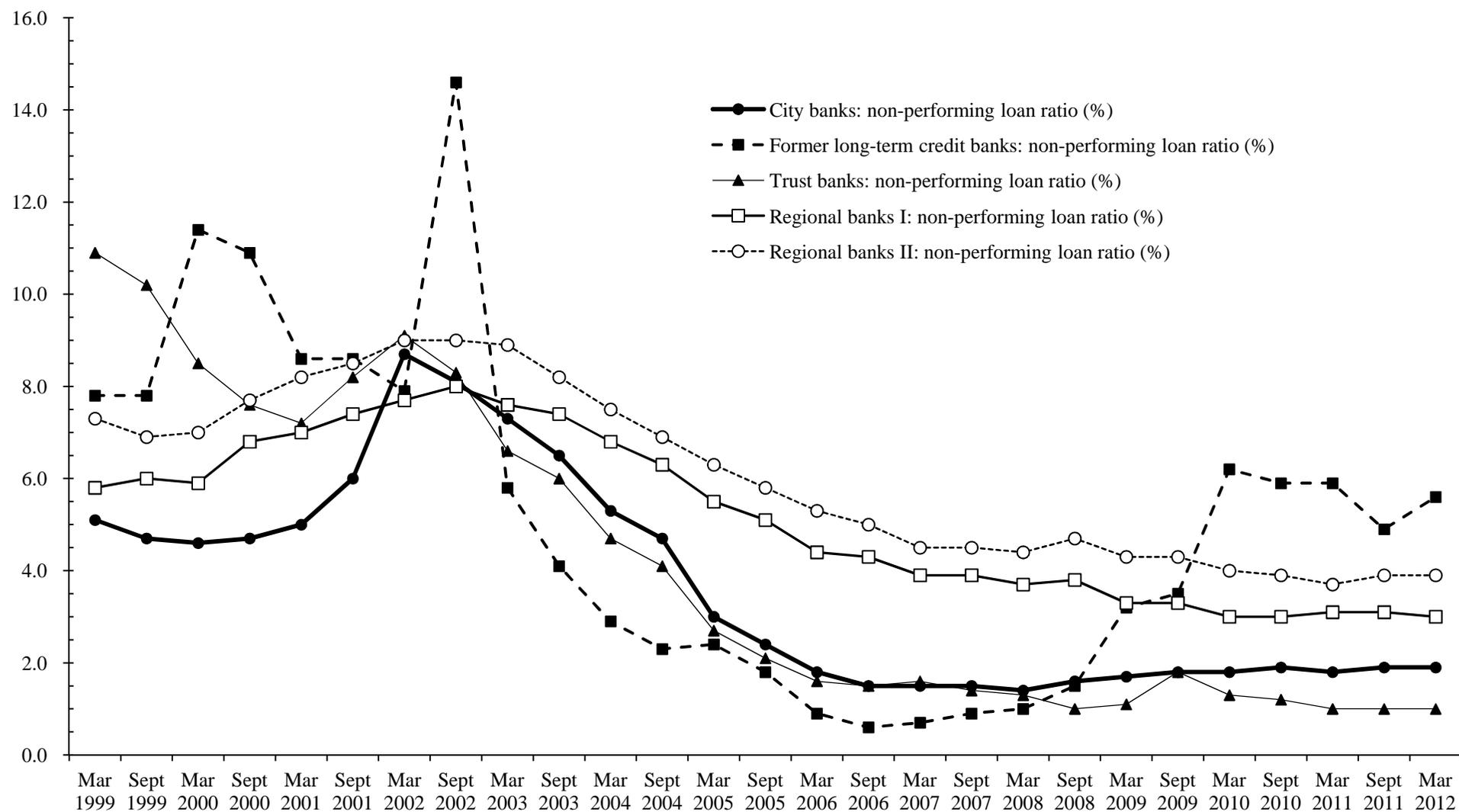|	4–1			4–2			4–3			4–4		
Estimation method	panel generalized method of moments											
Dependent variable	$\Delta \text{FRR}_{i,t}$			$\Delta \text{FRR}_{i,t}$			$\Delta \text{FRR}_{i,t}$			$\Delta \text{FRR}_{i,t}$		
Cross-section	fixed			fixed			fixed			fixed		
Period (year)	pooled			pooled			pooled			pooled		
Independent variables	coefficient	t statistic		coefficient	t statistic		coefficient	t statistic		coefficient	t statistic	
c	0.3058	0.8097		-2.5826	-3.2199	***	-2.2617	-3.6889	***	-2.2702	-3.6967	***
$\Delta \text{ROE}_{i,t}$	-0.0019	-2.3556	**	-0.0019	-2.5286	**	-0.0022	-3.6129	***	-0.0022	-3.6161	***
$\text{GPP}_{j,t}$	0.0000	-1.4763		0.0000	-2.1016	**	0.0000	-2.3907	**	0.0000	-2.3895	**
$\text{LP}_{j,t}$	0.0000	1.2979		0.0001	5.6181	***	0.0000	8.7641	***	0.0000	8.7747	***
$\Delta(\text{LON}_{i,t}/\text{DPS}_{i,t})$	6.4980	6.4538	***	3.9858	2.9348	***	4.3456	4.0971	***	4.3179	4.0679	***
