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The Japanese Banking Crisis: Where Did it Come from and How Will it End?

1. *Introduction*

Japan's financial system is in the midst of a major transformation. One driving force is deregulation. The reform program that has come to be known as the *Japanese Big Bang* represents the conclusion of a deregulation process that began more than 20 years ago. By the time the Big Bang is complete, in 2001, banks, security firms, and insurance companies will face a level playing field on which unfettered competition can occur. At that time, Japanese financial markets will be at least as liberalized as the U.S. markets.

A second (and we will argue related) driving factor is the current huge

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financial crisis. As of September 1998, the estimates of bad loans in Japan remain at 7% of GDP (see Section 4 below for further details). This crisis has included the first significant bank failures since the end of the U.S. occupation of Japan. In policy circles, the banking problems are widely identified as one of the key factors for the poor performance of the Japanese economy over the last couple of years.[1] A growing academic literature suggests that the problems in the banking sector are now creating a serious drag on the economy's ability to recover.[2]

The Japanese government during the 1990s has taken a number of steps to address the financial problems. Starting with the loan purchasing program set up in early 1993, followed by the establishment of banks to buy out failed credit cooperatives and the *jusen*, and culminating in the reforms that reorganized the supervision authority for banks and earmarked over ¥60 trillion for bank reorganization and capitalization, there have been a nearly continuous set of attempts to fix the banking problem.[3]

In the latest attempt, the Long-Term Credit Bank of Japan (LTCB) and Nippon Credit Bank (NCB) were nationalized in late 1998, and three regional banks were put under receivership in the first half of 1999. Their balance sheets are supposed to be cleaned up so that they can be sold. Meanwhile, in March 1999, 15 large banks applied for a capital injection and received ¥7.4592 trillion of public funds. These banks are also required to carry out restructuring plans that will include eliminating 20,000 workers, closing 10% of their branches, and increasing profits by 50% over the next four years.[4] Nevertheless critics, including the U.S.

1. For example, both the International Monetary Fund (IMF) (1998a) and the Organization for Economic Cooperation and Development (OECD) (1998) country reports on Japan for 1998 point to the banking problems as a key factor in causing the post-November 1997 slowdown in growth. The Japanese government's 1998 Economic White Paper also identifies problems in the financial sector an important factor in prolonging the recession (Economic Planning Agency, 1998).
2. For instance, Bayoumi (1998) finds that fluctuations in asset prices played an important role in recent Japanese business cycles and that the shocks were mostly transmitted through bank lending. Without associated changes in bank loans, asset price fluctuations would not have affected the real economy very much, he argues. Likewise, Ogawa and Kitasaka (1998) report that small firms were especially hard hit by the decline in bank loans in the 1990s and that small- and large-firm investment differentials have emerged as the slow growth has continued. Motonishi and Yoshikawa (1998) find that the index of (firms' perception of) banks' willingness to lend (loose or tight) in BOJ's *Tankan* survey worsened substantially from late 1997 and contributed to slow growth, especially at small firms. Finally, Woo (1998) argues that since 1997 there has been a marked shift in bank-loan supply that has contributed to the weak growth in 1997 and 1998.
3. For a discussion of the loan purchasing program by the Cooperative Credit Corporation see Packer (1998). For a review of the *jusen* problems see Milhaupt and Miller (1997).
4. For more details on the restructuring plans, see Choy (1999). Individual restructuring plans in Japanese can be downloaded from the Financial Reconstruction Commission Web site (www.frc.go.jp).

Treasury, have argued that these steps have been inadequate.[5] In the latter half of 1999, two more regional banks were shut down and ¥260 billion of public funds were injected to re-capitalize four other regional banks. As of this writing there is still widespread pessimism about whether the banks have turned the corner.

We believe that a recurring problem with the Japanese government's attempts to overcome the crisis has been the lack of a clear vision for the future of the Japanese banking system. For instance, the debate that culminated in the passage of the Financial Reconstruction Bill in the fall of 1998 was drawn out because the ruling Liberal Democratic Party (LDP) and the major opposition party (the Democrats) haggled over two competing plans. On the surface, the negotiation seemed to center on what should happen to the Long-Term Credit Bank, which had been rumored to be insolvent for almost 4 months. At a deeper level, however, the two plans represented competing views about the current condition of the Japanese banking system.

LDP leaders believed that the major banks could not be allowed to fail. To them, the biggest problem with the Japanese banks was they were not strong enough to support (supposedly) healthy customers. Thus, the desired solution was to inject public funds into the major banks as they did in March 1998, to prevent a credit crunch. In the event of a failure, protecting solvent borrowers, by transferring the failed bank's business to a bridge bank, was given the highest priority.

The Democrats argued instead that giving public funds to the weak banks was a waste of taxpayers' money. Weak banks should be nationalized and restructured. Through this process, the Japanese banking sector would reemerge smaller but healthier.

In the end the LDP and the Democrats reached a compromise and passed the Financial Reconstruction Act. This law allows the newly created Financial Reconstruction Commission to choose between nationalization and a bridge bank scheme when a bank fails. However, shortly thereafter, over the objections of the Democrats, the LDP also formed a coalition with the Liberal Party and managed to pass the Prompt Recapitalization Act to help recapitalize supposedly healthy banks.[6]

Thus, the struggle in the Diet during the fall of 1998 amounted to a battle over whether the Japanese banking sector has too little capital or

5. For instance, Lawrence Summers, while he was U.S. Deputy Secretary of the Treasury, was reported to have suggested to Hakuo Yanagisawa, chairman of the Financial Reconstruction Committee, that another round of capital injections may be necessary (*Nikkei Net Interactive*, February 26, 1999.)

6. See Fukao (1999) for a summary and an analysis of the two laws, and Corbett (1999a) for a more complete history of the policies leading up to the fall 1998 legislation.

whether Japan is currently overbanked. To settle this issue one needs to ask what the banking sector will look like once the current crisis is over and the deregulation is complete. This question has attracted little attention. For instance, although there is now some discussion of how many large banks might be viable, aside from Moody's (1999) and Japan Economic Research Center (1997) (which we discuss in detail below) we are unaware of any attempts to determine how many *assets* will remain in the banking sector.[7]

More importantly, the mergers and closures that have occurred thus far (including the fall 1999 megamergers) have not reduced capacity in the industry. If the overbanking hypothesis is correct, these adjustments alone will probably not help. Similarly, the March 1999 capital injection required the 15 banks that received funds to reduce their general administrative expenses by ¥300 billion, but at the same time to increase loans to prevent a so-called "credit crunch." We believe that one needs a clear vision of the future of the industry to evaluate this situation.

One of the primary contributions of this paper is an attempt to make some educated guesses about the future size of the industry. We hope that by providing these estimates we can inform the debate over how much assistance it is reasonable to provide now. We believe that it is impossible to determine the appropriate level of resources to earmark for rescuing the existing banks without taking a position on what role the banks will play in the post-Big Bang economy.

To answer this question about the future, it is necessary to review the recent history of the financial system. In particular, we need to know how the Japanese banking system got into so much trouble. Having determined the cause of the current trouble we can then ask what will have to occur in order for the banks to get out of trouble. Based on our diagnosis, we can then assess what the financial system, particularly the banking system, will look like once the crisis is over.

The story that emerges from our investigation points to the nature of the deregulation leading up to the Big Bank as playing a major role in the banking crisis. During the Japanese high-growth era, usually dated from the mid-1950s through the mid-1970s, the financial system was regulated to steer both savers and borrowers towards banks. As growth slowed in the mid-1970s a gradual deregulation process started. By the late 1980s this deregulation had eliminated many of the restrictions regarding large corporations' options for financing. During the 1980s these key bank clients began sharply reducing their dependence on

7. For example, Atkinson (1998) argues that there will be only two to four major banks in Japan. We believe it is more important to focus on the size of the sector than on the number of banks.

bank financing. By the 1990s large Japanese firms' financing patterns had begun to look very similar to those of the large U.S. firms.

Meanwhile, innovation and the deregulation of the restriction on households' investment moved much more slowly. Most Japanese savings into the late 1990s continued to flow into banks. The banks therefore remained large but had to search for new lending opportunities. [The same type of argument is emphasized by Gorton and Rosen (1995) in their discussion of the U.S. banking crisis.] The new lines of business that they entered turned out badly.

We conclude that the lopsided nature of the financial deregulation, combined with maturing of the Japanese economy and slow growth starting in the mid-1970s, created a disequilibrium situation that has lasted to date. To eliminate the disequilibrium, further deregulation of the financial system will be inevitable. Once the deregulation is complete, the Japanese allocation of savings and the investment financing patterns will move further towards the patterns seen in the United States. We show this will imply a substantial decline in the prominence of the banks.

To paint this picture we divide the discussion into five parts. First, we review the regulatory conditions that prevailed prior to the Big Bang, focusing on the banking regulation that has governed the system over the last two decades. We argue that the regulation in Japan and the United States is converging and that the United States provides a sensible benchmark to use in forecasting what might happen in Japan. Section 3 provides some empirical support for this proposition. We show how past deregulation in Japan has altered firms' borrowing patterns and banks' activities. In Section 4 we describe the current state of the banking industry. This brief section aims to clarify some common misperceptions about the current crisis and explain why there are so many different estimates of its scope. In Section 5, we look ahead and ask how much lending will be required if Japanese firms' borrowing patterns move closer to those seen in the United States. Our calculations suggest that this will imply a sizable contraction in the traditional banking sector. Finally, in the conclusion we briefly discuss several scenarios for the transition between the current system and the eventual system.

2. *Financial Regulation in Japan*

To understand the current conditions and to put the current rules in context it is necessary to review briefly some background information. Until the 1920s, the Japanese banking system was characterized by free competition with little regulation. The Bank Act of 1890, for instance, set no minimum capital level for banks. A series of banking crises in the

1920s, especially the banking panic of 1927, led the Japanese government to change completely its attitude toward regulating banks, and tight regulation of the banking sector began. Government regulation and control of the financial system intensified under the wartime economy.

This pattern continued during the U.S. occupation of Japan. Indeed, some reform measures implemented during the occupation, such as the Glass–Steagall-style strict separation of commercial and investment banking, helped perpetuate the government's strong role in the financial sector. The financial system was also highly segmented. The regulatory framework that was completed during the occupation period stayed more or less in place until the mid-1970s.[8]

During the high-growth era from 1955 through 1973, banks dominated the financial system. Bond markets were repressed, and equity issuance was relatively uncommon.[9] In the 1970s this all began to change.

One big change was slower aggregate growth. Up until this time household savings were mostly channeled through banks to finance business investment. With lower growth the corporate funding requirements fell. The success of the Japanese economy in the rapid-economic-growth period also helped the corporations accumulate internal funds. This intensified the decline in the borrowing requirements of the companies.

A third feature of the economy in the 1970s was that the government began to run a sizable deficits. The deficits arose because of a combination of slower tax revenue growth, a policy decision to engage in deficit spending to try to spur the economy, and an expansion of the Social Security system. To finance the deficits, the government significantly ramped up its bond issuance.

2.1 CHANGES AFFECTING SAVERS

The increase in the government bond issues changed the financial system. Previously, the limited amounts of debt that were issued were sold almost exclusively to financial institutions. The coupon rates were low, but the banks and other buyers tolerated this because the total amount issued was small and other government regulation was protecting them from competition. Moreover, it was customary for the Bank of Japan to periodically buy up the government bonds from the financial institutions as a way to keep money-supply growth in line with aggregate growth. But the soaring debt issuance would have impaired the banks' profitability if they had been forced to absorb all the low-yielding government bonds.

Thus, the Ministry of Finance was compelled to open a secondary

8. See Patrick (1967, 1971, 1972) and Hoshi and Kashyap (1999a) for further details.
9. For instance, Patrick (1972) examined financial intermediation in this period and found that the "capital issue markets played a relatively minor role" (p. 112).

market for government bonds in 1977, and to start issuing some bonds through public auctions in 1978. The opening of the secondary market for government bonds, combined with accumulation of financial wealth by households during the rapid economic growth of the 1960s and the early 1970s, increased the demand for bonds. Moreover, many of the restrictions in the bond markets that had been put in place to ration funds during the high-growth era now started to look out of date.

The expansion of the secondary market for government bonds undermined the interest-rate controls that had been a prominent feature of the postwar financial system. Since the government bonds were now traded at market prices, investors were able to stay away from the other financial assets, such as deposits, whose interest rates were set at artificially low levels. Thus, opening up the government bond market led to the liberalization of interest rates in many other markets. For example, interest rates in the interbank lending market, the *tegata* market, and the *gensaki* market were all freed from any regulation by the late 1970s.[10] All the other interest rates except deposit rates were fully liberalized by the end of the 1980s. Starting with large deposit accounts, the deposit rates were gradually decontrolled during the 1980s and the 1990s, and were completely unrestricted by April 1993.

In addition to the interest-rate deregulation, there were several other steps that gave savers better options. Money-market mutual funds slowly began to appear, and investing in other new instruments such as commercial paper eventually became possible. However, there was a lag between the time when bond financing and commercial-paper issuance became commonplace and when savers could easily hold these securities. A summary of the major changes is contained in Table 1. The key conclusion from this table is that options for savers *gradually* changed and many restrictions survived into the late 1990s. As we will see, these changes lagged the changes that benefited borrowers and in several respects were not nearly as dramatic.

2.2 CHANGES AFFECTING BORROWERS

Probably the biggest development for borrowers was the emergence of vibrant bond markets both at home and abroad. In the domestic market, until the mid-1970s firms seeking to issue bonds had to secure approval from a body known as the Bond Issuance Committee. This group determined not only who would be allowed to issue bonds but also how much each issuer could raise. Firms seeking to issue bonds had to satisfy

10. In a *gensaki* transaction, a seller sells a security to a buyer with an agreement to repurchase the same security at a certain price on a certain future date. The *gensaki* market is open to all corporations. In a *tegata* transaction, a seller sells a bill before its maturity to a buyer at a discount. The *tegata* market is restricted to financial institutions.

Table 1 SIGNIFICANT EVENTS AFFECTING THE CHOICES AVAILABLE TO JAPANESE SAVERS

1979	Negotiable CD market set up.
1981	Maturity-designated time deposits introduced (up to 3 yr); new type of loan trust fund (called "big") accounts introduced by trust banks.
1982	Money-market dealers allowed to begin buying bills; securities companies banned from selling foreign-currency zero-coupon Euro bonds to residents (ban lifted subject to certain restrictions in February 1983)
1983	Banks start over-the-counter sale of government bonds to the general public; government-bond time deposit account introduced; medium-term government-bond time deposit account introduced; postal insurance system permitted to invest in foreign bonds; banks authorized to sell long-term government bonds and medium-term government bonds over the counter.
1984	Short-term Euro–yen loans to residents liberalized; domestic trade in CDs and CPs issued abroad permitted.
1985	Initial relaxation of time-deposit rates (for deposits over 1 billion yen) and money-market certificate (MMC) rates (interest-rate ceiling of 0.75% below weekly average newly issued CD rate); bankers' acceptance market created.
1986	Treasury bill auction begins.
1987	Freely determined interest rates permitted for time deposit accounts over ¥100 million.
1988	Postal savings system allowed to progressively increase foreign investments and to diversify domestic investments (no longer obligated to place all its funds with the Trust Fund Bureau).
1989	Introduction of small-lot MMCs (minimum lot ¥3 million); unregulated interest rates for time deposits over ¥10 million.
1990	Interest-rate ceilings for money-market certificates removed; residents allowed to hold deposits of up to ¥30 million with banks overseas without prior authorization.
1991	Unregulated interest rates for time deposits over ¥3 million; pension funds and investment trusts allowed to buy securitized corporate loans.
1992	Securities houses allowed to offer money-market funds (minimum deposit of ¥1 million provided that more than half of such funds are invested in securities).
1993	All time-deposit rate ceilings removed.
1994	All major interest-rate restriction have been removed.
1997	Security houses allowed to handle consumer payments for their clients; restriction on minimum sales unit of commodity funds removed.
1998	OTC sales of investment trusts by banks and insurance companies.
1999	Liberalization of brokerage commissions for stock trading.

Sources: Takeda and Turner (1992); Ministry of Finance, *Banking Bureau Annual Report,* various issues; Ministry of Finance, *Securities Bureau Annual Report,* various issues.

a set of financial conditions relating to size, profitability, and dividend payments. In addition, bonds had to be issued with collateral.

The first step towards liberalization came in 1975 when the Bond Issuance Committee adopted a policy of honoring the requested amount of bond issues by every company. The collateral requirements also became gradually less important. In 1979, unsecured straight bonds and unsecured convertible bonds were permitted, but the bond issue criteria were so stringent that only two companies (Toyota Auto and Matsushita Electric) were qualified to issue. The criteria for unsecured bonds were gradually relaxed during the 1980s.

Several of the key developments played out in international markets. This first became possible because of the reform of the Foreign Exchange and Trade Control Act in 1980. Foreign exchange transactions, which were "forbidden in principle" under the old rule, were made "free unless expressly prohibited." The internationalization was further advanced in 1984 by the abolition of the "real demand principle," which required foreign exchange transactions to be backed by "real" demand for foreign exchange, such as foreign trade. Following the suggestions in the Yen–Dollar Commission report, the euro market was substantially deregulated and the Tokyo offshore market was opened in 1986.

The foreign bond markets were attractive for Japanese firms because they made it possible to bypass the Bond Issuance Committee.[11] Perhaps most importantly, no collateral was required in foreign markets. This led to high levels of issuance in foreign markets. Warrant bonds, which were introduced in 1981 and allowed the holders to have an option to buy shares at a prespecified price during a certain period, were a leading example. Throughout the 1980s many warrant bonds were issued outside Japan, even though these securities did not prove to be very popular in the domestic market.

Liberalization also proceeded in the domestic market. By 1987 the domestic commercial-paper market was created, giving firms another nonbank source of funding. By the late 1980s firms began to be able to avoid the bond issuance criteria if they were rated. Finally in 1996 all rules regarding bond issues were lifted.

11. However, some self-regulation by the security houses continued, so that firms in the 1980s were still forced to satisfy versions of the bond issuance criteria in order to be able to issue debt abroad. Although Japanese banks technically could underwrite foreign bond issues by Japanese corporations through the banks' foreign subsidiaries, the *three-bureaus agreement* of 1975 suggested that banks should "pay due respect to the experience gained by and the mandate given to the Japanese securities firms" (Rosenbluth, 1989, p.152). In practice, the three-bureaus agreement has been interpreted to prohibit subsidiaries of Japanese banks from becoming the lead underwriters of bond issues by Japanese corporations. Thus the Japanese banks did not have much say about the self-regulation of foreign bond issues.