$\Delta(\text{MRG}_{i,t}/\text{LON}_{i,t})$	-58.3490	-1.4602		-43.2764	-1.6809	*	-4.0104	-2.6147	***	-3.9902	-2.6004	***
Instrument varialbes												
c	Yes			Yes			Yes			Yes		
$\Delta \text{FRR}_{i,t-1}$	Yes			Yes			Yes			Yes		
$\Delta \text{ROE}_{i,t}$	Yes			Yes			Yes			Yes		
$\Delta \text{ROE}_{i,t-1}$	Yes			Yes			Yes			Yes		
$\text{GPP}_{j,t}$	Yes			Yes			Yes			Yes		
$\text{LP}_{j,t}$	Yes			Yes			Yes			Yes		
$\text{EMP}_{k,t}$	No			No			Yes			Yes		
$\Delta(\text{JGB}_{i,t}/\text{DPS}_{i,t})$	No			Yes			No			Yes		
$\Delta(\text{LON}_{i,t}/\text{DPS}_{i,t})$	Yes			Yes			Yes			Yes		
$\Delta(\text{MRG}_{i,t}/\text{LON}_{i,t})\times\Delta(1/\text{EMP}_{k,t})$	No			No			Yes			Yes		
cross-sections included	140			140			140			140		
periods included (years)	11 (2000–2010)			11 (2000–2010)			11 (2000–2010)			11 (2000–2010)		
included observations	1,326			1,324			1,326			1,324		
Standard Error of Regression	2.2913			0.1608			1.6606			1.6612		
Instrument rank	17			147			148			149		
J statistic	2.6664			3.3302			8.1145			9.0818		