Over this period regulations regarding stock markets were also changed. Listing requirements were eased, and commissions were eventually deregulated. These changes made equity issuance more attractive, although initial public offerings were typically more underpriced in Japan than elsewhere (see Jenkinson, 1990).

The key changes regarding the opening up of capital markets are collected in Table 2. Comparing this table and the previous one shows that the financing options for bank borrowers opened up much faster than the options for savers. As we document below, by the end of the 1980s many of the banks' traditional clients had already migrated to cheaper bond financing. One striking statistic is that during the decade the number of firms permitted to issue unsecured domestic bonds grew from two to over 500.

The third leg of deregulation dealt with changes in bank powers. The major changes are shown in Table 3. We draw three important lessons from the list. First, bank powers were expanded very slowly and gradually. While the banks' main borrowers were able to get quickly into the bond market, the banks had their hands tied in many respects. For instance, securitizing loans was not even possible until 1990. Second, many new types of businesses, particularly fee-generating activities, did not become available until relatively recently. For example, through 1998 Japanese banks were still prohibited from collecting fees by offering loan commitments. Thus, banks in Japan were essentially forced to continue to try to make money through conventional deposit-taking and loan-making during the 1980s. [Gorton and Rosen (1995) point out that similar problems were present in the U.S. Furthermore, the absence of an active takeover market for banks likely exacerbated the problems in both countries.] Finally, even up until the end of 1990s there were significant barriers which continued to keep investment banking and commercial banking separated in Japan.

The culmination of the deregulation is the Big Bang.[12] When the government first proposed the program in the fall of 1996, it was heralded as drive to make Japanese financial markets "free, fair and global." As we describe more completely below, the result will be that banks, insurance companies, and securities dealers will be able to compete directly.

2.3 COMPARISONS WITH THE UNITED STATES

As we look ahead we see these changes pushing the Japanese financial system to become more similar to the U.S. system. In fact, ever since the U.S. occupation of Japan there has been a certain degree of similarity

12. There are many good summaries of the provisions of the Big Bang. Two recent guides are Craig (1998) and Toyama (1998).

Table 2 SIGNIFICANT EVENTS IN THE LIBERALIZATION OF CAPITAL MARKETS

1975	Bond issuance committee begins to honor requested amounts for firms that pass the criteria.
1976	Official recognition of *gensaki* (repurchase agreement) transactions.
1977	First issue of 5-year government bonds; first issue of Euro–yen bonds by a nonresident; secondary trading of government bonds permitted.
1978	First issue of medium-term coupon government bond (the first to be issued by auction; 3-year bonds on this occasion, followed by 2-year bonds in June 1979 and 4-year bonds in June 1980).
1979	Unsecured straight bonds and unsecured convertible bonds permitted.
1980	Foreign Exchange and Trade Control Act amended so "free unless prohibited" replaces "forbidden in principle."
1981	Warrant bonds introduced.
1982	Criteria for the issuance of unsecured bonds by Japanese residents in overseas market clarified.
1983	Eligibility standards for issuing unsecured convertible bonds relaxed.
1984	"Real demand rule" for foreign exchange lifted; swap agreements and hedging of forward foreign-exchange transactions allowed; collateral requirement for nonresident issue of Euro–yen bonds dropped; freer issuance of yen-dominated CDs in Japan; standards for issuing *samurai bonds*[a] by private companies eased.
1985	First unsecured straight corporate bond issued; bond futures introduced; first *shogun bond*[b] issue; first Euro–yen straight bond issued.
1986	The credit rating system in the qualification standard fully introduced for Euro–yen bonds issued by nonresidents; floating-rate notes and currency conversion bonds introduced for Euro–yen issued by residents; first issue of short-term government bonds (TB); public issue of 20-year government bonds; Japan offshore market opened (minimum deposit ¥100 million; minimum time 2 days).
1987	Introduction of credit rating system in the qualification standards for Euro–yen bond issues by residents; packaged stock futures market established on the Osaka Stock Exchange, ending a ban introduced in 1945; commercial-paper market created.
1988	Restrictions on samurai CP issues by nonresidents relaxed.
1989	Tokyo International Financial Futures Exchange established; rating criteria for bond issuance added.
1990	Accounting criteria for bond issuance removed.
1992	Bond issuance restrictions eased: more companies allowed to issue bonds overseas, and restraints on samurai bonds relaxed.
1995	Deregulation on OTC (JASDAQ) market, creating a new market to facilitate fundraising for startups.
1996	All bond issuance restrictions have been removed.
1998	Introduction of medium-term notes; relaxation of rules governing asset-backed securities.

Sources: See Table 1.

[a] Yen-dominated public bonds which are issued in Japan by non-Japanese residents.

[b] Foreign-currency-denominated bonds issued in Japan by nonresidents.

Table 3 SIGNIFICANT EVENTS RELATING TO THE RANGE OF PERMISSIBLE ACTIVITIES FOR BANKS

1979	Banks permitted to issue and deal in CDs; banks permitted to introduce short-term *impact loans* (foreign-currency loans to residents) subject to certain conditions.
1980	Foreign exchange banks allowed to make medium and long-term impact loans.
1982	Japanese banks permitted to lend yen overseas on a long-term basis to borrowers of their choice (earlier priority system for overseas yen lending is abolished).
1983	Banks started over-the-counter sale of government bonds to the general public; banks authorized to affiliate with mortgage securities companies.
1984	Securities licenses granted to subsidiaries/affiliates of some foreign banks with branches in Japan (equity stakes limited to 50%); permission for foreign and Japanese banks to issue Euro–yen CDs with maturities of 6 months or less; banks allowed to deal on their own account in public bonds.
1985	Foreign banks allowed to enter trust banking business; banks began trading in bond futures; medium and long-term Euro–yen loans to nonresidents liberalized.
1986	City banks authorized to issue long-term mortgage bonds; banks' overseas subsidiaries authorized to underwrite and deal in CP issues abroad.
1987	Banks allowed to engage in private placement of bond issues; banks begin underwriting and trading in the domestic CP market; banks allowed to deal in foreign financial futures.
1988	Banks allowed to securitize home loans.
1989	Banks begin brokering government-bond futures; banks allowed to securitize loans to local governments.
1990	Banks allowed to securitize loans to corporations; banks allowed to enter the pension trust business through their investment advisory companies.
1992	Financial System Reform Bill passes the Diet, allowing banks to set up subsidiaries to enter the securities business (effective April 1993).
1993	Three bureaus agreement ends, allowing banks to be lead underwriters in foreign bond issues; IBJ, LTCB, Norin Chukin Bank, Sumitomo Trust, and Mitsubishi Trust establish their subsidiary security firms.
1994	Major city banks establish their subsidiary security firms.
1998	Ban on financial holding companies lifted.
1999	Banks, trust banks, and securities houses can enter each other's markets; banks allowed to issue straight bonds.
2001	Banks and securities houses will be allowed to enter the insurance business.

Sources: See Table 1.

between the financial systems in the two countries. A key reason for the similarity is that Article 65 of the Securities and Exchange Act was passed in March of 1947 with the intent of mimicking the U.S. Bank Act of 1933 (Glass–Steagall). Both laws mandated a separation of investment and commercial banking. This separation has constituted a defining feature that differentiates the two financial systems from those in Europe and has shaped the evolution of both systems. In what follows, we argue that not only has the evolution been similar, but the banks in the two countries are going to become even more similar in the future.

The Japanese banks have traditionally been more successful than the U.S. banks in their attempts to participate in investment banking. For instance, the banks were able to play the role of trustee of collateral in the bond underwriting process in Japan, while they were mostly shut out in the United States. Similarly, Japanese banks were able to take limited equity positions in the firms to which they were lending. However, as Dale (1992) points out, like the U.S. banks, the Japanese banks were "excluded from market-making in and the public distribution of corporate securities." This constraint kept the Japanese banks from becoming full-fledged, German-style universal banks. Instead the Japanese financial system, like the U.S. system, was fragmented, with banks, insurance firms, and securities firms each maturing while facing little direct competition from each other.

Within the banking system in each country there was further segmentation. In the United States, cross-border branching was restricted until recently so that banks could not compete on a nationwide basis. Similarly, in Japan, competition between city banks, trust banks, regional banks, long-term credit banks, and other small banks such as credit unions has traditionally been restricted by legal measures and administrative guidance by the Ministry of Finance.

Beyond the segmentation, there are further similarities in the ways that the bank powers in the two countries changed over time. In both countries, the drive by the commercial banks to reenter investment banking has taken more than 50 years. During this period the deregulation process has been slow and incremental. In the United States, for example, banks were allowed to enter investment banking through subsidiaries only in 1987, as regulators began to reinterpret Section 20 of the banking laws that prohibits banks from having affiliates that are "principally engaged" in nonbanking activity. Over time the permissible fraction of bank income accruing from the so-called "Section 20 subsidiaries" has slowly risen.

In Japan, the financial system reform in 1993 made it possible for banks to enter the securities business through subsidiaries, but the ac-

tual establishment of bank-owned securities subsidiaries was only gradually permitted over the next couple of years. The range of securities services that these subsidiaries can provide is still limited, but the limitations will be incrementally removed between now and 2001.

Importantly, as banking deregulation proceeded in Japan, there was discussion over whether a shift toward permitting universal banking would be desirable. In March 1989 the Ministry of Finance convened an advisory group dubbed the Second Financial System Committee of the Financial System Research Council. This group described five possible routes towards permitting more integration of commercial and investment banking: separated subsidiaries, multi-functional subsidiaries, holding companies, universal banks, and a piecemeal approach (Second Financial System Committee, 1989). According to the Committee, "the sight of banks pushing out in every direction in pursuit of high returns, even at high risk, might shake people's faith in them." Thus, the Committee recommended against a universal banking approach. Ultimately, in 1993, the separated-subsidiary approach was adopted. Later, in 1997, relaxation of Section 9 of the Anti-Monopoly Act made it possible to establish a financial holding company.

As the turn of the century approaches, firms trying to offer one-stop financial shopping are facing fewer and fewer barriers in both countries. In Japan, as a result of the Big Bang, it is already possible to create a holding company that can span the securities and insurance industries. By April 2001 it will be possible to bring banking into the same holding company. In the United States legislation to repeal Glass–Steagall was finally passed, allowing the banking, securities underwriting, and insurance businesses to be integrated. Thus, in the near future the regulatory conditions in the two countries will be very similar.

Once the deregulation in both countries is complete, a transition featuring competition among entrenched securities firms, insurance companies, and banks will begin. In the previous version of this paper, Hoshi and Kashyap (1999b), we tabulated all the major alliances in the Japanese financial services industry that were announced in 1998 and early 1999. This very long list of tie-ups suggests that a scramble is already underway to provide much broader services than have been available in the past, and that the same sort of tie-ups are occurring in the United States and in Japan. Finally, the list also shows that foreign institutions are aggressively entering the Japanese market.

Collectively these patterns suggest that banks in the two countries are going to face the same types of competitive pressures and will have some sort of options available to respond to the pressures. Although the Japanese banks start from a much weaker capital position than the U.S.

banks, it is hard to see why the bank activities in the two countries will not become similar.

3. *An Empirical Look at the Fallout from the Deregulation*

To support our contention that Big Bang is going to push the financial system in Japan to look more like the U.S. system, we examine several pieces of evidence. For organizational purposes it is convenient to separate the discussion into the responses of the borrowers, savers, and lenders. We will see that the behavior of large and small borrowers turns out to be quite different. On the bank side we will distinguish between the portfolio adjustments that were made and the new business opportunities that were missed. For the savers we will see that the deregulation prior to the Big Bang has not made a big difference.

Throughout most of our discussion we will emphasize the importance of regulatory shifts. This choice does not mean that we doubt the importance of other factors such as macroeconomic conditions. In fact, it is quite reasonable to assume that the deregulation may have contributed to the fast growth of lending in the late 1980s that preceded the long recession of the 1990s. However, for the purposes of looking ahead we do not believe that it is necessary to separately identify the role of macroeconomic factors. Our basic point is that the past deregulation did have some independent effects and that based on the responses to past deregulation it is reasonable to expect that the Big Bang will have a large effect as well. Thus, our empirical work is aimed at showing that regulatory shifts have clear, independent influences on borrowers, savers, and banks.[13]

3.1 THE RESPONSE OF BORROWERS TO FINANCIAL-MARKET DEREGULATION

It is widely recognized that part of the reason why banks in Japan got into trouble is that they lost many of their best borrowers in a very short period of time.[14] As mentioned earlier, between 1983 and 1989 the Japa-

13. There are several studies that focus on drawing a more comprehensive picture of what caused the current banking problem in Japan. Cargill, Hutchison, and Ito (1997) list both macroeconomic conditions generated by loose monetary policy in the late 1980s and reduced corporate dependence on bank financing, on which we focus, as contributing factors to the problem. They also list other factors such as government deposit guarantees and regulatory forebearance. Cargill (1999) gives a similarly comprehensive list. By estimating some cross-section regressions, Ueda (1999) confirms the importance of both macroeconomic conditions and financial deregulation in bringing about the banking problem.

14. For instance, see Cargill, Hutchison, and Ito (1997), Cargill (1999), Ueda (1999), Lincoln (1998), Hutchison (1998), and Hoshi and Kashyap (1999a).

nese bond market blossomed, permitting many internationally known companies to tap the public debt markets for the first time. While this story is well known, we are unaware of any attempts to compare the bank dependence of large Japanese and U.S. firms before and after the deregulation. We provide evidence that the Japanese deregulation has permitted the largest Japanese firms to become almost as independent of banks as their U.S. counterparts.

A major challenge in conducting this investigation is the limited availability of comprehensive data on bank borrowing by firms. In Japan there are essentially two types of data that can be used. For exchange-traded firms, the corporate financial statements that are publicly available generally break out bank borrowing. This means that for these (typically) large firms one can get fairly good data. As an example, the Japan Development Bank Database provides this type of information on over 2000 firms for 1997.

To learn anything about unlisted companies one must rely on survey data. The most comprehensive survey that we know of on this topic is conducted by the Ministry of Finance and published in the *Hojin Kigyo Kiho* (*Quarterly Report of Incorporated Enterprise Statistics*). The cross-sectional coverage of these data is excellent. All nonfinancial corporations with book *capital* of ¥1 billion ($8.33 million using the exchange rate of 120 ¥/$) are included in the survey.[15] The remaining (small corporations) are randomly sampled with sampling factors that depend on their size. Only very tiny firms (those with less than ¥10 million in capital) are completely excluded. We believe that the survey is sufficiently comprehensive that it essentially sidesteps the selection problems associated with using listed data.[16]

The main drawback with the survey information is that data for firms with similar amounts of capital are aggregated, so that no firm-level statistics are accessible. Unfortunately, all the size thresholds used in the MOF data are based on *nominal* thresholds, so that over time (as the price level rises) firms drift into the upper grouping, even if their size measured in constant prices is unchanging. We discuss the effect of this limitation in the places where we believe it might be important.

In our analysis we focus on the ratio of (the book value of) bank debt to (the book value of) total assets as the basic measure of the importance of bank financing. We scale by assets to eliminate pure size differences.[17]

15. In what follows we use this exchange rate. We use GDP deflators when it is necessary to convert nominal amounts into real amounts.
16. For example, the 1997 fourth-quarter survey was sent to 23,475 firms, and the response rate was over 80% (19,007).
17. This ratio can also be thought of as the product of the bank-debt-to-total-debt ratio and

Below we also show some results which distinguish among different industries. The industry comparisons can be motivated in many ways, including as an attempt to correct for industry-level differences in risk and collateralizability of assets.

Table 4 shows the ratio of the bank debt to total assets based on the MOF data for different-sized Japanese firms over time. The data pertain to the second quarter of each year between 1980 and 1998. In addition to showing data for all industries, the table also displays separate series for manufacturing, wholesale and retail trade, and all other firms. The largest firms which are separately identified in the sample are those with a book value of equity greater than ¥1 billion in current prices. In the second quarter of 1998 the 5363 firms in this category had average assets of ¥112 billion.[18]

The table reveals a consistent pattern of large Japanese firms scaling back their bank borrowing. The shift has been most pronounced among manufacturing firms, where the ratio of bank debt to assets has dropped by almost 50%. Moreover, the shift was effectively complete by 1990—since then the ratio has been roughly constant. This timing suggests that the banks lost many of their traditional clients soon after the opening up of the bond market.

There was also a substantial drop in bank dependence for the trade firms. In publicly available versions of the survey all trade firms are shown together, but the Ministry of Finance provided us with unpublished data for selected years which allow us to separate wholesale trade companies from the retail trade companies. From the unpublished data we learned that the drop in bank dependence is more pronounced for retail trade firms than for wholesale trade firms. For instance, between 1980 and 1998 the large retail trade companies cut their bank-debt-to-asset ratio from 0.35 to 0.26, while the wholesale firms cut theirs from 0.35 to 0.30.

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the total-debt-to-total-asset ratio. This decomposition distinguishes the total amount of leverage from the sources of financing for borrowers. For our purposes we believe this distinction is not very helpful, since the banks presumably care about their total lending. To a first approximation it probably does not matter if they are losing business *over the kind of long periods that we are studying* because of overall deleveraging as opposed to more competition from other funding sources. We also checked that using book-value data would not paint a misleading picture. A quick comparison of data on national income accounts in Japan and the United States suggested that the gap between the current value of assets (the analog to market value) and the historical value was similar in the two countries. Thus, we see no obvious biases from using book-value data for both countries.

18. Of the 5363 large firms, 2192 were in manufacturing, 941 were in trade (wholesale or retail), and the remaining 2230 were in other industries. There were 1,161,179 small firms in the 1998 survey, with 232,313 in manufacturing, 363,707 in trade, and 565,159 in the other industries.

Table 4 *HOJIN KIGYO TOKEI* DATA ON THE RATIO OF BANK DEBT TO ASSETS FOR JAPANESE FIRMS
(Large firms have book value of equity greater than 1 billion yen.)