Notes :   ***, **, and * respectively denote significance at 1, 5, and 10 percent levels.

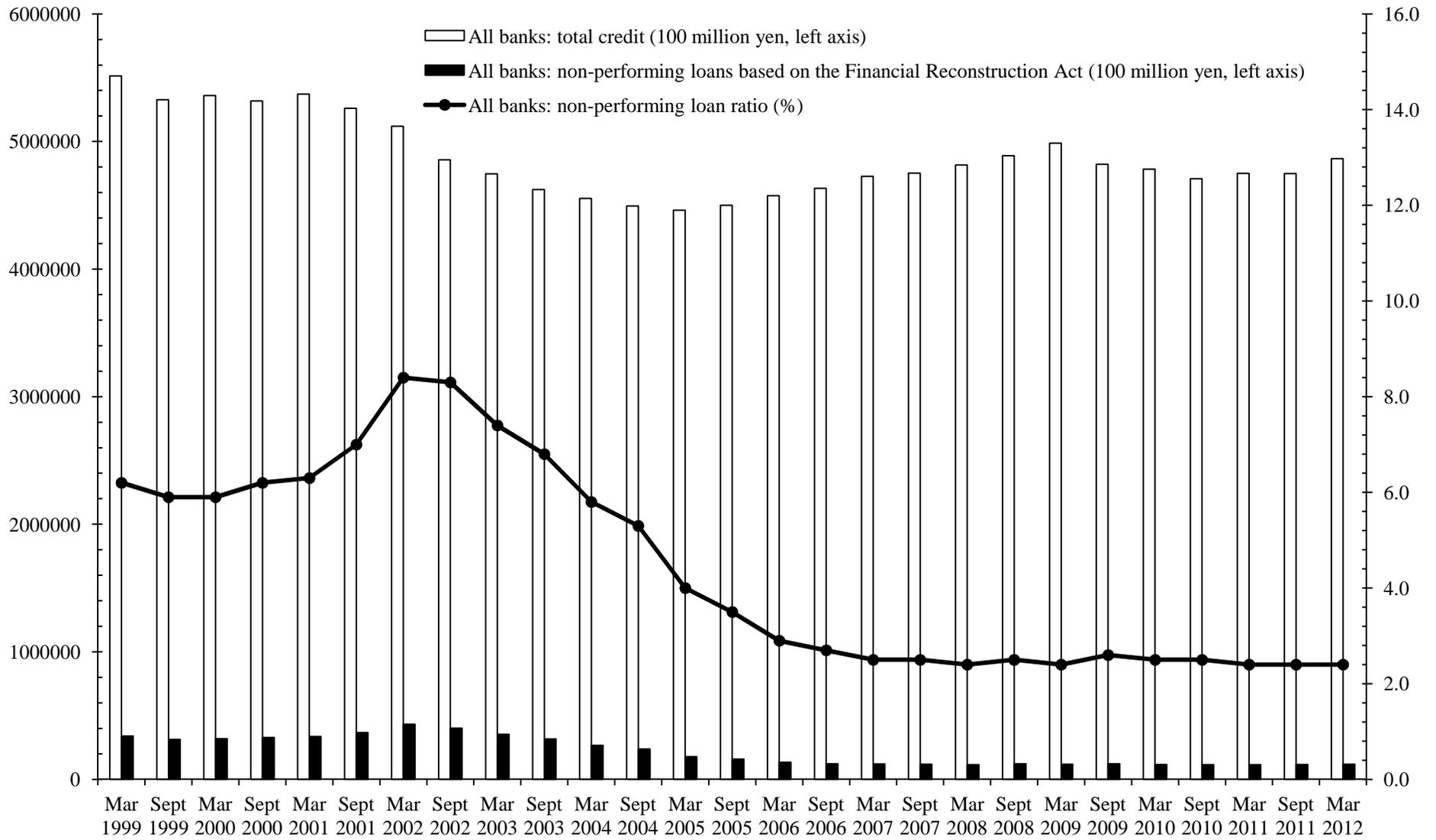**Figure 1** Aggregate non-performing loans defined by the Financial Reconstruction Act, 1999–2012.

Legend:
- Major & Former Long-Term: non-performing loan ratio (%)
- Regional banks I & II: non-performing loan ratio (%)
- All banks: non-performing loan ratio (%)

Figure 2 Sectoral non-perfoming loan defined by the Financial Reconstruction Act, 1999–2012.

Legend:
- City banks: non-performing loan ratio (%)
- Former long-term credit banks: non-performing loan ratio (%)
- Trust banks: non-performing loan ratio (%)
- Regional banks I: non-performing loan ratio (%)
- Regional banks II: non-performing loan ratio (%)

Figure 3 Total credit and non-perfoming loan, 1999–2012

Figure 4 Total credit and non-perfoming loan of major banks, 1999–2012.
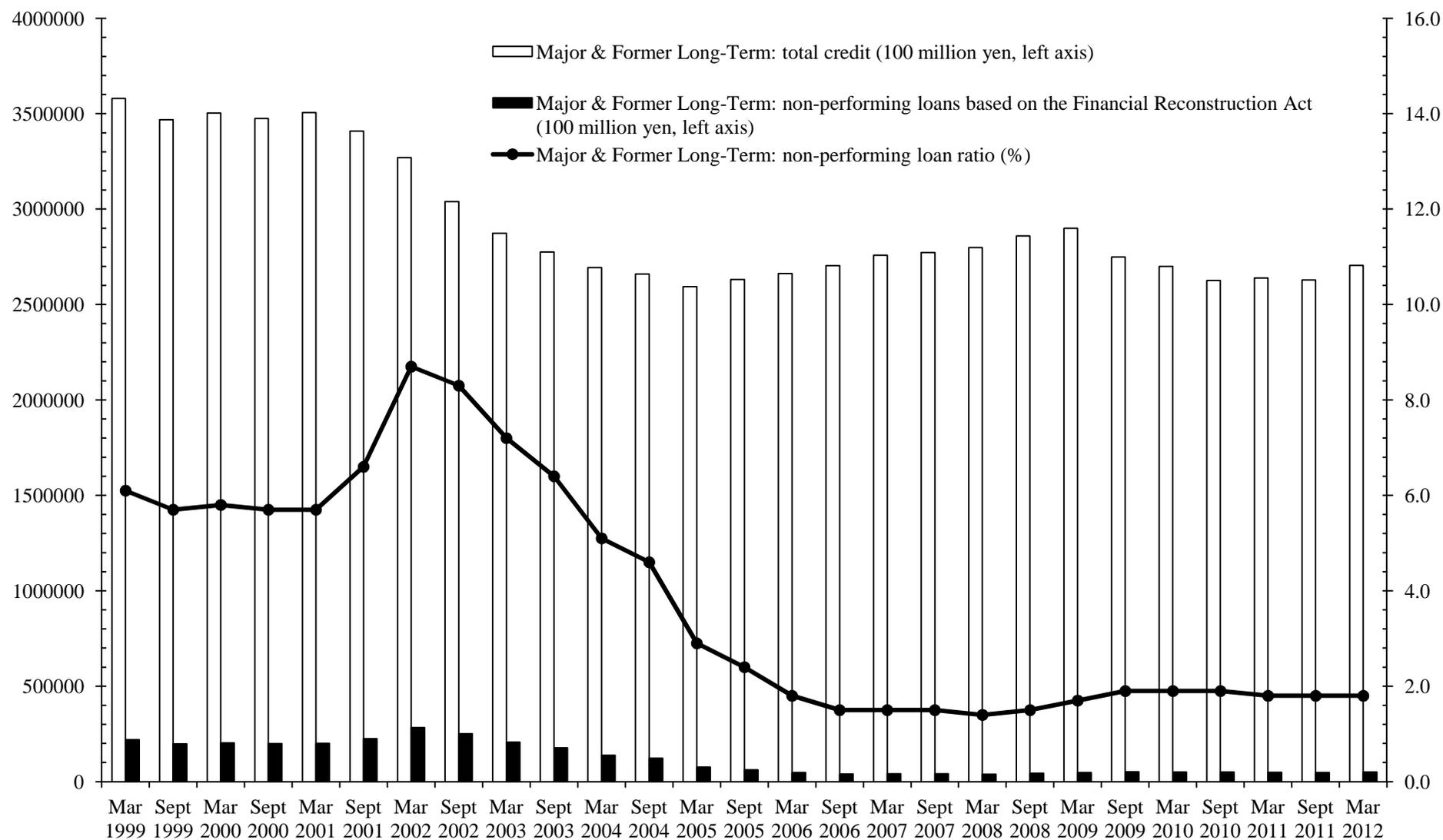
Figure 5 Total credit and non-perfoming loan of regional banks, 1999–2012
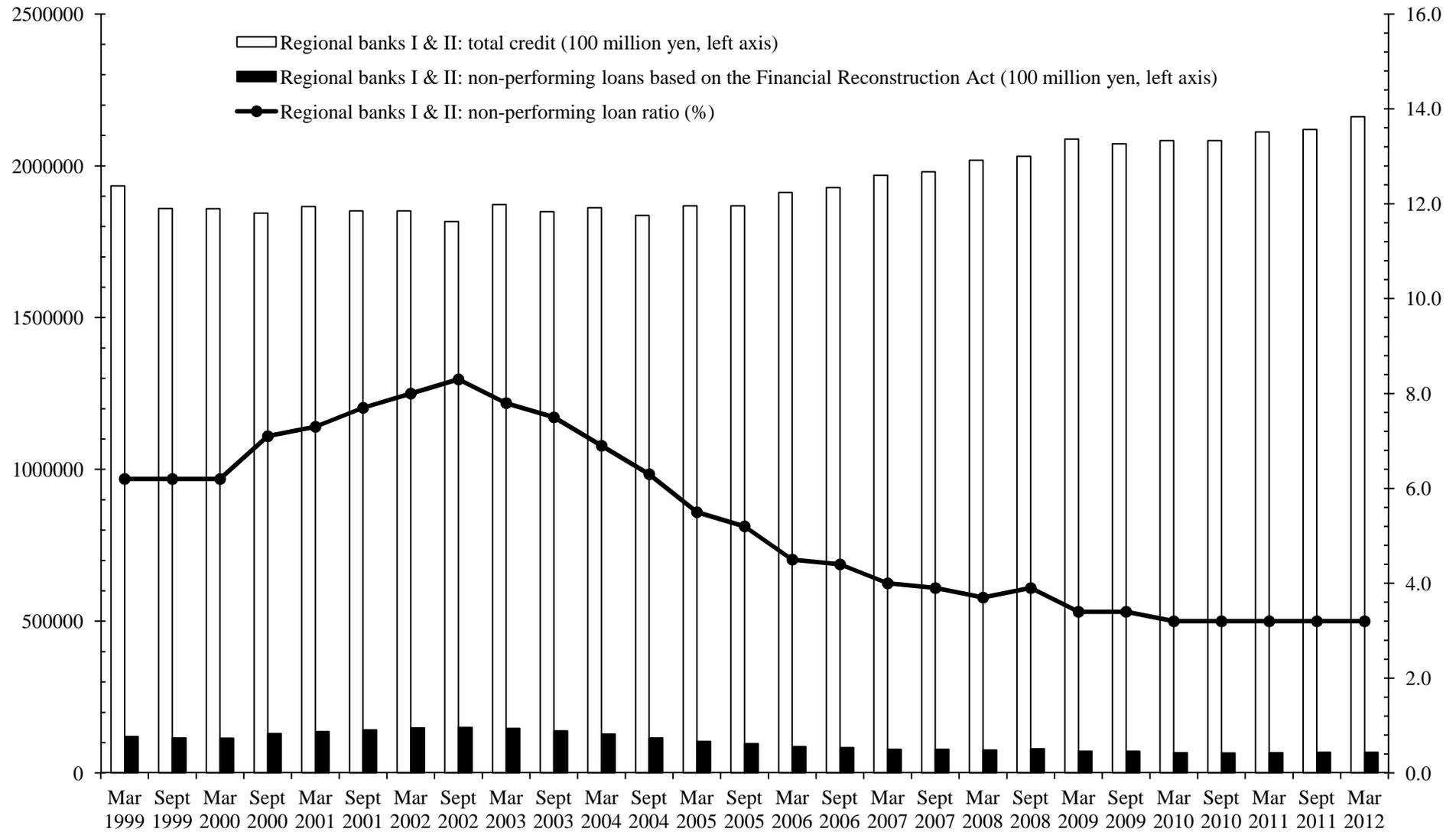
Legend:
- □ Regional banks I & II: total credit (100 million yen, left axis)
- ■ Regional banks I & II: non-performing loans based on the Financial Reconstruction Act (100 million yen, left axis)
- ●— Regional banks I & II: non-performing loan ratio (%)