	All Industries		*Manufacturing*		*Wholesale and Retail*		*Other*	
Year	*Large Firms*	*Small Firms*	*Large Firms*	*Small Firms*	*Large Firms*	*Small Firms*	*Large Firms*	*Small Firms*
1978	0.3786	0.3332	0.3654	0.3294	0.3818	0.2929	0.4007	0.3847
1979	0.3587	0.3282	0.3372	0.3009	0.3689	0.2897	0.3890	0.3984
1980	0.3431	0.3214	0.3181	0.2860	0.3486	0.2892	0.3833	0.3908
1981	0.3484	0.3329	0.3193	0.2954	0.3628	0.3015	0.3886	0.4048
1982	0.3473	0.3649	0.3122	0.3081	0.3650	0.3109	0.3947	0.4833
1983	0.3513	0.3600	0.3041	0.3178	0.3847	0.3059	0.4073	0.4433
1984	0.3420	0.3634	0.2806	0.3230	0.3762	0.3113	0.4197	0.4487
1985	0.3219	0.3754	0.2577	0.3257	0.3755	0.3184	0.3853	0.4705
1986	0.3281	0.3884	0.2560	0.3417	0.3910	0.3341	0.3938	0.4721
1987	0.3304	0.4039	0.2487	0.3613	0.3992	0.3373	0.4011	0.4912
1988	0.3202	0.4161	0.2179	0.3436	0.3865	0.3604	0.4050	0.5040
1989	0.3022	0.4311	0.1819	0.3438	0.3605	0.3543	0.4069	0.5364
1990	0.2901	0.4130	0.1614	0.3438	0.3106	0.3475	0.4174	0.4933
1991	0.2907	0.4225	0.1584	0.3350	0.3176	0.3367	0.4158	0.5225
1992	0.2867	0.4147	0.1645	0.3537	0.3092	0.3443	0.3971	0.4899
1993	0.2934	0.4342	0.1786	0.3837	0.3049	0.3621	0.3981	0.5033
1994	0.2925	0.4346	0.1800	0.3783	0.3145	0.3953	0.3915	0.4878
1995	0.2846	0.4317	0.1756	0.3878	0.2995	0.3891	0.3826	0.4827
1996	0.2797	0.4336	0.1658	0.3641	0.2857	0.3682	0.3850	0.5081
1997	0.2732	0.4224	0.1595	0.3653	0.2827	0.3775	0.3801	0.4773
1998	0.2761	0.4257	0.1647	0.3527	0.2876	0.3978	0.3796	0.4773

Source: Ministry of Finance, *Hojin Kigyo Tokei.* The survey includes all the corporations with book capital of ¥1 billion ($8.3 million using the exchange rate of 120 ¥/$) in all nonfinancial industries. The rest (small corporations) are randomly sampled with sampling factors depending on their sizes. The average value of assets for the large firms is ¥112 billion ($934 million) in 1998. There were 5,363 large firms and 1,161,179 small firms in the 1998 survey. The firms in the "other" category are all those which are not in manufacturing, wholesale trade, or retail trade.

Table 4 also indicates that remaining large firms hardly changed their bank borrowing.

To explore the effect of the nominal thresholds we also looked at other data for listed firms. In Table 5 we report analogous statistics in which we define large firms to have real assets (measured in 1990 prices) to be greater than ¥120 billion ($1 billion). Using this consistent size definition, the manufacturing firms show an even more pronounced shift away from bank debt. The larger drop is partly expected, since the nominal size thresholds in the MOF survey data will cause some smaller firms (which are presumably more bank-dependent) to drift into the large firm category over time.

The third and fourth columns in Table 5 show the patterns for large, listed wholesale and retail firms. The retail firms show the same general pattern as the manufacturing firms, although the drop in bank dependence is less pronounced. For the listed wholesale trade firms the bank-debt-to-asset ratio drifted up noticeably in the 1980s, before beginning to decline in the 1990s. This nonmonotonic decline can be traced to the behavior of the nine large general trading firms and is not representative of other wholesaling companies. The trend disappears when these nine firms are omitted, and the aforementioned unpublished MOF data showed a slight overall drop in bank dependence.[19] The final column in the table shows that the remaining large listed firms have also cut their bank borrowing.

The two tables together show a clear pattern of rapid adjustment by the large firms (except for possibly a few wholesale trade companies). Notice in Table 5 that for all the sectors where bank dependence was falling, the bank-debt-to-asset ratios in 1990 and 1998 were about the same, so that in fact much of the adjustment had occurred before the onset of slow aggregate growth.

In contrast, among the small firms there has been no clear reduction in bank dependence. Indeed, Table 4 shows that in each of the major sectors the smaller firms have become somewhat more bank-dependent as the deregulation has progressed, although in manufacturing and in the "other" sector small firms' bank dependence is below the peaks that occurred in the late 1980s and early 1990s. As we discuss below, we

19. The nine companies in question are Mitsui Bussan, Itochu, Kanematsu, Sumitomo and Company, Tomen, Nissho Iwai, Nichimen, Marubeni, and Mitsubishi and Company. When they are excluded, the ratio of bank debt to assets is much lower in most years (e.g. 0.248 in 1998 as opposed to 0.431), and in 1998 it is slightly lower than in the early 1970s. We have heard several anecdotes suggesting that this discrepancy arises because the large trading companies took on considerable bank debt in the 1980s in order to set up subsidiaries to enter the real estate business.

Table 5 RATIO OF BANK DEBT TO ASSETS FOR PUBLICLY TRADED JAPANESE FIRMS
(Large firms are defined to have book value of assets > ¥120 billion at 1990 prices.)

Year	*Manufacturing*	*Wholesale*	*Retail*	*Nonmanufacturing Excluding Wholesale and Retail*
1970	0.3621	0.3006	0.3019	0.3605
1971	0.3655	0.3207	0.3153	0.3620
1972	0.3891	0.3438	0.3486	0.3848
1973	0.3758	0.3590	0.3919	0.3961
1974	0.3388	0.3170	0.4367	0.3864
1975	0.3606	0.3513	0.4371	0.3860
1976	0.3809	0.3804	0.4378	0.3912
1977	0.3712	0.3902	0.4022	0.3863
1978	0.3650	0.4121	0.3640	0.3796
1979	0.3471	0.3970	0.3180	0.3691
1980	0.3157	0.3641	0.2922	0.3677
1981	0.3043	0.3745	0.3046	0.3595
1982	0.2970	0.3665	0.3142	0.3688
1983	0.2949	0.3989	0.3369	0.3788
1984	0.2736	0.4050	0.3239	0.3813
1985	0.2446	0.4003	0.3122	0.3793
1986	0.2380	0.4348	0.2975	0.3173
1987	0.2316	0.4503	0.2600	0.3107
1988	0.2031	0.4800	0.2134	0.3069
1989	0.1654	0.5242	0.1900	0.2976
1990	0.1269	0.5079	0.1726	0.2745
1991	0.1333	0.4784	0.1820	0.2757
1992	0.1386	0.4884	0.1830	0.2806
1993	0.1452	0.4983	0.1986	0.2755
1994	0.1496	0.4865	0.1915	0.2861
1995	0.1431	0.4768	0.2042	0.2878
1996	0.1311	0.4523	0.1943	0.2850
1997	0.1256	0.4311	0.1841	0.2899

Source: Authors' calculations using the Japan Development Bank Database of companies listed on the major Japanese stock exchanges.

believe that some of these patterns are attributable to the fact that the banks themselves did not shrink much as the deregulation proceeded.

One question raised by these patterns is what they imply for the future of relationship financing in Japan. The data in Tables 4 and 5 clearly show that even before the Big Bang had taken place, the large

Japanese firms had cut their bank dependence. Tight dependence of large firms on their banks was probably the most unusual aspect of the Japanese financial system.[20] A growing literature (e.g., Petersen and Rajan, 1994; Berger and Udell, 1995) shows that relationship financing for small firms is quite prevalent also outside of Japan. It appears that any relationship financing that will continue in Japan will be more like what is observed elsewhere in the world.

To put the size of the shift in behavior of the large firms in perspective, we offer a comparison with financing patterns in the United States. This effort is complicated because of the absence of completely comparable data for the United States. Contrary to the conventions followed in Japan, there are no standard sources that provide firm-level information on firms' bank borrowing. U.S. firms do sometimes identify bank lending in the footnotes to their financial statements, but databases such as Compustat do not report such information. So we cannot report data which would be comparable to Table 5.

The only broad-based U.S. data on bank borrowing patterns come from a survey conducted by the Census Bureau called the Quarterly Financial Report for Manufacturing, Mining, and Trade Corporations (QFR).[21] The QFR contains the financial statistics for corporations aggregated by industry and by size. Like the MOF survey, the size thresholds are based on nominal thresholds, although the QFR size cutoffs are based on assets rather than capital. The coverage of the QFR for manufacturing industries is outstanding. All the corporations with total assets of $250 million and over are included in the survey. Smaller firms are randomly sampled with sampling factors ranging from $\frac{1}{2}$ to $\frac{1}{160}$, depending on their sizes.

Unfortunately the QFR coverage beyond manufacturing is quite limited. For firms in three industries (mining, wholesale trade, and retail trade) all the corporations with total assets $250 million and over are included, but small corporations are intentionally excluded. Since 1988 the definition of "small" has been set so that no corporations with total assets under $50 million are included; previously, between 1981 and 1987, this threshold has been $25 million in current prices. This prevents us from examining the financing pattern of small firms outside manufacturing. Moreover, for industries that are not covered by the QFR (trans-

20. See Aoki and Patrick (1994) for a comprehensive study of the tight dependence of Japanese firms on banks. There is no contradiction in saying that the past relationships for the large firms may have been valuable but were not sustained after deregulation. This will be the case if, as capital markets improved, the costs of being tied to the banks was rising. See Hoshi and Kashyap (1999a) for further discussion on this point.
21. See Gertler and Gilchrist (1994) for more discussion of the QFR.

portation, communication, services, construction, etc.), we cannot get data even for large firms.

It is fairly straightforward to find a breakpoint in the QFR data that can be compared with the *Hojin Kigyo Tokei Kiho* data described in Table 4. Recall from Table 4 that the average asset size of the large Japanese firms was $934 million in 1998. According to QFR for 1998, the average size of total assets for manufacturing corporations with assets $10 million or above was $1020 million. Thus, it appears that "large" firms in Table 4 are roughly comparable to QFR data for firms with total assets of $10 million.

Table 6 shows data on the bank-debt-to-asset reported in the QFR from 1979 through 1997. Columns 2 through 4 show data on all manufacturing firms and then on large and small manufacturing firms respectively. We draw three conclusions from this part of table. First, and most importantly, the time-series variation in bank dependence in the U.S. data is much less noticeable than in the Japanese data. Second, for the large firms there has been a slight upward drift in the bank-debt-to-asset ratio. Consequently the bank dependence of the U.S. and Japanese large firms is much closer now than in the 1980s—we explore this further below. Third, the small manufacturing firms in the two countries do not seem to be converging in their borrowing behavior. The small U.S. manufacturing firms have held steady with a ratio of bank debt to assets between 16% and 19%. In contrast, the small Japanese firms' ratio has crept up from about 29% to 35%.[22]

The remainder of Table 6 provides information on borrowing patterns by wholesale and retail trade firms. Interpreting these figures requires some care, since the universe of firms included in the sample has changed greatly across the years—see the footnotes to the table for details. Despite these changes, it seems safe to conclude that very large nonmanufacturing firms in the United States are still much less bank-dependent than similar firms in Japan.

One potential concern with Table 6 is that the nominal size thresholds may be responsible for some of drift upwards in the large manufacturing firms' bank dependence. Unfortunately, we were unable to obtain any unpublished data from the U.S. Census Bureau to check this directly. However, based on the checks which we were able to perform using published data, this does not seem likely to be too much of an issue. For instance, it is possible to study manufacturing firms with more than $1 billion in assets. Within this sample, the firms which drift

22. Toward the end of the 1990s, however, the bank dependence of the small Japanese manufacturing firms did decline. We expect this pattern to continue after the Big Bang.

Table 6 QUARTERLY FINANCIAL REPORTS DATA ON THE RATIO OF BANK DEBT TO ASSETS FOR U.S. FIRMS
(Large manufacturing firms are defined as having nominal assets > $10 million.)

Year (4th Quarter)	*All Manufacturing*	*Large Manufacturing*	*Small Manufacturing*	*Wholesale*	*Retail*	*All Industries*
1979	0.0660	0.0550	0.1642	0.1777	0.1255	0.0919
1980	0.0680	0.0575	0.1688	0.1882	0.1206	0.0937
1981	0.0665	0.0568	0.1676	0.1844	0.0637	0.0850
1982	0.0712	0.0617	0.1695	0.2383	0.0546	0.0829
1983	0.0644	0.0542	0.1710	0.2028	0.0524	0.0746
1984	0.0754	0.0652	0.1860	0.1995	0.0553	0.0839
1985	0.0731	0.0632	0.1867	0.1825	0.0681	0.0820
1986	0.0796	0.0714	0.1878	0.1773	0.0797	0.0882
1987	0.0830	0.0751	0.1892	0.1865	0.0922	0.0932
1988	0.0950	0.0875	0.2045	0.1886	0.1296	0.1064
1989	0.1004	0.0944	0.1988	0.1937	0.1434	0.1130
1990	0.1032	0.0976	0.2009	0.1868	0.1417	0.1146
1991	0.0954	0.0899	0.1954	0.1771	0.1287	0.1064
1992	0.0924	0.0875	0.1831	0.1786	0.0968	0.1007
1993	0.0863	0.0814	0.1771	0.1671	0.0916	0.0945
1994	0.0850	0.0798	0.1868	0.1676	0.0932	0.0940
1995	0.0862	0.0809	0.1934	0.1703	0.0993	0.0961
1996	0.0834	0.0782	0.1910	0.1623	0.1026	0.0932
1997	0.0877	0.0834	0.1794	0.1513	0.1089	0.0966

Source: Quarterly Financial Report for Manufacturing, Mining, and Trade Corporations (QFR) produced by Bureau of Census. For manufacturing firms all corporations with total assets of $250 million and over are included in this survey. Smaller manufacturing firms are randomly sampled with sampling factors ranging from 1/2 to 1/160, depending on their sizes. We define large firms to be those with nominal assets greater than $10 million. The sampling rules governing the inclusion of wholesale and retail trade firms has changed over time. In the 1979 and 1980 surveys, the rules for these sectors were the same as that for manufacturing. From 1981 to 1987, only firms with assets above $25 million were included. From 1988 on, firms had to have assets above $50 million to be included.

into the category should already be quite large and have a low level of bank dependence. This sample of firms shows the same basic patterns as in Table 6: bank dependence rises in the late 1980s and then falls in the 1990s, but remains at a higher level than in 1980.

Comparing Tables 4 and 6, we find that the bank dependence of the large Japanese firms has become closer to that of comparable-sized U.S. firms, particularly in manufacturing industries. The convergence, however, still looks incomplete. One possible reason for this may be cross-country differences in the industrial structure. Average bank-debt-to-asset ratios vary considerably across industries. For instance, in the 1998 MOF data shown in Table 4, the range of bank-debt-to-assets ratios varies between 0.09 and 0.42 across manufacturing industries (using two-digit SIC codes to identify industries). This type of variation is not surprising, given the differences in riskiness and collateral of different industries. Such variation will probably persist even after the Big Bang. Therefore one would only expect convergence in the bank-debt-to-asset ratio for the entire manufacturing sector if the asset distribution across industries were the same in both countries. This suggests that it is advisable to study the borrowing patterns at the two-digit industry level (or finer).

One problem with looking to industry-level data is that there is less detail on the size distribution of firms within industries. The published QFR data only show separate information for firms with assets above and below $25 million. The published Quarterly Report of Incorporate Enterprise Statistics includes no information on different-sized firms in each industry. By getting unpublished data from Japan we were able to make some very rough comparisons.[23] The Japanese data cover firms with capital above ¥1 billion, so there is a slight size mismatch in the comparison.[24] The overlap in industrial classification definitions allows us to match 14 industries (food; textiles; pulp and paper; printing and publishing; chemicals; petroleum and coal products; stone, clay and glass; iron and steel; nonferrous metals; fabricated metal products; machinery; electrical and electronic machinery; transportation equipment; and precision machinery).

Table 7 reports information on how large Japanese firms' bank dependence has compared with U.S. firms' bank dependence over time. For the Japanese firms we show the bank-debt-to-asset ratio in 1980 and

23. We thank Itsuko Takemura for providing these data.

24. The ¥1 billion cutoff is closer to a $10 million cutoff. However, using the published data on all manufacturing firms, we verified that the firms with between $10 and $25 million in assets are of limited importance. Thus, we believe that the size mismatch is not likely to mislead us about the general trends in bank dependence in the two countries.

Table 7 INDUSTRY-LEVEL COMPARISONS OF BANK-DEBT-TO-TOTAL-ASSETS RATIO FOR LARGE U.S. AND JAPANESE MANUFACTURING FIRMS

Industry	*U.S. 1998*	*Japan 1980*	*Japan 1998*	*Japan 1980 minus U.S. 1998*	*Japan 1998 minus U.S. 1998*
Food	0.1216	0.1925	0.1369	0.0709	0.0153
Textiles	0.2014	0.3828	0.2465	0.1814	0.0451
Pulp and paper	0.1167	0.4372	0.3535	0.3205	0.2368
Printing and publishing	0.0860	0.0808	0.0852	−0.0052	−0.0008
Chemicals	0.0758	0.3145	0.1649	0.2387	0.0891
Petroleum and coal	0.0240	0.5836	0.4168	0.5596	0.3928
Stone, glass, and clay	0.1531	0.3708	0.1941	0.2177	0.0410
Iron and steel	0.1138	0.3924	0.2647	0.2786	0.1509
Nonferrous metals	0.0726	0.4458	0.3599	0.3732	0.2873
Metal products	0.1788	0.3150	0.1738	0.1362	−0.0050
Machinery	0.0725	0.2415	0.1568	0.1690	0.0843
Electronic machinery	0.0497	0.1542	0.0919	0.1045	0.0422
Transportation durables	0.0393	0.1479	0.1096	0.1086	0.0703
Precision machinery	0.1551	0.1647	0.1020	0.0096	−0.0531
Average	0.1043	0.3017	0.2040	0.1974	0.0997

Source: See text.
Note: Large U.S. firms are defined as those having assets >$25 million.