Figure 6 JGB holding over total credit ratio, 1998–2011

Legend:
- All banks: Japanese government bond / total credit (%)
- City banks: Japanese government bond / total credit (%)
- Regional banks: Japanese government bond / total credit (%)
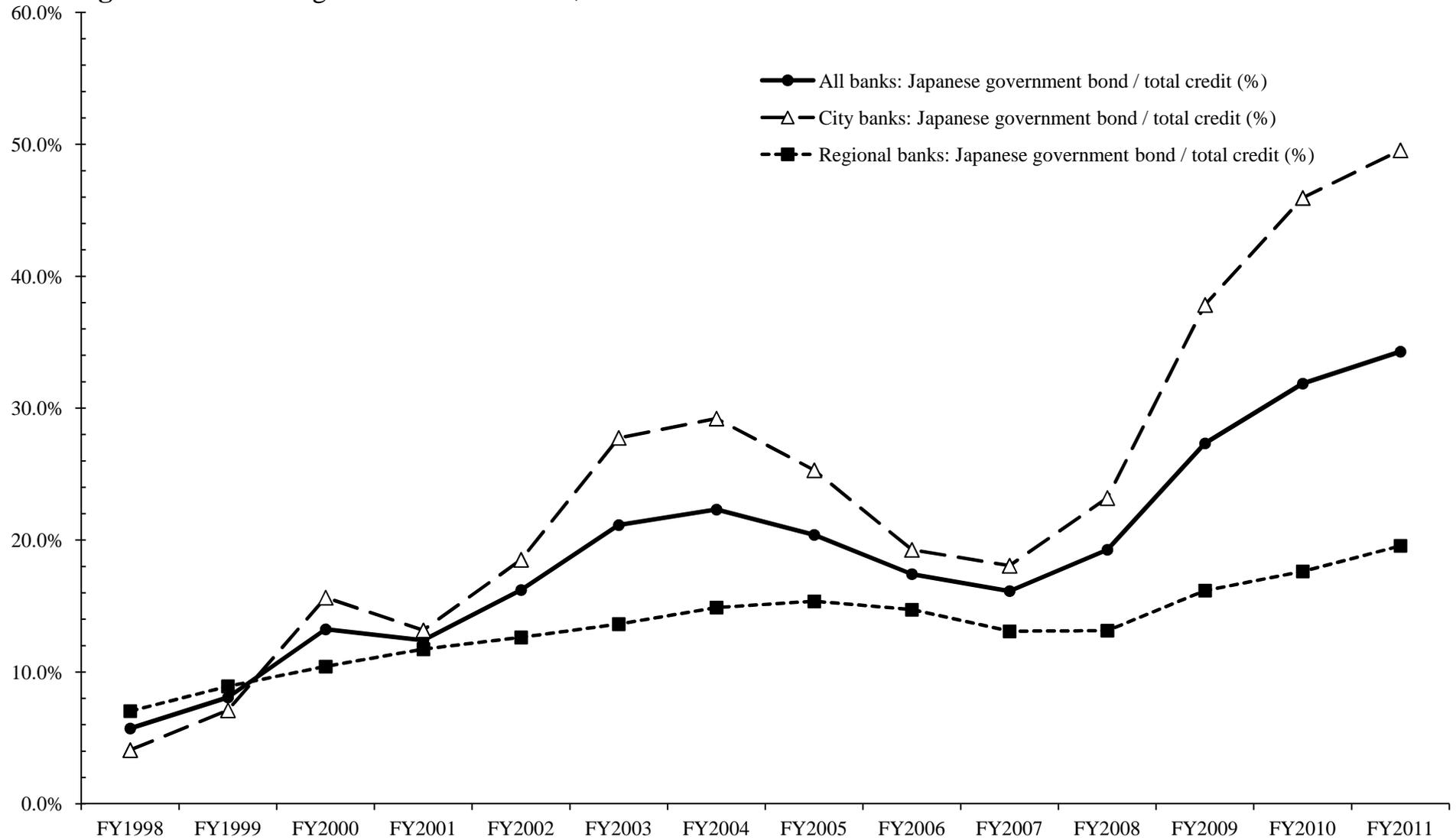
Source: a) Government bond: Japan Bankers Association, "Zenkoku Ginko Zaimu Shohyo Bunseki (Analysis of Financial Statements of All Banks)," each year. b) Total credit: Financial Services Agency, *Kinyu Cho no 1 Nen (The Annual Report of the Financial Services Agency)*, each year.

Figure 7 Foreign securities issuance, 1997–2012.

100 million yen

- ■ Foreign issuance: stock
- □ Foreign issuance: convertible bond
- ▨ Foreign issuance: straight bond