1998. Since there is no noticeable trend in the U.S. data, we report only the 1998 levels for the U.S. industries—using other years or an average of several years made no difference in what follows. The last two columns of the table show the difference for each of 14 industries in two periods. In 1980, the difference was diffusely distributed between 0 and 0.56. For the industry average the difference was 0.197. The table shows that by 1998 the distribution had become much more concentrated around zero. By 1998, for ten out of fourteen industries, the Japanese bank debt ratios are within 10 percentage points of the U.S. ratios. Moreover, for these ten industries the distribution of differences in bank dependence is more symmetric, with three of the ten Japanese industries appearing less bank-dependent than their U.S. counterparts.

Interestingly, the four industries where convergence has not occurred (pulp and paper, nonferrous metals, petroleum, and iron and steel) are all cases where a significant portion of the Japanese firms have performed poorly.[25] We believe that for these depressed industries the effects of

25. We thank Bob Uriu for pointing this out.

Table 8 INDUSTRY-LEVEL COMPARISONS OF THE RATIO OF BANK DEBT TO TOTAL ASSETS FOR SMALL U.S. AND JAPANESE MANUFACTURING FIRMS

Industry	*U.S. 1998*	*Japan 1980*	*Japan 1998*	*Japan 1980 minus U.S. 1998*	*Japan 1998 minus U.S. 1998*
Food	0.2637	0.3945	0.4877	0.1308	0.2240
Textiles	0.1971	0.3300	0.3460	0.1329	0.1489
Pulp and paper	0.2334	0.2591	0.3910	0.0257	0.1576
Printing and publishing	0.1958	0.3115	0.2600	0.1157	0.0642
Chemicals	0.1775	0.2095	0.2874	0.0320	0.1099
Petroleum and coal	0.1763	0.3917	0.2576	0.2154	0.0813
Stone, glass, and clay	0.2246	0.3068	0.4302	0.0822	0.2056
Iron and steel	0.1910	0.2818	0.4137	0.0908	0.2227
Nonferrous metals	0.1977	0.2727	0.4078	0.0750	0.2101
Metal products	0.1814	0.2720	0.4000	0.0906	0.2186
Machinery	0.1865	0.2622	0.3671	0.0757	0.1806
Electronic machinery	0.1771	0.2390	0.2632	0.0619	0.0861
Transportation durables	0.1795	0.2504	0.3271	0.0709	0.1476
Precision machinery	0.1295	0.2039	0.3236	0.0744	0.1941
Average	0.1937	0.2847	0.3545	0.0910	0.1608

Source: See text.
Note: Small U.S. firms are defined as those having assets <$25 million.

deregulation are likely being masked by the poor profitability of the firms; going to public debt markets is always hard for financially troubled firms. Overall we read the industry-level comparisons as further suggesting that large Japanese and U.S. manufacturing firms have become fairly similar in their bank dependence.

Table 8 shows a comparable set of industry differences for small manufacturing firms. The contrast with the previous table is striking. For the small firms there is no sign of convergence, and if anything the differences are larger than in 1980. However, the differences were even larger in 1993, so the relative gap is now closing. Nevertheless, there is still a long way to go.

3.2 SAVERS' RESPONSE TO THE DEREGULATION

An obvious question is why the small and large borrowers fared so differently. We believe that the key to understanding the difference comes from looking at the behavior of the banks' depositors. Japanese households have historically held the dominant part of their financial

Table 9 RATIOS OF BANK DEPOSITS TO GDP FOR SELECTED YEARS—G7 COUNTRIES

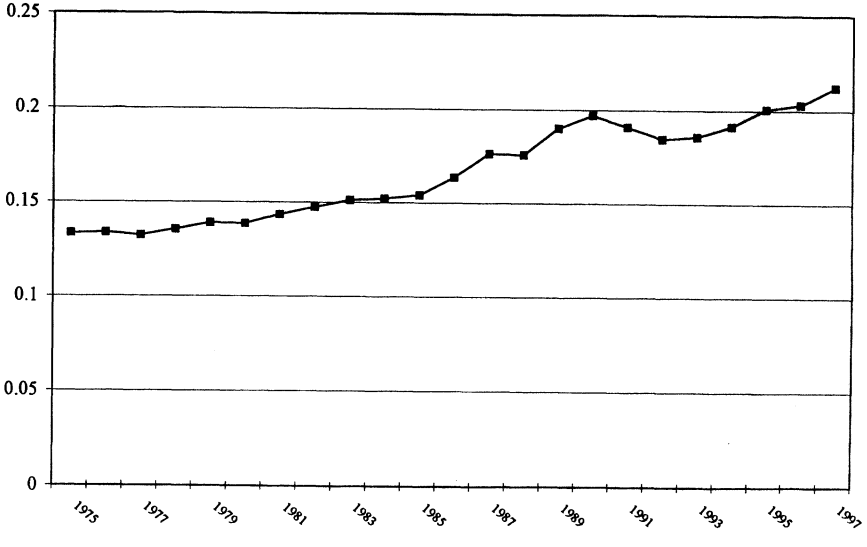
Country	*Year*	*(Demand Deposits)/ GDP*[a]	*(Time Deposits)/ GDP*[b]	*(Total Deposits)/ GDP*[a]	*(Nonbank Deposits)/ GDP*[b,c]	*Addendum: (Total Deposits)/ Wealth*[d]
Canada	1983	0.09	0.55	0.63	0.58	0.35
	1996	0.17	0.62	0.79	0.75	0.33
France	1983	0.18	0.43	0.61	0.46	0.57
	1996	0.20	0.45	0.65	0.68	0.36
Germany	1983	0.11	0.40	0.50	0.72	0.55
	1996	0.18	0.42	0.60	0.93	0.43
Italy	1983	0.31	0.36	0.67	0.59	0.35
	1996	0.27	0.25	0.52	0.51	0.33
Japan	1983	0.21	1.36	1.58	1.50	0.67
	1996	0.28	1.78	2.06	1.43	0.62
U.K.	1983	0.10	0.25	0.35	0.85	N/A
	1996	N/A	1.06	1.06	0.91	N/A
U.S.	1983	0.11	0.46	0.57	0.74	0.25
	1996	0.11	0.31	0.42	0.50	0.16

[a]International Financial Statistics, International Monetary Fund. This information includes all institutions that accept deposits, not only commercial banks.
[b]*Bank Profitability: Financial Statements of Banks, Statistical Supplement,* Organization for Economic Cooperation and Development, several issues.
[c]For United Kingdom the data correspond to 1984. For United Kingdom and Japan, nonbank deposits include interbank deposits.
[d]*Financial Accounts of OECD Countries,* Organization for Economic Cooperation and Development, several issues.

assets in bank deposits. The conventional explanation for this (e.g., Hamada and Horiuchi, 1987) was the relatively low overall level of financial assets held by the households along with the high transactions costs of operating in immature capital markets. Table 9, which shows the ratios of bank deposits to GDP for G7 countries, suggests that at the onset of deregulation in 1983 Japan had far more bank deposits (relative to GDP) than any of the other G7 countries. The total deposit-to-GDP ratio in Japan stood at 1.58, more than double the ratio for Italy, the next highest country.

The table also shows that by 1996 the picture had hardly changed. Japan still looks anomalous in its deposit/GDP ratio. Figure 1 shows yearly data for the city banks and confirms that there were no unusual breaks in the pattern and that even the large commercial banks were

Figure 1 HOUSEHOLDS' DEPOSITS AT CITY BANKS RELATIVE TO GDP (1975–1997)



Source: Bank of Japan, *Economic Statistics Annual,* various issues.

gaining deposits (relative to GDP) in the last two decades. The fact that deposits at the city banks account for only about 10% of the deposits recorded in the IMF data is one way of seeing the importance of postal savings accounts. As we discuss below, forecasts of the future of the banking system need to be conditioned on what will happen to the postal savings accounts.

Why didn't the Japanese savers prune their bank deposits? One answer is that the deposit-to-GDP ratio may not tell the complete story. The last column in Table 9 shows that the ratio of deposits to *wealth* fell from 67% in 1983 to 62% in 1996. So from the households' perspective they did cut back slightly on their use of banks. Nevertheless, there does seem to be a puzzle as to why the banking reliance remained so strong, particularly since there were so many steps taken to liberalize financial markets during this time.

We believe that there were several features of the deregulation process that kept savers from pulling their money out of the banks. First, the deregulation process was very slow in allowing individual investors easy direct access to capital markets. For example, participating directly in the stock market remained expensive for individuals until very re-

cently. Up until April 1998, commissions on trades as large as ¥50 million were still fixed and regulated. Only in October 1999 were all commissions fully deregulated. Similarly, a range of activities including stock options trading by individuals, over-the-counter trading of equity-related derivatives, and trading non-listed stocks through securities firms were prohibited until December 1998. So prior to the Big Bang it was very costly for individual investors to participate in capital markets directly.

But the limited direct access only partially explains individuals' strong attachments to bank deposits. One obvious question is why investment trusts (which have existed for many years) didn't draw money away from banks. Here again regulation was important. Until 1998, investment trusts in Japan were limited to contract-type funds, and company-type funds (i.e., U.S.-style mutual funds) were not allowed. Furthermore, any investment trust had to be sold to more than 50 investors, precluding the possibility of establishing funds specialized for a few rich investors, like many hedge funds, vulture funds, and LBO funds in the United States.

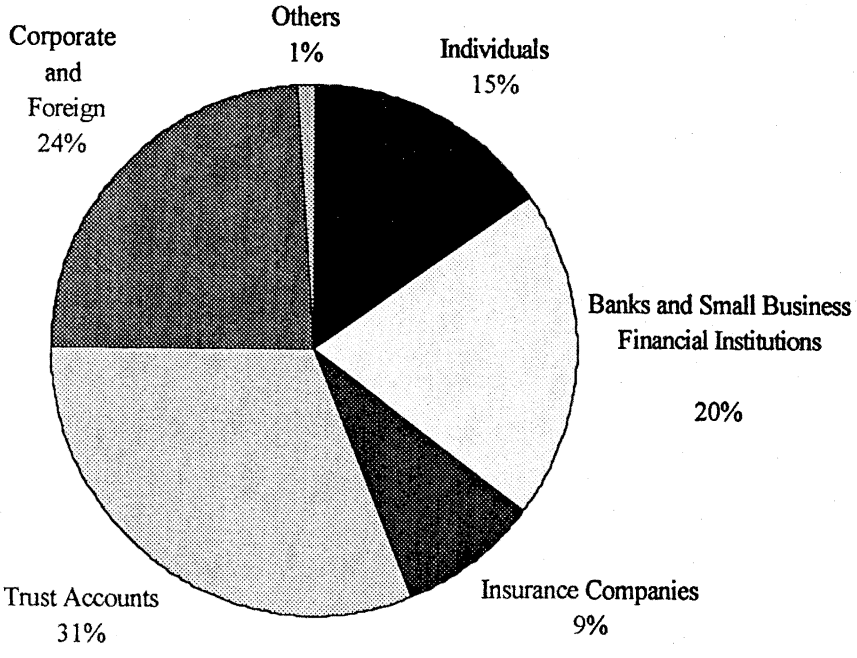
More importantly, entry into the investment trust business was limited by other regulations. This protection muted some of the incentives to improve the returns on investment trusts. Since almost all the investment trust companies were subsidiaries of securities companies, they were often interested in churning all the accounts they managed to collect the high commissions for their parents. Consequently the investment trusts had a poor track record, generally underperforming market indices by large margins (Cai, Chan, and Yamada, 1996; Ohmura and Kawakita, 1992, Chapter 7; Yonezawa and Maru, 1984, p. 31).

Other financial services companies were barred from offering investment trusts until the 1990s. But even in the 1990s, when the entry barriers finally started to be removed, the investment trust companies were still required to get government approval each time they set up a new investment trust fund. The restriction remained until December 1998 and stifled competition in introducing innovative products.[26]

We believe these factors together significantly limited the options of savers and led them to keep much of their money in the banks. Notice that our explanation does not emphasize any attempts by banks to attract funds to take advantage of their deposit insurance guarantees. This does

26. When a career official at the Ministry of Finance was arrested on corruption charges, the most important favor that he supposedly provided to the security firms was quickly approving the prospectuses of new investment funds that they proposed (*Nihon Keizai Shimbun*, March 6, 1998, evening edition).

Figure 2 CORPORATE BOND PURCHASES BY SECTOR (1981–1990)



Source: Flow-of-funds accounts; see text for details.

not imply that we completely dismiss the moral-hazard stories that have been emphasized by others (e.g., Cargill, Hutchison, and Ito, 1997; Hutchison, 1998). Rather, we believe that our complementary explanation stressing the limited degree to which savings options were deregulated has been overlooked.

Of course, one might still wonder who ended up buying all the bonds that the companies issued. Figure 2 shows the distribution of bond purchases during the 1980s.[27] Consistent with our account, direct individuals' purchases were relatively small. Given the aforementioned impediments, we do not find this surprising. Instead, it appears that various types of financial institutions (most notably insurance companies, com-

27. These statistics are built up from flow-of-funds data that show owners of domesticity issued corporate bonds including convertibles and warrant bonds. The corporate bonds held by government financial institutions are excluded from the total to isolate the corporate bonds held by the private sector. Since the privatization of NTT in 1985 and JR in 1987 reclassified their bonds from public bonds to corporate bonds, the number includes NTT (JR) bonds that were issued before 1985 (1987) and had not been retired as of the end of 1990 in addition to the net purchases of corporate bonds.

mercial banks, and trust banks) were major purchasers, along with corporations and foreigners.[28]

We draw two further conclusions from this reading of the evidence. First, the Big Bang is likely to be more important in generating new options for savers than for borrowers, who by 1990 had already gained important alternatives to bank financing. Second, we believe that the historical record gives us little quantitative guidance as to how the households will respond to the Big Bang. It is clear that the banks will face significant new competition for funds, but there is too little evidence for us to make any strong predictions about which competitors will be the most threatening to the banks. Banks themselves are now allowed to sell investment trusts over their counters (since December 1998). This means that when we make our projections about the future size of the banking industry, our calculations will not rely on any specific assumptions about the future supply of funds to the industry. Instead, as a plausibility check we will see what our forecasts imply about future changes in household portfolio decisions.

3.3 BANKS' RESPONSES TO THE DEREGULATION

Our account of the savings behavior suggests that banks had a bit of a windfall in that they were able to hold on to many of their deposits despite the deregulation. But the windfall was not big enough to offset the adverse fallout from deregulation, and by the end of the 1990s the banks were in bad shape. While our story clearly gets the timing of events right, it may not correctly characterize the causation. For instance, one alternative explanation is that the Japanese banks are suffering now purely because of the poor performance of the overall Japanese economy in the 1990s. While we believe that macro conditions played an important role in shaping the fate of the industry, the question we care about is whether macro factors were all that mattered. To assess this question we offer several pieces of evidence.

The starting point for our exploration is to see how the banks responded under the constraints of the prevailing regulations. As mentioned above, Japanese banks prior to the Big Bang were not really able to move into the nontraditional areas of banking that many of the other global banks have pursued. To gauge the significance of these restrictions we compare the recent profitability and income sources for large U.S. and Japanese banks.

28. At the aggregate level corporate borrowing was rising, since the large firms were tapping the bond markets and the smaller firms were increasing their bank borrowing. The savings that were funding this seem to have previously been going towards financing the government deficit, which was falling in the late 1980s.

Table 10 PROFITABILITY AND NONINTEREST INCOME: MAJOR U.S. BANKS, 1976–1996

Year	*Noninterest Income*[a]	*ROA*[b]	*ROE*[c]
1976	0.1053	0.0055	0.0919
1977	0.1024	0.0058	0.1013
1978	0.0967	0.0062	0.1106
1979	0.1377	0.0065	0.1185
1980	0.1294	0.0049	0.0889
1981	0.1171	0.0036	0.0297
1982	0.1271	0.0041	0.0481
1983	0.1431	0.0049	0.0634
1984	0.1093	0.0055	0.0759
1985	0.1325	0.0071	0.1287
1986	0.1448	0.0065	0.1040
1987	0.1506	0.0003	−0.0135
1988	0.1513	0.0071	0.1468
1989	0.1472	0.0041	−0.1150
1990	0.1527	0.0023	0.0534
1991	0.1864	0.0056	0.0783
1992	0.2213	0.0104	0.1384
1993	0.2465	0.0131	0.1684
1994	0.2373	0.0127	0.1691
1995	0.2246	0.0128	0.1645
1996	0.2535	0.0146	0.1670

Notes: Data are taken from the December call report for each year. Each entry is the average over the top 1% institutions (according to total assets) of the ratio for the year. All the variable names in the footnotes are extracted from the instructions for submitting call reports, 1976–1996.

[a]Mean ratio of noninterest income to total income. Before 1984, noninterest income is computed as total income minus interest income, which is the sum of riad4000, riad4020, riad4025, riad4063, riad4065, and riad4115. From 1984 onward, there is a specific item that keeps track of nininterest income (riad4107). Thus, from 1984 onward, we define noninterest income as riad4000 minus riad4107.

[b]Mean return on assets, computed as net income (riad4340) divided by total assets (rcfd2170).

[c]Mean return on equity, computed as net income (riad4340) divided by total equity capital (rcfd3210).

Table 10 shows data on the U.S. banks. Unfortunately, the regulatory reports from which these data are compiled do not directly provide information on revenue sources by line of business. As a crude measure of the income from nontraditional activities one can look at noninterest income. The table shows that noninterest income (relative to total income) has doubled since the early 1980s. This ratio has climbed steadily, and most banking experts use these figures to argue that U.S. banks are successfully pushing into new lines of business.

The table also shows that U.S. bank profitability at the end of 1990s is

Table 11 INTEREST iNCOME, FEE INCOME, RETURN ON ASSETS, AND RETURN ON EQUITY FOR JAPANESE CITY BANKS

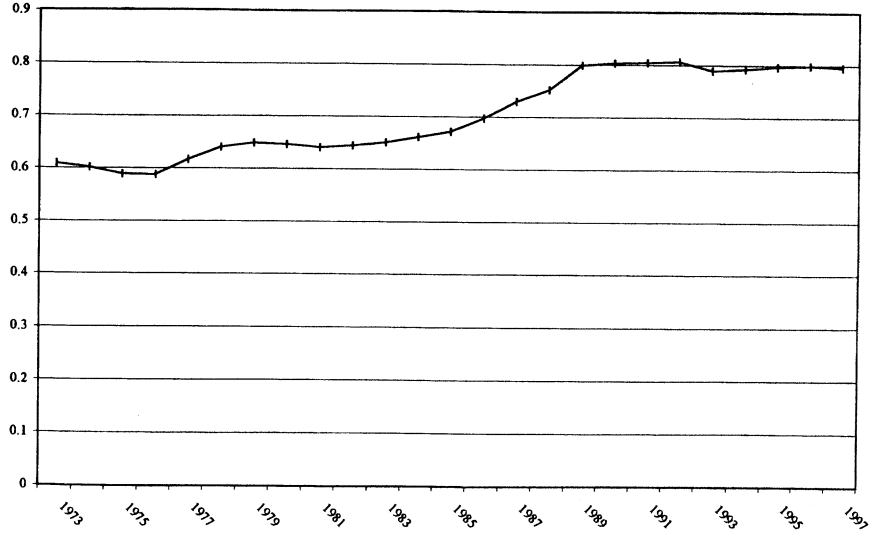
Year	*RINT*[a]	*RLINT*[b]	*RFEE*[c]	*ROCUR*[d]	*ROA*[e]	*ROE*[f]	*AROA*[g]
1976	0.9317	0.7152	0.0359	0.0024	NA	NA	NA
1977	0.9314	0.6980	0.0375	0.0028	0.0013	0.0528	0.0028
1978	0.8967	0.6385	0.0415	0.0047	0.0012	0.0476	0.0026
1979	0.8965	0.5876	0.0451	0.0031	0.0012	0.0484	0.0026
1980	0.8987	0.5568	0.0347	0.0025	0.0007	0.0300	0.0013
1981	0.9292	0.5760	0.0286	0.0019	0.0009	0.0425	0.0017
1982	0.9320	0.5163	0.0298	0.0015	0.0022	0.1094	0.0047
1983	0.9388	0.5192	0.0308	0.0014	0.0020	0.1030	0.0047
1984	0.9362	0.5482	0.0323	0.0015	0.0024	0.1297	0.0053
1985	0.9380	0.5091	0.0288	0.0014	0.0023	0.1190	0.0051
1986	0.9236	0.5541	0.0319	0.0018	0.0022	0.1213	0.0044
1987	0.8965	0.5301	0.0337	0.0030	0.0026	0.1341	0.0059
1988	0.8463	0.4764	0.0323	0.0036	0.0030	0.1541	0.0070
1989	0.8338	0.4867	0.0310	0.0940	0.0036	0.1617	0.0031
1990	0.8690	0.4894	0.0267	0.0696	0.0027	0.1073	0.0009
1991	0.9075	0.5857	0.0236	0.0364	0.0019	0.0683	0.0014
1992	0.9103	0.6213	0.0242	0.0424	0.0014	0.0465	0.0022
1993	0.9205	0.6091	0.0313	0.0153	0.0008	0.0248	0.0023
1994	0.8482	0.5324	0.0355	0.0651	0.0007	0.0212	−0.0012
1995	0.8011	0.4679	0.0361	0.1224	−0.0002	−0.0046	−0.0045
1996	0.8074	0.3906	0.0363	0.0867	−0.0042	−0.1171	−0.0077
1997	0.7916	0.3710	0.0410	0.1188	−0.0001	−0.0040	−0.0024

Note: Data are from the Nikkei Database for the accounting year ending in March of each year.
[a]Proportion of interest income in the current income.
[b]Proportion of interest income on loans in the current income.
[c]Proportion of fee income in the current income.
[d]Proportion of the other current income, including realized capital gains on securities.
[e]After-tax net income divided by total assets from March of the previous year.
[f]After-tax net income divided by total capital (capital plus reserves) from March of the previous year.
[g]Adjusted ROA: (current profits − gains from sales of the securities + losses from sales from the securities + losses from revaluation of securities)/(total assets from March of the previous year).

at near-record levels. The U.S. banks successfully rebounded from their very poor performance in the late 1980s. The initial recovery may have been partly due to luck, because the steep U.S. yield curve made it very easy for banks to make money by taking in deposits and investing them in government securities. However, even as the U.S. yield curve has flattened out, U.S. bank profits have remained high, and during this time the percentage of noninterest income has continued to grow.

Table 11 shows similar data for large Japanese banks. Perhaps surprisingly, they have about the same fraction of revenue coming from fee-

Figure 3 PROPORTION OF LOANS TO SMALL ENTERPRISES (1973–1997)



Source: Bank of Japan, *Economic Statistics Annual,* various issues.

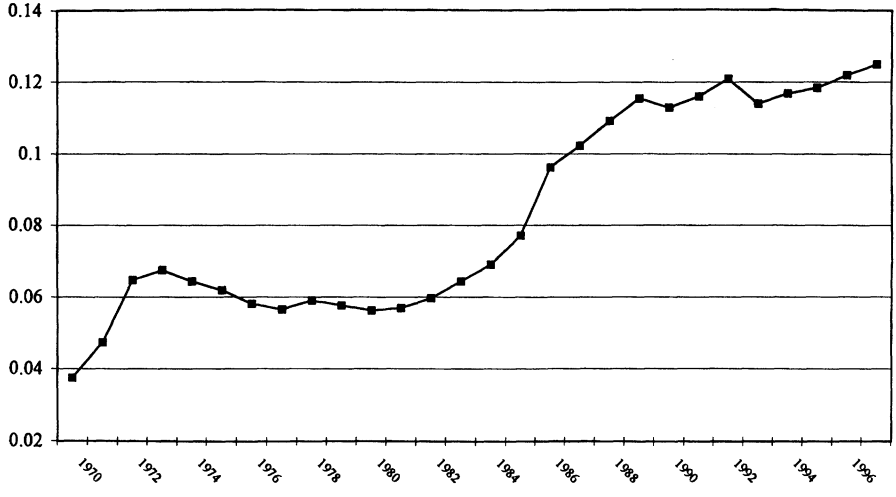
based activities in the late 1990s as in the early 1980s. Although during the 1990s the banks have made a lower fraction of income from interest receipts, most of the decline has been due to an increase in capital gains realized by selling securities.[29] Put differently, the total of interest income and "other" income has hardly changed in Japan. The table also shows how profitability (measured by either return on assets or return on equity) has deteriorated in the 1990s (even more so than the U.S. banks in the late 1980s.) Interestingly, the raw ROA levels (shown in the third-to-last column) are typically higher than the adjusted ROA levels, which omit gains and losses from securities sales (and are shown in the last column).[30] Thus, it appears that the banks have tried to mask some of the performance deterioration by realizing capital gains on securities holdings.

While the Japanese banks have yet to expand much into nontradi-

29. This shows the practice referred to as *fukumi keiei,* hidden asset management. The Japanese banks and large firms often hold shares which were purchased long ago and therefore have unrealized capital gains. These firms sometimes try to smooth their earnings by selling the shares when operating profits are low. Table 11 shows this clearly. To protect their cross-shareholding the sellers often buy back the shares after realizing the capital gains.

30. The corrected return on assets is calculated as (current profits—gains from sales of stocks and other securities + losses from sales of stocks and other securities + losses from devaluation of stock holdings)/(total assets at the beginning of the period).

Figure 4 PROPORTION OF LOANS TO THE REAL ESTATE INDUSTRY (1970–1997)



Source: Bank of Japan, *Economic Statistics Annual,* various issues.

tional lines of business, they did reorganize their traditional lending patterns. Figure 3 shows the proportion of bank loans to small enterprises.[31] The graph shows a dramatic increase in small business lending in the 1980s. As the banks started to lose their large customers to capital markets, they went after small firms. Most observers agree that previously the banks had not had close ties to many of these smaller borrowers. We return to this point below.

Figure 4 shows a second aspect of the banks' portfolio shift: increasing loans to the real estate industry. The proportion of loans to the real estate industry started to soar in the beginning of 1980s and soon surpassed the previous peak, which had occurred during the Japanese Archipelago rebuilding boom of 1972–1973. By the early 1990s, the proportion of loans to the real estate industry by banks had doubled from its level in the early 1980s.

A third change in the banks' behavior, which has been emphasized by Peek and Rosengren (1997a, b), was a noticeable increase in foreign

31. These data are taken from the *Bank of Japan Economic Statistics Monthly.* The small firms here are defined to be those that are not large according to the Bank of Japan definition: large firms are those firms which have more than ¥100 million in equity and more than 300 regular employees. The definition of small firms here roughly corresponds to that in the other tables in this paper.

lending. As they explain, in some cases this lending was done through separately capitalized subsidiaries so that not all the loans would show up on the parent bank's balance sheets. Peek and Rosengren's analysis shows that the foreign activity has dramatically slowed in the 1990s.

One way to evaluate the portfolio shifts and performance is to see if they might have represented a natural response to the underlying economic conditions. After all, land prices were soaring in the late 1980s, so perhaps the shift into property-based lending was simply in keeping with past practices. To explore how much of the banks' performance might be attributable to basic economic conditions, we ran several regressions.

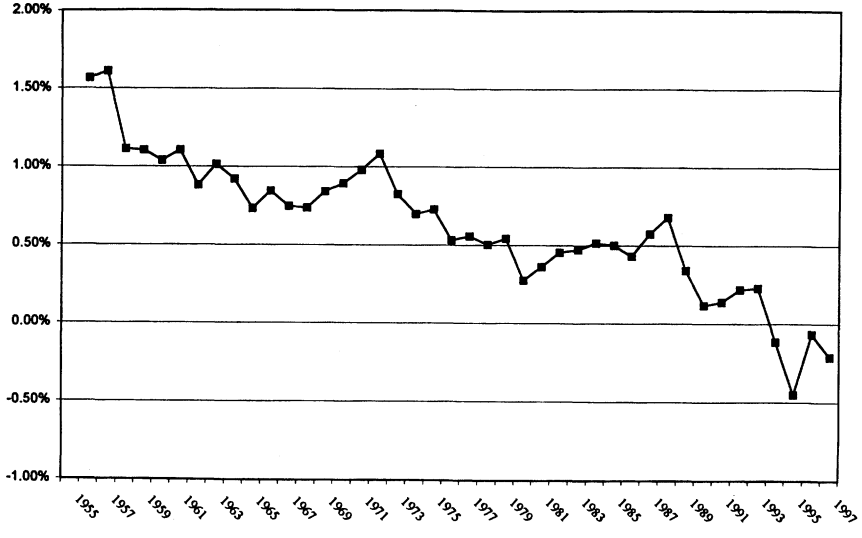
The dependent variable for the regressions is the adjusted return on assets (AROA) for city banks, which was shown in the last column of Table 11. As a robustness check we also tried the same regressions using the raw ROA series and found the same basic patterns. The adjusted ROA series is graphed in Figure 5. The figure shows that Japanese bank performance slowly declined from the mid-1950s through the 1980s and then sharply deteriorated in the 1990s.

To determine the role of deregulation on performance one would like to include a proxy for deregulation in a full-blown model of bank profitability. Unfortunately, we lack not only a compelling theoretical model that makes tight predictions about the exact determinants of (adjusted) ROA, but also convincing proxies for the impact of deregulation. Given these limitations, we take the indirect and admittedly ad hoc approach of looking only to see whether the dynamics for ROA changed following deregulation. Operationally our strategy amounts to checking whether there is a stable relation between ROA and standard macroeconomic variables before and after 1983 (the date at which we argue the deregulation of the bond market began in earnest.) Thus, our modest goal is to provide evidence against a story that posits that macro factors can *fully* explain the banks' performance after the onset of deregulation.

We considered interest rates, land prices, stock prices, and GDP growth to be the baseline set of macroeconomic variables that could be plausibly justified as determinants of ROA. Intuitively, these variables allow for monetary policy, collateral, and general economic conditions to drive bank performance. Because we had just under 30 years of data and did not have much guidance about how many lags to allow for in the regressions, we did almost no experimenting with other variables. The one exception was inflation, which we measured using the GDP deflator; we found no independent effect of controlling for inflation.

Data limitations largely drove our choices of the specific proxies used in the regressions. In particular, the call rate (which measures the price of overnight credit between banks) is the only consistent interest-rate

Figure 5 CITY BANKS' ADJUSTED ROA (1956–1997)



Source: Ministry of Finance, *Banking Bureau Annual Report,* various issues, and Nikkei Database. Raw ROA has been adjusted for gains and losses due to sale or revaluation of equity holdings.

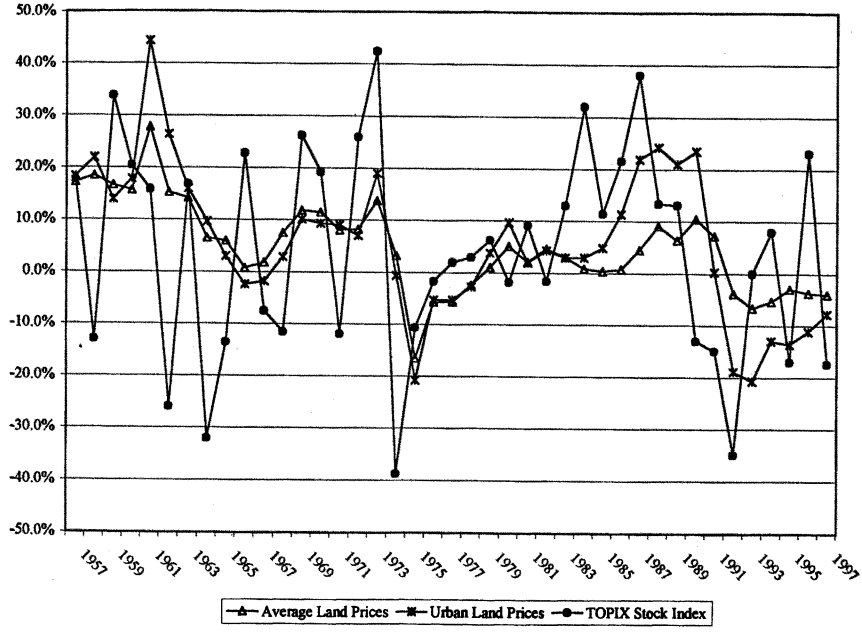
series that is available from the 1950s onward. We take the difference between the nominal call rate and the current year's inflation to form our real call-rate series.[32]

Similarly, the only consistent land price data come from a semiannual survey conducted by the Japan Real Estate Research Institute. One survey covers all land prices nationwide, and the other pertains to land prices in the six major metropolitan areas. The logarithmic differences in both series (again subtracting inflation) are graphed in Figure 6. This graph also shows the logarithmic difference of the TOPIX stock return index and inflation.

The figure shows three important things. First, the stock return series is much more volatile than either land price series. Large swings in stock prices routinely occurred throughout the period. Second, large changes in the relative price of land also had happened several times prior to the late 1980s. Furthermore, the land price changes were not always coincident with the swings in stock prices. This is important because it means that we have some hope of identifying the econometric connection between land prices, stock prices, and bank profits. Finally, the figure also

32. Using instead the nominal call rate along with a separate inflation variable made no difference in what follows.

Figure 6 PERCENTAGE REAL CHANGE IN LAND AND STOCK PRICES (1957–1997)



Sources: Japan Real Estate Research Institute and Tokyo Stock Exchange.

Note: All nominal data are converted to constant prices using the GDP deflator.

shows that the choice of which land price series to use could be potentially important. The late 1980s land price run-up was concentrated in the major cities.

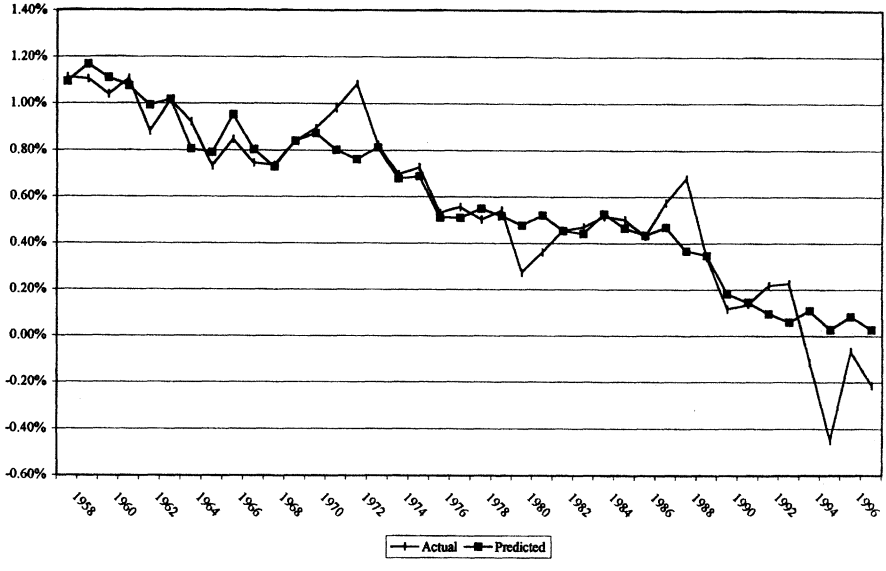
Two representative regression specifications among those we tried are shown in Table 12. One key issue is how to account for the long-term decline in profitability documented in Figure 5. In the first pair of regressions (which differ only in which land price is used) we include a time trend in addition to the macroeconomic variables. We draw two conclusions from these regressions. First, and not surprisingly, the time trend is the most important variable in the equation. Second, aside from stock prices, which are of borderline importance, most of the macro variables appear to have no correlation with bank profitability.

The next two columns repeat the first specification except that a lagged dependent variable is added. The addition of the lagged dependent variable marginally improves the R^2 and wipes out the explanatory power of the time trend. The *t*-statistics of several of the macro variables

Table 12 REGRESSIONS RELATING BANKS' RETURN ON ASSETS AND MACROECONOMIC VARIABLES
(Dependent variable is city banks' adjusted return on assets; sample Period is 1957–1983.)

	Coefficient and (t-statistic)			
Variable	*Regression 1*	*2*	*3*	*4*
Intercept	0.01138 (5.833)	0.01182 (5.951)	0.00337 (0.990)	0.00413 (1.122)
Time trend	−0.00026 (−3.645)	−0.00028 (−4.039)	−0.00009 (−0.982)	−0.00010 (−1.018)
Real GDP growth	−0.00377 (−0.331)	−0.00359 (−0.295)	−0.00255 (−0.263)	−0.00020 (−0.018)
Real GDP growth ($t-1$)	0.00479 (0.456)	0.00343 (0.359)	0.01993 (1.893)	0.01432 (1.495)
Log change in real average land price	−0.00584 (−0.761)	— —	−0.01355 (−1.906)	— —
Log change in real average land price ($t-1$)	0.00646 (1.281)	— —	0.00861 (1.981)	— —
Log change in real urban land price	— —	−0.00299 (−0.654)	— —	−0.00634 (−1.487)
Log change in real urban land price ($t-1$)	— —	0.00241 (0.671)	— —	0.00369 (1.149)
Real call rate	0.00620 (0.518)	0.00501 (0.423)	0.01547 (1.442)	0.01166 (1.080)
Real call rate ($t-1$)	−0.00862 (−0.971)	−0.00983 (−1.039)	−0.00495 (−0.648)	−0.00725 (−0.864)
ROA ($t-1$)	— —	— —	0.53427 (2.693)	0.48948 (2.375)
Log change in real equity prices	0.00370 (2.088)	0.00362 (2.159)	0.00392 (2.608)	0.00343 (2.319)
Log change in real equity prices ($t-1$)	0.00248 (0.973)	0.00273 (1.089)	0.00201 (0.928)	0.00191 (0.857)
R^2	0.8259	0.8144	0.8826	0.8651
P-Values from Exclusion Tests for the Sum of the Coefficients on				
GDP growth	0.9432	0.9916	0.2135	0.3381
Land prices	0.9274	0.8858	0.4271	0.4743
Interest rates	0.8467	0.6896	0.3743	0.6972
Equity prices	0.1113	0.0820	0.0756	0.0994
P-Values from Tests for the Equality of Coefficients after 1984	0.0149	0.0241	0.0298	0.0658

Figure 7 ACTUAL VERSUS PREDICTED ADJUSTED ROA FOR CITY BANKS



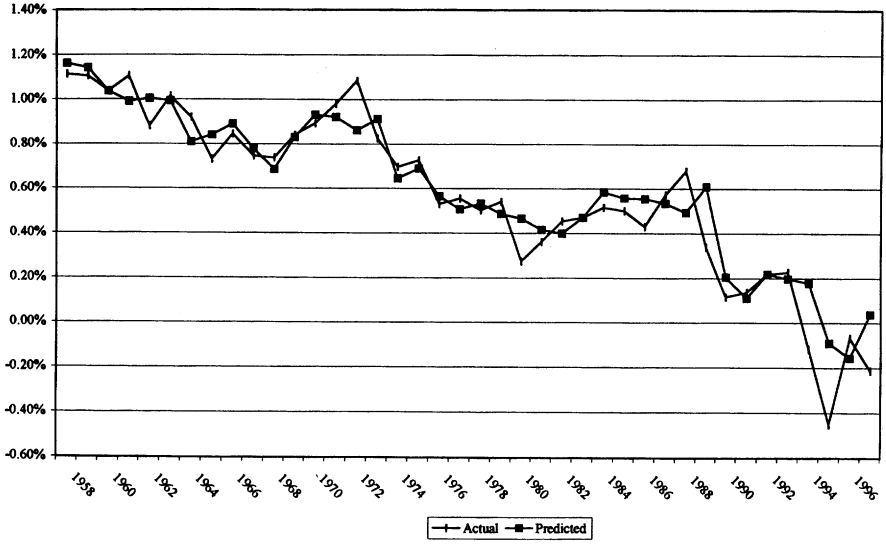
Source: Authors' calculations using regression coefficients from regression 1 in Table 12.

rise, but the tests on the statistical significance of the sum of the coefficients, shown at the bottom of the table, continue to indicate that only the stock price coefficients are likely to be different from zero. This same pattern turned up in all of the variations that we tried that included lagged dependent variables. From this we conclude that prior to the mid-1980s there was at best a loose link between macro variables and bank profitability.

For both specifications we then checked how they fit after 1983. Figures 7 and 8 compare the actual values and fitted values for the regression specification including average land prices (regressions 1 and 3 in the table). Importantly, the fitted values are one-step-ahead forecasts, so the actual values of the right-hand variables are being used in forming these predictions. By taking this approach rather than going with a full dynamic simulation we are giving the prediction equation its best chance at explaining the postderegulation events.

Our main conclusion from the figures is that the macro variables lead to an underprediction of bank ROA in the late 1980s and an overprediction in the 1990s. This is most clearly seen in Figure 7 (which shows the results when there is no lagged dependent variable), but even in Figure 8, where the lagged dependent variable keeps the forecasts

Figure 8 ACTUAL VERSUS PREDICTED ADJUSTED ROA FOR CITY BANKS



Source: Authors' calculations using the regression coefficients from regression 3 in Table 12.

more closely on track, the 1988 and 1989 peaks are underestimated and the last few years of the sample are overestimated. This evidence leads us to doubt stories which argue that the formation of the bubble and its bursting can *fully* explain the banks' performance over the last fifteen years.

An alternative way to judge the stability of the models is to check for a structural break in the coefficients. Having only 15 years of data in the deregulated era led us to suspect that this type of test would have very little power. Nevertheless, the tests for structural breaks shown in the bottom half of the table indicate that none of the four equations is stable across the two regimes. In each case we can decisively reject the hypothesis of no change in the coefficients. In addition to being statistically different across the two periods, the differences also appear to be large in terms of their economic implications. For instance, many of the coefficients reverse their signs and the magnitude of the coefficient on lagged dependent variable also moves noticeably. Overall the tests for coefficient stability also confirm the inability of a set of stable macro correlations to explain the recent ROA data.

While we view this evidence as suggestive, we recognize that there are clear limitations to how hard we can lean on the lack of a well-fitting

time-series model for bank profitability. Our preferred interpretation of the Table 12 results is that the deregulation pushed the banks to alter their business practices so that their exposure to macroeconomic factors changed. But it is also possible that we have simply failed to control for the correct macro factors and that the poor specification of our model is masking the truth.

We believe a stronger test of the importance of deregulation can be conducted by looking at cross-bank differences in performance. If our story emphasizing the role of deregulation is correct, then those banks which relied more heavily on loans to customers who obtained access to capital markets should have underperformed after deregulation. To test this hypothesis we check whether bank performance in the postderegulation period is negatively correlated with the bank's prederegulation dependence on bank loans to traditional customers.

In this analysis we continue to date the start of the deregulation period as fiscal year 1983. Our performance measure is again return on assets corrected for the gains and losses from stock sales and the revaluation of stock holdings. To measure postderegulation performance we use a time average of this variable. Time averaging allows us to avoid being too dependent on correctly specifying the exact dates of the adjustment period. However, it could also mean that we are including observations when the response to deregulation had yet to begin or was already complete. To guard against this possibility we consider two different averaging intervals. We first use the average return for 1991–1997. We then also use the average for 1984–1997 so that we pick up both the boom in the late 1980s and the stagnation in the 1990s.

We consider two types of prederegulation bank characteristics that could influence the postderegulation performance. One factor is a bank's reliance on income from traditional activities. We expect banks intensive in traditional activities to have fared (relatively) badly in the deregulation environment. As a proxy we use the proportion of current income coming from interest on loans. If this proportion is high, it indicates that the bank's performance was relatively dependent on traditional activities at the onset of the reforms.

A second factor relates to the bank's customer base at the onset of deregulation. Ideally we would like to know which banks had many customers that were eligible to shift to bond financing. Unfortunately, data on the the external financing options for the bank customers are not available. We were able to collect information on the proportion of loans made to listed firms and the proportion of loans made to manufacturing firms. Given that the listed firms are typically large and are required to

release audited information on their performance, we think this is a fairly good proxy. We expect the banks that had a higher exposure to listed firms to have been at more risk of losing customers to the capital markets. We also know that the size-based standards of the bond issuance rules made it easier for manufacturing firms to go to the capital markets in the 1980s. Thus, we also expect the banks that had more clients in the manufacturing industry to have also been more likely to lose customers.

All the data except for the listed company loan shares come from Nikkei database on bank balance sheets and income statements. The data on the loan shares were collected from Keizai Chosakai's annual publication *Kin'yu Kikan no Toyushi.* The sample for the regressions includes 10 city banks, 3 long-term credit banks, 6 trust banks, 64 regional banks, and 60 second-tier regional banks.[33]

Table 13 shows the estimation results. Each column reports the coefficient estimates and their *t*-statistics for a different regression model. We draw several conclusions from this table. First, the proportion of interest on loans in the current income in 1983 is significantly negatively correlated with the postderegulation performance. The correlation seems to be robust, as it turned up in all the specifications that we considered. Second, the proportion of loans to listed firms is also negatively correlated with postderegulation performance, although the statistical significance of the coefficient is marginal when the average for whole postderegulation period (1984–1997) is used.[34] Finally, the proportion of loans to manufacturing industry in 1983 is also significantly negatively correlated with the postderegulation performance. We read these results as saying the firms that were more at risk because of the deregulation did seem to underperform after 1983.

Returning to the big picture, there are several ways to interpret the differences in the paths taken by the U.S. and Japanese banks. One interpretation is that the Japanese banks had a different vision of the future of the industry and pursued that vision. For instance, maybe

33. Nippon Trust and Banking was excluded from the analysis because its return on assets is dramatically lower than all the other banks in the sample for the 1990s. Including this bank noticeably changes the results, especially the ones concerning the effect of loans to listed firms. There are some other trust banks and long-term credit banks that experienced very low return on assets for the 1990s, but none of them individually influences the regression results in any significant way. When we ran the same set of regressions excluding all trust banks and long-term credit banks, we obtained qualitatively similar results.

34. One problem with using listed firms is that we do not know if they in fact qualified to issue bonds. For some of the smaller listed firms the bias in the bond issuance rules may have been a problem.

Table 13 CROSS-SECTION REGRESSIONS RELATING POSTDEREGULATION RETURN ON ASSETS WITH PREDEREGULATION BANK CHARACTERISTICS

	Dependent Variable Is Adjusted Return on Assets, 1991–1997				*Dependent Variable Is Adjusted Return on Assets, 1984–1997*			
Independent Variable	*Model 1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
City-bank dummy	0.00281 (1.165)	0.00042 (0.385)	0.00129 (0.942)	0.01114 (3.875)	0.00619 (3.432)	0.00246 (3.139)	0.00245 (2.604)	0.01034 (4.797)
Long-term credit dummy	0.00076 (0.269)	−0.00232 (−1.395)	0.00094 (0.353)	0.01181 (3.103)	0.00508 (2.413)	0.00066 (0.593)	0.00157 (0.933)	0.01041 (3.804)
Trust-bank dummy	−0.00155 (−1.002)	−0.00204 (−1.756)	0.01426 (2.410)	0.02019 (3.230)	0.00478 (4.277)	0.00317 (3.995)	0.00914 (2.206)	0.01448 (3.235)
Regional-bank I dummy	0.00904 (3.064)	0.00490 (7.003)	0.00375 (11.154)	0.01544 (5.319)	0.01065 (4.667)	0.00532 (10.306)	0.00460 (18.479)	0.01396 (5.994)
Regional-bank II dummy	0.00948 (2.863)	0.00407 (7.527)	0.00272 (10.591)	0.01526 (4.802)	0.01100 (4.342)	0.00462 (10.635)	0.00388 (19.752)	0.01399 (5.538)
1983 interest on loans relative to current income	−0.00898 (−2.092)			−0.01463 (−3.658)	−0.00927 (−2.833)			−0.01203 (−3.824)
1983 fraction of loans to manufacturing firms		−0.00828 (−2.882)		−0.00637 (−2.420)		−0.00434 (−2.078)		−0.00408 (−2.107)
1983 fraction of loans to publicly traded firms			−0.01589 (−3.165)	−0.01579 (−3.040)			−0.00612 (−1.719)	−0.00670 (−1.747)
Adjusted R^2	.479	.498	.509	.548	.345	.332	.326	.387

Dependent variable: return on assets adjusted for gains and losses of stock sales averaged over either 1991–1997 or 1984–1997. Mean of dependent variable: 0.001901 (average for 1991–1997); 0.003931 (average for 1984–1997). Independent variables are measured for accounting year ending in the March of 1983.

The 143 observations include data for ten city banks, three long-term credit banks, six trust banks (excluding Nippon Trust), 64 regional banks, and 60 second-tier regional banks. Each column shows coefficient estimates for a separate regression model. Numbers in the parentheses below coefficients are *t*-statistics, calculated using a heteroskedastic consistent covariance matrix following White (1980).

the strong Japanese growth in the late 1980s led the banks to assess the profitability of various strategic options differently than U.S. banks (which were trying to recover from the bad loans they had extended in Latin America). We believe the regression evidence in the last two tables casts some doubt on this explanation, but perhaps a more complicated story involving incorrect future beliefs could explain the performance data. In this case, the fact the Japanese strategy may not have worked out is more of an accident than anything that was caused by the regulatory regime.

A second reading of the evidence is that the Japanese banks were constrained by the regulation from taking the path of the U.S. banks. Since many fee-generating lines of business were not available, the banks chose to move into property-related lending and lending more to small firms, perhaps knowing that this involved taking on more risk.[35] This was not the only option for the banks. When large customers started to leave bank financing, the banks could have started buying government bonds and other securities instead of lending to new customers. We know now both that this strategy looked relatively attractive and that few, if any, banks in Japan followed it. Regardless of what one decides about the rationality of the banks' responses, it seems clear that banks would never have chosen to search for new lines of business if their large customers had not shifted their financing patterns in response to the deregulation. In this sense, the regulatory mix seems to have mattered, and one interpretation of our findings is that the poor performance was partially due to the deregulation.

For the purposes of looking ahead, it may not matter whether we can separate these two alternatives. At this point the Japanese banks remain among the largest in the world, yet they are now among the least profitable. Moreover, the approach of sticking to traditional banking and focusing on new, smaller customers has failed. As Hoshi and Kashyap (1999b) show, foreign firms and nonbank financial firms are moving quickly to compete with banks for funds. It seems reasonable to conclude that the Japanese banks are going to be pushed by all of these considerations to shift their strategy and become more like U.S. banks. But the current conditions of the industry may place some constraints on which options are achievable. Thus, before making any forecasts, we briefly review the current conditions of the banks.

35. At least ex post, property lending was risky. For example, four major banks (Sanwa, Sumitomo, Dai-ichi Kangyo, and Tokyo-Mitsubishi) published data showing nonperforming loans broken out by the industry. For these banks, between 16% and 40% of total nonperforming loans are to the real estate sector, and for all the banks besides Dai-ichi Kangyo this is the leading sector for nonperforming loans.

4. *The Bad-Loans Problem*

While it is widely recognized that Japanese banks are in bad shape, there appears to be little consensus on the magnitude of the problems. For instance, in early February 1999 a top Ministry of Finance official (Eisuke Sakakibara) was quoted as saying that the financial crisis would be over within a matter of weeks. At the time private-sector analysts were arguing that conditions were deteriorating and that bold new steps were needed. Such conflicting opinions have been common for the last several years.

One problem plaguing the entire discussion is that there is no common standard for what people mean when they refer to "bad loans." One reason for this ambiguity is that the standards for determining which loans the banks identify as being at risk on their financial statements have varied over time. A second problem is that numbers from the bank balance sheets are only one of three types of estimates which are sometimes used to identify loans that are at risk. Unfortunately, these three types of estimates are not even intended to measure the same thing, and for each approach there are judgmental decisions that can swing the numbers considerably. As we now show, these considerations explain why, to a casual observer, there have been such divergent claims about the scope of the banking crisis in Japan. After having clarified the size of the problem, we then discuss its implications for the future.

4.1 ESTIMATES BASED ON DATA FROM BANKS' FINANCIAL STATEMENTS

Remarkably, Japanese banks did not disclose anything about the extent of their problem loans prior to 1993. This lack of disclosure made it impossible to say very much about the condition of the banks. Since 1993 the banks have included footnotes on their financial statements that classify loans according to the health of the borrowers. The decisions about which loans should be identified in the footnotes have been made by the Japanese Bankers Association (Zenginkyo). Importantly, these voluntarily disclosed data are not supposed to take account of differences in the chances the different loans might be repaid (say because of differences in the collateral associated with the loans). For example, if a borrower files for bankruptcy, all the loans made to the borrower are treated equivalently.

Table 14 shows these voluntarily disclosed data for 1993 through 1998. The first half of the table shows information for major banks (city banks, trust banks, and long-term credit banks), and the second part shows the comparable number for all banks (major banks plus regional banks).

From March 1993 to September 1995, the statistics covered only the loans to failed enterprises and the loans for which no payments had been made for at least 6 months. Thus, the figures did not include any restructured loans. Moreover, regional banks did not have to disclose (and many chose not to disclose) the loans with suspended payments. Under this reporting convention the amount of bad loans fluctuated around ¥12 trillion (roughly 3.5% of total loans) for major banks and ¥13.5 trillion (roughly 2.5% of total loans) for all banks.

For the major banks, intermittent data on loan write-offs are available for this period from the Web site of the Financial Supervisory Agency. These data, shown in the third column of the table, indicate that write-offs were quite low in these first couple of years of the banking crisis. The fourth and seventh columns of the table show that during this period the banks were also slow in increasing the amount of funds set aside to cover the bad loans. Although provisioning was increasing, the loan loss reserves were never sufficient to cover the expected losses. For instance, as of September 1995, the loan loss reserves covered only 52% of bad loans for major banks (and 60% for all banks). Analysts in the private sector repeatedly argued that the reported data grossly understated the true extent of the problems. For example, Ohara (1996) argued that as of March 1995 the bad loans for the major banks were more likely to be as large as ¥75 trillion, once all the restructured loans and future liabilities of the affiliated nonbanks were properly accounted.

Starting with the accounting data released in March 1996, a couple of changes were made. First, the regional banks were now instructed to classify any loans with suspended payments as bad. More importantly, the bad-loan definition was expanded to include loans for which the interest rates were cut to levels below the Bank of Japan discount rate at the time of the concession. These changes led to a sharp jump in the reported figures (with the totals rising to ¥20 trillion for major banks and almost ¥27 trillion for all banks). At the same time the amount of write-offs jumped.

The accounting data released in the following March included another change in definition, as loans to enterprises undergoing creditor-assisted restructuring were now included. Although the definition was expanded, the amount of bad loans declined slightly (to ¥18 trillion for major banks and ¥24 trillion for all banks). The amount of loan loss reserves also declined by ¥1 trillion for major banks and by ¥1.2 trillion for all banks. One contributing factor to the declines was an acceleration in the actual write-offs (which remove bad assets from the balance sheets). A second factor that probably helped was the brief recovery of the Japanese economy in 1996.

Table 14 PROBLEM LOAN STATISTICS FOR JAPANESE BANKS: 1993–1998 (BILLION YEN)

	Major Banks			*All Banks*		
Date	*Bad Loans*	*Cumulative Write-offs*[a]	*Special Reserves for Loan Losses*	*Bad Loans*	*Cumulative Write-offs*[a]	*Special Reserves for Loan Losses*
March 1993	11,730	424	3,699	12,685	N/A	4,876
September 1993	12,662	N/A	3,875	13,732	N/A	5,128
March 1994	12,472	2,514	4,547	13,659	N/A	5,967
September 1994	12,198	N/A	4,798	13,439	N/A	6,327
March 1995	11,637	5,322	5,537	12,961	N/A	7,305
September 1995	11,969	N/A	6,173	13,421	N/A	8,047
March 1996	20,357	10,812	10,345	26,831	11,602	13,469
September 1996	18,846	N/A	9,508	24,383	N/A	12,035
March 1997	18,447	14,488	9,388	23,987	15,918	12,299
September 1997	17,890	N/A	10,330	23,896	N/A	13,685
March 1998	21,978	17,988	13,601	29,758	19,911	17,815
September 1998	22,008	18,653	12,457	30,078	19,630	16,932
March 1999	20,250	22,256	9,258	29,627	24,620	14,797

Sources: Federation of Bankers Associations of Japan, *Analysis of Financial Statements of All Banks*, various issues. Federation of Bankers Associations of Japan, *Analysts of Interim Financial Statements of All Banks*, various issues. Financial Supervisory Agency (FSA), "The status of risk management loans held by all banks in Japan (as of the end of September, 1998)," press release, January 22, 1999 and FSA, "The status of risk management loans held by all banks in Japan (as of the end of March 1999)," press release, July 23, 1999.

Notes: Definitions of bad loans: From March, 1993 to September, 1995, for major banks, loans for failed enterprises and loans whose payment had been suspended for 6 months or more; for regional banks, only loans for failed enterprises. From March, 1996 to September 1996, loans for failed enterprises, loans whose payment had been suspended for 6 months or more, and loans with interest rates lowered below the BOJ discount rate at the time of the rate cut. From March 1997 to September 1997, loans for failed enterprises, loans whose payment had been suspended for 6 months or more, loans with interest rates lowered below the BOJ discount rate at the time of the rate cut, and loans for enterprises under restructuring. For March 1998, loans for failed enterprises, loans whose payment had been suspended for 3 months or more, and loans with relaxed conditions.

Coverage: From March 1993 to September 1995, the numbers are for 21 major banks (11 city banks, 7 trust banks, 3 long-term credit banks) and 151 banks in all (64 regional banks and 66 second-tier regional banks in addition to the major banks). Hyogo Bank, which was closed in 1995 and reopened with a new name (Midori Bank) and organization, is not included in the numbers for March 1996 and later. The merger between Mitsubishi Bank and Bank of Tokyo in April of 1996 (to form Mitsubishi Bank of Tokyo) reduced the number of city banks by one. Taiheiyo Bank (later Wakashio Bank) and Hanwa Bank failed in 1996 and dropped out of the sample, starting in March 1997. Hokkaido Takushoku Bank, one of the major banks, failed in 1997 and dropped out of the sample in March 1998. Tokuyo City, Kyoto Kyoei, Naniwa, and Fukutoku dropped out of the sample in September 1998. In March 1999, Long-term Credit Bank, Nippon Credit Bank, Kokumin, Koufuku, and Tokyo Sowa were eliminated from the coverage. As a result of these changes, the sample for March 1999 covers 17 major banks (9 city banks, 7 trust banks, and 1 long-term credit bank), as well as 121 other banks (64 regional and 57 second-tier regional banks) for a total of 138 banks.

[a]Cumulative direct write-offs (which include losses on sales of loans to other entities such as the CCPC and losses on support to other financial institutions) (billion yen).

In March 1998, the definition of bad loans was once again expanded. The new definition, which remains in place at this writing, identifies bad loans (now called "risk management credits") as loans to failed enterprises, loans whose interest payments have been suspended for 3 months or more, and loans with concessions (which cover loans with reduced interest rates and loans to corporations under reorganization). This expansion of the definition and the deterioration in the economy in 1997 sharply increased the stock of bad loans. Thus, as of March 1999, despite continued write-offs and removal of many banks which failed over the last couple of years, the official amount of bad loans for the major banks (all banks) stood at ¥20 trillion (¥30 trillion).[36] Overall, the bad-loan numbers quoted on the bank financial statements still tend to be low, since the banks need not identify loans to firms that are in trouble but where no restructuring or missed payments have yet been recorded.

4.2 ESTIMATES BASED ON SUPERVISORY GUIDELINES

For supervisory purposes, the regulators have always been aware of this problem so the Bank of Japan and Ministry of Finance [and now the Financial Supervisory Authority (FSA)] have focused on the chances that a loan will be collected. This means that both the condition of the borrower and the quality of collateral are relevant. Accordingly, loans to the same borrower can be classified into different categories if they are secured by different collateral and hence offer different expected levels of repayment. The coverage of assets which are considered is also slightly broader than the voluntarily disclosed data, since this assessment includes loanlike items such as securities loaned in addition to conventional loans.

Under this scheme, which is also used by U.S. regulators, loans are classified into four categories. Category 4 includes the loans that are noncollectable or of no value. These are the unsecured portions of loans made to failed firms. Category 3 is the set of loans that are seriously doubtful with regard to their ultimate collection. These include loans to bankrupt (or nearly bankrupt) companies that are secured, but where the market value of collateral is well below the book value. In practice these loans are expected to return little or nothing, unless the value of the collateral increases dramatically. The FSA describes Category 2 loans as "credits subject to specific risk management." These loans are not yet judged to be uncollectible but are

36. See the footnotes to Table 14 for a complete list of when various banks were dropped from the official statistics.

deemed to require attention; the popular press sometimes refers to the Category 2 loans as being in the "gray zone." Category 2 loans are sometimes further classified to separate those loans that require "special attention" from the others. For example, the Financial Reconstruction Commission's guideline on provisioning for nonperforming loans suggests two different provisioning ratios for these two subcategories. Finally, Category 1 covers the remaining loans whose repayment is not supposed to be in any doubt.

Because of the large number of Category 2 loans (which are mostly excluded from the numbers shown on the bank financial statements), this classification scheme generally produces much larger estimates of problem loans. In 1998, the government started to publish aggregate statistics on loans sorted according to these criteria. The banks' own assessments are reported in the top panel of Table 15. In December 1998 the FSA released its own estimates for the major banks (as of March 1998, based on their 1998 on-site examinations). These figures are shown in the bottom panel of the table. The FSA data suggest that the major banks in Japan had ¥57.4 trillion of bad loans (or 14% of total loans) as of March of 1998.

Converting these figures into the expected cost of cleaning up the bank balance sheets requires two more assumptions. First, one has to decide whether the supervisors have correctly identified all the problem loans at the banks. It is generally agreed that the banks' self-reporting has been fairly optimistic. For example, when Nippon Credit Bank (NCB) was nationalized, the FSA announced that it had problem loans of more than ¥3.7 trillion; NCB's own assessment put the losses at roughly ¥3.2 trillion. The same kind of underreporting was uncovered when the Long-Term Credit Bank (LTCB) was nationalized. Comparing the top and bottom panels in Table 15 shows that the FSA believed that the major banks had failed to identify roughly ¥7 trillion of risky loans. In April 1999, the FSA issued new guidelines that included detailed instructions on how to classify loans.

A second problem is determining the fraction of the Category 2 and Category 3 loans that will ultimately be lost. A study by the Supervision Department of the Bank of Japan (1997) found that 17% of Category 2 loans and 75% of Category 3 loans identified in 1993 became uncollectable within three years. Although the sample size used in the BOJ study was very small, the numbers provide an upper bound on the recovery rates for Category 2 and Category 3 of 83% and 25% respectively. Assuming that the Category 4 loans are worthless, but that Category 2 loans do return ¥83 against every ¥100 is owed and that Category 3 loans return ¥25 per ¥100, the data in Table 15 imply that the total expected loss

Table 15 DISTRIBUTION OF LOANS BY SUPERVISORY CLASSIFICATION

Banks' 1998 Self-Reported Data[a]

		Loans (billion yen)				
Sample	*Date*	*Category 1*	*2*	*3*	*4*	*Total Loans*
Major banks	Mar. 1998	371,607	45,157	4,808	125	421,697
All banks	Mar. 1998	544,814	65,488	6,065	130	616,495
Major banks	Sept. 1998	354,629	45,537	5,697	77	405,940
All banks	Sept. 1998	524,980	66,078	6,863	86	598,007

March 1998 Data for 19 Major Banks as Determined by FSA Audits[b]

	Loans (billion yen)				
	Category 1	*2*	*3*	*4*	*Total Loans*
	364,332	48,971	7,756	637	421,696

There are four loan categories used by bank supervisors. Category 4 includes the loans that are noncollectable or of no value. Category 3 is the set of loans that are seriously doubtful with regard to their ultimate collection. In practice these loans are also expected to return nothing. Category 2 loans are "credits subject to specific management risk." These loans are not yet judged to be uncollectable but are deemed to require special attention. Category 1 covers the remaining loans, whose repayment is not supposed to be in any doubt. (See text for further details.)

[a]*Source:* Financial Supervisory Agency, "The status of risk management loans held by all banks in Japan (as of the end of September, 1998)," press release, January 22, 1999. The figures include loans of Long-Term Credit Bank and Nippon Credit Bank, but exclude those of Hokkaido Takushoku Bank, Tokuyo City Bank, Kyoto Kyoei Bank, Naniwa Bank, Fukutoku Bank, and Midori Bank.

[b]*Source:* Financial Supervisory Agency Web site (www.fsa.go.jp), published in December 1998. Note that these figures include loans of the Long Term Credit Bank and Nippon Credit Bank.

amounts to ¥14.78 trillion (which is about 3% of GDP or 3.5% of total loans).

Some private-sector analysts find this calculation very optimistic, because the calculation is based on the amount of problem loans reported by banks and FSA, and the figures in BOJ study overestimate the true recovery rates for problem loans. For example, Ohara (1998) estimates that the amount of bad loans at the major banks to be ¥73.4 trillion as of March 1998. Assuming a 25% recovery rate for the risk management loans and 62.5% recovery rate for the remaining bad loans, she arrives at ¥35 trillion (7% of GDP) as the estimated loss. Fiorillo (1999) estimated, as of February 1999, the size of loans for the major banks that will eventually be uncollectable to be ¥38 trillion, or 7.6% of GDP.[37] These estimates suggest (plausibly to us) that many more loans will have to be written off than have been disposed of so far.

37. Private-sector analysts also point out that there are probably large losses in financial institutions besides the banks.

4.3 ESTIMATES BASED ON THE DISCLOSURES MANDATED BY THE FINANCIAL RECONSTRUCTION ACT

Since April 1999 another set of bad-loan estimates have been floating around. Section 7 of the Financial Reconstruction Act (FRA) requires each bank to report bad loans (as described below) to the Financial Reconstruction Commission and to publish the data. Unfortunately, the FRA definition of bad loans falls in between the two previously described definitions. In particular, the FRA highlights loans to failed enterprises and de facto failed enterprises, loans to near-bankrupt companies, loans whose interest payments have been suspended for more than three months, and loans with concessions. Essentially this means that the FRA definition includes the Category 3 and 4 loans according to the supervisory definition, but not all of the Category 2 loans. Instead the FRA definition focuses only on any remaining loans that would be counted in the banks' voluntarily disclosed data.

Given this reporting convention, the FRA estimates should be expected to lie in between the two prior sets of estimates. In the first round of disclosure, which covered the conditions as of March 1999, the amount of bad loans at all banks was ¥34 trillion. Based on data from the web sites of the FSA and FRC, this was about ¥4 trillion larger than voluntarily disclosed data, but far lower than the ¥64 trillion estimated by the supervisors. This is about ¥6 trillion larger than the voluntarily disclosed data, but far below the supervisory estimates (Fiorillo, 1999). For a further discussion of how the various sets of estimates compare see Iwahara, Okina, Kanemoto, and Narisawa (1999).

Overall, we conclude that there are three key considerations that must be kept in mind when evaluating different estimates of the size of the bad-loan problem. First, and most importantly, one must check whether the data are based on assessments of the collectability of loans or are taken from the bank financial statements. Second assuming that most people will want the collection-based estimates, it is necessary to determine whether the data have been self-reported by the banks or are based on supervisors' (or private-sector analysts') estimates. Finally, it is imperative to be clear about what assumptions are being used regarding the fraction of the gray-zone loans that will be collected.

To help put the Japanese bad loans problem in perspective, Table 16 shows the size of banking crises in other developed countries over the last two decades (see Corbett, 1999b, for a more comprehensive comparison). Clearly the Japanese crisis is much larger than the U.S. savings-and-loan crisis, and thus a full bailout would require significantly more resources than were deployed in the U.S. rescue. Discussions of what to

Table 16 REVIEW OF SELECTED COUNTRIES' BANKING PROBLEMS, 1980–1996

Country	*Period*	*Non-performing Loans*[a]	*Fiscal Cost*[b]	*Comments*
Argentina	1980–1982	9%	4%	
	1989–1990	27%	N/A	37% of state-owned banks were nonperforming. Failed banks held 40% of financial system assets.
	1995	N/A	N/A	45 of 205 institutions were closed or merged.
Australia	1989–1992	6%	1.90%	
Chile	1981–1987	16%	19%	8 banks intervened in 1981 (33% of outstanding loans, 11 in 1982–1983 (45% of outstanding loans).
Colombia	1982–1985	15%	5%	
Czech Rep.	1991–present	38%	12%	
Finland	1991–1994	13%	8%	Liquidity crisis in 1991.
France	1991–1995	9%	1%	
Indonesia	1992–1995	25%	2%	Nonperforming loans concentrated in state-owned banks.
Italy	1990–1995	10%	N/A	
South Korea	Mid-1980s	7%	N/A	
Malaysia	1985–1988	32%	5%	Loans loss equivalent to 1.4% of GDP.
Mexico	1982	N/A	N/A	Banking system nationalized.
	1994–present	12%	6%	
Niger	1983–present	50%	N/A	
Norway	1987–1993	6%	3%	
Philippines	1981–1987	30%	13%	
Sweden	1990–1993	18%	4%	
United States	1980–1992	4%	2%	1142 S&L institutions and 1395 banks were closed.
Uruguay	1981–1985	59%	31%	
Venezuela	1994–present	N/A	17%	

Sources: IMF (1998c) and Lindgren, Garcia, and Saal (1996).
[a]Estimated at peak of the crisis, as percentage of total loans.
[b]Estmated as percentage of annual GDP during the restructuring period.

do about a bailout are further clouded by the fact that the government is already running a large deficit (estimated to be more than 6% of GDP by the IMF, 1998b). On top of this, Japan faces a significant upcoming social security problem. This has led the government to try to rein in the deficits. For instance, the Fiscal Structural Reform Act passed in November 1997 required the government to bring the deficit below 3% of GDP by fiscal year 2003. The weakness of the economy led the government to first push back the goal by two years in May 1998 and then eventually suspend the Act completely in December 1998. There is still strong sentiment, however, within the government for trying to begin cutting the deficit as soon as possible.

We draw two conclusions from this assessment. First, the fiscal concerns suggest it is important to focus on the amount of funds that would be needed to keep a large enough banking sector in place to serve borrowers once the crisis is over and the deregulation has taken hold. By looking ahead, one can try to determine the minimum amount of public money that will be needed. We can then compare the minimum estimates with the various proposals that have been made.

Second, in assessing the options that the banks have in developing new strategies it is important to allow for their weak capital positions. The flip side of the problems documented in Tables 14 and 15 is that the Japanese banks have very low levels of capital and are likely to have trouble raising much money in the capital markets in the short run. For instance, Moody's rating agency gives most of the major Japanese banks a financial strength rating of E or E+ (the two lowest ratings on their scale). Such banks are expected to "require periodic outside support." As a consequence the banks are unlikely to be able to purchase other large firms in order to acquire expertise. Similarly, bankruptcy seems like a real risk that would become more imminent if they were to undertake any large investments that have long payback periods. With this in mind, we sketch one scenario for the future of the Japanese banking sector.

5. *Quantifying the Impending Shrinkage of the Japanese Banking Sector*

The evidence presented in Section 3 suggests that large Japanese manufacturing companies have already almost reduced their reliance on banks to about the level of bank dependence observed in the United States. If our conjecture that other firms will soon be following this lead is correct, it is natural to ask what that might imply for the future of Japanese banks. The purpose of this section is to explore this question quantitatively.

5.1 MAINTAINED ASSUMPTIONS AND CAVEATS

Before diving into the calculation it is important to recognize several caveats about the exercise. First, our approach should be thought of as only calibrating the eventual size of a possible reduction in loan demand. We will explore several different assumptions about potential shifts, but all of our scenarios will take years to play out, so that the numbers that follow can at best be thought of as medium-run forecasts. We discuss the timing issues further in the next section.

Second, we are implicitly assuming that loan demand will drive the size of banks. Although we believe this is the most reasonable assumption to make, it could fail for a variety of reasons. For instance, depositors may continue to stuff their money into the banks even after all the Big Bang reforms are complete. For the most part we have also ignored the presence of the huge Japanese postal savings system (PSS). But there is a continuing debate about whether the PSS should be reformed. It is easy to imagine PSS reforms that wind up pushing large savings flows back towards the banks. We will briefly discuss the plausibility of the size of the implied adjustment in deposits after we present our findings.

Another risk of basing our forecasts on loan demand is the possibility that the banks could shed loans but pick up enough new lines of business so that they would not have to shrink.[38] Given that the Japanese banks currently have very little expertise outside of traditional banking and limited capital to buy such expertise, this scenario may seem unlikely right now. However, if some of these banks end up being sold to foreign financial services firms, it becomes much more realistic. In view of the rapidly changing competitive landscape of the Japanese financial services industry, we view this as a genuine possibility.

A third complication is that, because we focus on the bank debt-to-asset ratio, one must take a stand on what will happen to the growth of corporate assets in order to draw any conclusions about the level of bank lending. Put differently, if corporate assets are growing, then forecasts of a declining bank debt-to-asset ratio need not imply that the level of bank loans will fall. However, there are several pieces of evidence which suggest that an assumption of zero growth of corporate assets is a reasonable forecast for Japanese firms over the medium run.

One consideration is the recent evidence on asset growth. The Hojin Kigyo Tokei data suggest that total assets for all industries grew only at 1.7% a year from 1993 to 1998. Since new firms are added to the survey

38. There are also factors that push in the other direction. For instance, these calculations ignore the possibility of foreign lenders taking away business from the Japanese banks.

each year, the number in fact overstates the true growth rate of corporate assets. If this trend were to continue, then asset growth would be sufficiently low not to matter much for our purposes.

Another factor, which has been emphasized by the Japan Economic Research Center (1997), is that Japanese corporations are expected to begin reducing their financial assets (especially low-return liquid assets) as their financial management skills improve. The dwindling of the banks' practice of requiring compensating balances, together with the winding down of cross-shareholdings, will further contribute to the reduction of financial assets. Thus, even if a business-cycle recovery leads Japanese corporations to start increasing their fixed assets, declining financial assets will be a significant offsetting factor. For these reasons we believe that a reasonable benchmark is to translate any forecast declines in the bank debt-to-asset ratio into one-for-one declines in bank lending.

Finally, we also recognize that this whole exercise ignores the potential general equilibrium feedbacks that could occur with large changes in intermediation. Partly this is out of necessity, since building a full model of the financial sector is not yet possible. However, this strategy can be partially justified if we maintain that the economic role of banks is tied to loan generation, particularly to smaller firms, and that for most other activities banks are redundant. Under this view, if the banks were to hold onto customers that might otherwise go to the capital market, the banks would have to match the capital-market rates. As these rates are increasingly determined by global forces, our assumption does not seem very unreasonable.

Keeping in mind all these caveats, we now explore what would happen if all Japanese corporations followed the lead of the large manufacturing firms that have already moved towards U.S. levels of bank dependence.[39] Since we want to consider several scenarios, we start by describing and defending the two basic assumptions that are common to all projections. After discussing these premises we outline the different scenarios that we consider.

The first key assumption is that loan demand for large and small firms can be aggregated within sectors. Thus, for each sector we treat all large firms and all small firms identically. We do not necessarily treat large firms and small firms symmetrically within or across sectors. Our main justification for this approach is the evidence in Table 6 regarding the relative stability of the bank borrowing patterns exhibited by the U.S. firms.

Our second key assumption involves the choice of sectors to be ana-

39. The whole exercise is very much in the spirit of Rajan and Zingales (1998).

lyzed. The only really reliable data that we have for the United States pertain to manufacturing. We also have some information for large firms in the wholesale and retail trade sectors. In all of our projections we model these three sectors separately, in some cases making finer assumptions about what is happening within manufacturing. Unfortunately, this means that we have no U.S. data to guide us for other industries. For this reason we aggregate the remaining Japanese industries into an "other" category.

5.2 IMPLICATIONS OF U.S. BORROWING PATTERNS FOR JAPANESE LOAN DEMAND

There are three basic inputs into the forecasts that we report. The first piece of information is the 1998 total amounts of borrowing done by large and small firms across our four sectors of the Japanese economy. These numbers come from the *Hojin Kigyo Tokei,* and we follow the convention from Table 4 of defining large firms to have a book value of capital above ¥1 billion. The second element in the calculation are the initial observed levels of bank dependence for the large and small firms in the different sectors. These numbers can also be computed directly using the unpublished data we obtained.

Table 17 shows the 1998 distribution of bank borrowing and bank dependence for Japanese firms. Table 4 has already shown the noticeable differences in large-and small-firm bank dependence across sectors. We draw three further conclusions from Table 17. First, the "other" category covers over half of the bank borrowing done by firms in the sample. Since we have no representative data for these firms in the United States, this means that a significant portion of our forecast will be based purely on imputations for what might happen to this large, unmodeled segment of borrowers.

Second, the table shows that Japanese banks are already serving primarily small borrowers. Adding up loans made to small firms across all four sectors reveals that small borrowers receive about 64% of the bank credit tracked in the *Hojin Kigyo Tokei.* One check on the plausibility of our forecasts will be to see if they imply reasonable splits between the aggregate amount of large- and small-firm borrowing.

Lastly, the table also indirectly shows the comprehensive coverage of the *Hojin Kigyo Tokei.* According to balance-sheet information for all banks, total lending should be about ¥450 trillion as of March 1998.[40] The

40. This figure excludes overdrafts. We believe that excluding overdrafts makes sense because such commitment lending is unlikely to be affected by the Big Bang. See Kashyap, Rajan, and Stein (1999) for theoretical support for this argument and empirical evidence showing that even in the U.S. the commitment business is dominated by banks.

Table 17 DISTRIBUTION OF THE 1998 QUANTITY OF BANK BORROWING AND THE RATIO OF BANK DEBT TO ASSETS FOR JAPANESE FIRMS

Sample[a]	*Total Bank Borrowing (trillion yen)*		*Ratio of Bank Debt to Assets*		*Fraction of Category Borrowing by Small Firms*
All firms, all industries	445		0.3567		0.6432
Large firms, all industries		159		0.2761	
Small firms, all industries		286		0.4257	
All firms, manufacturing	92		0.2372		0.5738
Large firms, manufacturing		39		0.1647	
Small firms, manufacturing		53		0.3527	
All firms, wholesale trade	65		0.3392		0.7160
Large firms, wholesale trade		19		0.3027	
Small firms, wholesale trade		46		0.3562	
All firms, retail trade	41		0.4110		0.8193
Large firms, retail trade		7		0.2559	
Small firms, retail trade		34		0.4746	
All firms, other industries[b]	247		0.4348		0.6207
Large firms, other industries		94		0.3796	
Small firms, other industries		153		0.4773	

Source: Ministry of Finance, *Hojin Kigyo Tokei.*
[a]Large firms are those that have book value of equity greater than ¥1 billion.
[b]All those which are not in manufacturing, wholesale trade, or retail trade.

coverage in our sample is ¥445 trillion. The close match actually masks two differences. One is that the survey includes borrowing from financial institutions such as credit unions that are not counted as banks. However, the survey also excludes borrowing done by truly tiny firms and individuals. It appears these two differences largely cancel.

The final ingredient needed for our forecasts is the assumed level of bank dependence that will prevail in the new steady state. Wherever possible we try to pin down these figures using the U.S. experience. Based on the QFR data from Table 6, we can get benchmarks for large and small manufacturing firms, large retail firms, and large wholesale firms. In fact, for the manufacturing sector we can do better and get two-digit-level data for the 14 industries. However, we have no solid data for the borrowing by U.S. firms in the "other" industries and therefore try several very different ways of calibrating the changes for these firms.

Since each hypothesized steady state requires eight assumptions about the bank debt-to-asset ratios (two types of firms in four sectors), there are endless simulation possibilities. To simplify the reporting, we

focus on three different variations that we believe should bound the implied adjustments. Each of these variations amounts to setting a switch that pins down two or more of the eight bank debt-to-asset ratios.

The first set of alternatives involve differing assumptions about the behavior of Japanese manufacturing firms. Our simplest assumption is that the large and the small firms' bank dependence in Japan converge to the same levels that hold for the typical large and small manufacturing firms in the U.S. We call this case the *simple manufacturing assumption.* This assumption ignores the differences in industrial composition between the two countries. Therefore, we repeat the calculations assuming instead that large and small Japanese firms' bank dependence converge on an industry-by-industry basis to the U.S. levels. Here we have data for 14 industries (shown in Tables 7 and 8), and we form a fifteenth category for the remaining firms. Although we conduct the calculations at the industry level, the results are aggregated back to the total manufacturing level for reporting purposes. We denote this second case as the *industry-adjusted manufacturing assumption.*

A second pair of assumptions relate to the treatment of small firms in the wholesale and retail sectors. Although the QFR gives us some data on U.S. borrowing propensities for large firms, there are no QFR data for small firms in these sectors. The only available data that we know of describing small-firm borrowing patterns in the U.S. are in the 1993 National Survey of Small Business Finances (NSSBF). This survey, conducted for the Board of Governors of the Federal Reserve System and the U.S. Small Business Administration, covers a nationally representative sample of very small businesses.[41]

Petersen and Rajan (1994) have analyzed these data and were kind enough to provide us with some simple tabulations of the ratio of bank debt to assets for these firms. These tabulations suggest that for the NSSBF the total debt ratio was between 0.18 and 0.24 for the sector groupings that we are analyzing (on an asset-weighted basis). We also learned that banks supply about half of all loans to these firms. However, there are two factors that make us hesitant to rely completely on these numbers in our simulations. One concern is that the firms in the NSSBF are very small. For instance, the top decile of firms in this sample includes firms with as little as $2.3 million in assets. The "small" Japanese firms that we are studying appear to be about ten times bigger in terms of average assets.

41. The target population is all for-profit, nonfinancial, nonfarm business enterprises that had fewer than 500 employees and were in operation as of year-end 1992. The public data set contains 4637 firms and describes all the loans each firm has as of year-end 1992, as well as the institutions that these loans came from.

Secondly, we know that bank borrowing becomes more important once firms grow. For instance, within the NSSBF sample, both the fraction of firms with any debt and the fraction of firms' debt owed to banks rise with firm size. Thus, we suspect that U.S. firms which would be comparable in size to our sample of Japanese firms would be more bank-dependent in their financing than are the NSSBF firms. Nevertheless, it seems to us unlikely that this growth effect would be strong enough to push the firms' bank-debt-to-asset ratio much beyond the 35% (which is the upper end of the range for the total debt-to-asset ratio in the NSSBF).

With these numbers as a reference we consider two different scenarios for the small trade firms. The first approach plays off of the small-firm-to-large-firm borrowing ratio that is observed in U.S. manufacturing. We apply this ratio to the level of the QFR for large firms in each sector to get a target level of small firms in each sector. We describe this assumption as identifying small trade firms' bank dependence using U.S. manufacturing data. Given the data in Table 6, we can see that this will imply bank-debt-to-asset ratios of about 0.23 and 0.32 for small retail and wholesale firms respectively.

Are these numbers reasonable? In the NSSBF sample they are 0.24 and 0.20, respectively. Using the figures from Table 6, this suggests that the ratio of the NSSBF levels of bank dependence to the levels found for large retailers and wholesalers is in line with the approximate 2:1 ratio found in U.S. manufacturing. Thus, we believe that unless the NSSBF data significantly understate small firms' bank dependence, assuming the small and large firms' differences are about the same (in ratio terms) across sectors seems plausible.

Our second approach exploits the fact that we can observe both small and large firms' borrowing patterns for the Japanese trade firms. In this case we get the steady-state target level of small-firm borrowing for wholesalers by multiplying the ratio of small-firm to large-firm bank dependence of wholesalers in Japan by the level of bank dependence for large U.S. wholesalers. In essence this assumes that both large and small Japanese wholesalers will adjust by the same *percentage*. We carry out the same calculations for retailers, and describe this assumption as identifying small trade firms' bank dependence using existing Japanese borrowing patterns. Using these assumptions, the target levels of bank dependence are 0.20 and 0.18 for small retail and wholesale firms respectively. These targets are both below the levels found in the NSSBF and thus are likely to lead us to overstate the decline in bank dependence.

Our third and last set of cases involve the assumptions about the levels of bank dependence for the other industries such as transportation, communications, services, and construction, where we have abso-

lutely no QFR data. Based on the Japanese data shown in Table 17, we can see that as of 1998 these firms are more bank-dependent than the wholesale and retail firms. However, these firms also have more of their bank borrowing being done by large firms than is the case for either wholesalers or retailers. Considering both these factors, we use the average proportional adjustment done by the wholesale and retail trade firms to come up with the required adjustment for the large and small firms in the other category. More specifically, we assume that the ratio of the target level to the current level of bank dependence for large (small) "other" firms is equal to the weighted average of the target-to-current ratio for large (small) firms in wholesale and retail trade industries. In the NSSBF data the *level* of bank dependence for other sector firms is close to the level of bank dependence for trade firms. Thus, for small firms this assumption (which does not force the levels to converge) seems conservative.

Given the amount of guesswork involved constructing this benchmark, we consider a second refinement in which we assume these other firms only adjust half as much as the similar-sized average trade firm. We describe this refinement as *halfway convergence* to distinguish it from the first case above, which is called *full convergence.* Halfway convergence is an attempt to trade off our ignorance about how the large firms in this sector are financed against the presumption that capital-market financing is likely to displace at least some bank lending.

We summarize the pairs of alternatives and introduce some shorthand notation for describing them in Table 18. Since the three alternatives are mutually exclusive, we have eight total cases to consider. By comparing the scenarios where two of the three factors are held constant, we will be able to take "derivatives" to determine which of the convergence assumptions are most powerful. Below, as a sensitivity check, we also explore what happens if we do not assume that the large Japanese firms in wholesale and retail trade go all the way to the levels seen in the United States.

Table 19 compares the eight alternative steady states for future loan demand with the current levels of borrowing by Japanese firms. We draw five main conclusions from the calculations. First and most importantly, under all the scenarios we explore, *the U.S. benchmark implies a large impending decline in loan demand by Japanese firms.* The smallest hypothesized contraction suggests a decline of more than 25% in bank-loan demand. Even recognizing that these calculations refer to medium-term adjustments, we find the implied drops to be quite large. We discuss the transitional implications of this kind of shift in the concluding section.

Second, the forecasts all seem reasonable in their implications for the

Table 18 ALTERNATIVE ASSUMPTIONS REGARDING LOAN DEMAND USED FOR CALCULATING STEADY LOAN AMOUNTS

Sector(s) Directly Affected	*Shorthand Name*	*Brief Description*
Manufacturing	Simple manufacturing convergence	Large and small Japanese manufacturing firms' bank dependence converges to U.S. levels.
	Industry-adjusted manufacturing convergence	Within each of 15 manufacturing industries, large and small Japanese firms' bank dependence converges to the U.S. levels.
Wholesale and Retail Trade	Small trade firms' borrowing based on U.S. manufacturing	The ratio of bank dependence between U.S. large and small manufacturing is imposed to infer the target level of borrowing for small trade firms.
	Small trade firms' borrowing based on current Japanese patterns	The existing ratio of bank dependence between large and small firms within each sector is imposed to infer the target level of borrowing for small firms in each sector.
Other industries	Full convergence	Target levels for these firms are set to deliver an equal percentage adjustment in bank dependence for similar-sized trade firms.
	Halfway convergence	Target levels for these firms are set to deliver an equal percentage adjustment in bank dependence for similar-sized trade firms.

Table 19 IMPLIED REDUCTIONS IN LENDING FOR JAPANESE BANKS, ASSUMING U.S. BORROWING PATTERNS

Assumption for Manufacturing Firms	*Assumption for Target of Small Trade Firms*	*Assumption for Target Level in Other Industries*	*Implied Decrease in Lending*	*Fraction of Total Lending to Small Firms*
Simple convergence	Based on U.S. manufacturing	Full convergence	41.5%	70.6%
		Half convergence	29.8%	67.4%
	Based on current Japanese patterns	Full convergence	52.4%	63.8%
		Half convergence	37.5%	63.4%
Industry-adjusted convergence	Based on U.S. manufacturing	Full convergence	41.6%	71.3%
		Half convergence	29.9%	68.0%
	Based on current Japanese patterns	Full convergence	52.5%	64.7%
		Half convergence	37.5%	64.1%

Calculations assume that Japanese firms' borrowing patterns move towards U.S. levels. Benchmarks for the United States are taken from QFR for the 2nd quarter of 1998. For categories where the QFR data are not sufficient, the assumptions shown in columns 2 and 3 are used. These assumptions are described fully in the text and briefly in Table 18.

steady-state customer mix of the Japanese banks. The various scenarios all imply that small firms will account for between 62% and 72% of bank borrowing. These ranges seem to be plausible, and since this ratio was calculated endogenously, we find this to be a reassuring check on the methodology and our assumptions.

The other three conclusions concern which of the different assumptions appear to be quantitatively important. The different treatment for manufacturing firms does not appear to matter much. Holding constant our other assumption about the nonmanufacturing firms, the decision to

take account of interindustry variation in manufacturing borrowing patterns only changes the implied level of borrowing by about 0.1%. The implied percentages of aggregate borrowing by small firms also do not move very much across these two assumptions.

In contrast, the other two assumptions make a big difference. These two assumptions interact, since the target levels assumed for the small trade firms also help determine the target level of borrowing by small firms in the other category. Whether or not the "other" firms adjust all the way or just halfway accounts for at least an 11-percentage-point difference in the total projected level of borrowing. Similarly, the two alternatives for the target levels of borrowing by small trade firms lead to an estimated difference of at least 7-percentage points. As predicted, the benchmark based on the patterns in U.S. manufacturing produces smaller declines. Overall, the large size of these effects suggests that further work to narrow the uncertainty over which assumptions to rely upon is needed.

5.3 PLAUSIBILITY CHECKS FOR THE IMPLIED SHRINKAGE IN THE JAPANESE BANKING SECTOR

Given the large magnitudes of the projected decline in lending, one would like to see if there are other implications of this forecast that can be verified or alternative assumptions might overturn the prediction. We briefly describe three plausibility checks that we have conducted.

Our first test is to see whether the sectoral implications for drops in loan demand are credible. Implicit in all the estimates shown in Table 19 is the assumption that firms in the trade sector fully converge to the levels of bank dependence in the United States. Given the sizable existing gaps between large firms' bank dependence in the two countries documented in Tables 4 and 6, this is a fairly strong assumption. Indeed, one might also question whether it is prudent to forecast that bank dependence among small manufacturing firms will converge.

To address these concerns we conducted another set of simulations that presume far less convergence than is built into our baseline scenario. In these simulations, we maintained that only large manufacturing firms would fully converge to the same level of bank dependence. For all the remaining firms, Japanese firms were posited to move halfway towards the level of bank dependence that is observed in the United States. We view these assumptions as being extremely conservative, and yet they still imply reductions in the bank-debt-to-asset ratio between 22% and 29% (depending on which of the various assumptions are used to pin down the target levels for the small trade and other firms).

From Table 17 one can see why a reduction of at least 20% seems inevitable. The key observation is that the 1998 borrowing patterns in Japan do not involve much bank credit going to large trade firms. So varying their bank dependence does not have much aggregate effect. But about 42% of total bank lending is going to small firms in retail trade and other industries which have very high bank-debt-to-asset ratios. Even modest adjustments by these firms, combined with a continued decline in bank borrowing by the numerous large manufacturing firms, will generate a large decline in the bank-debt-to-asset ratio.

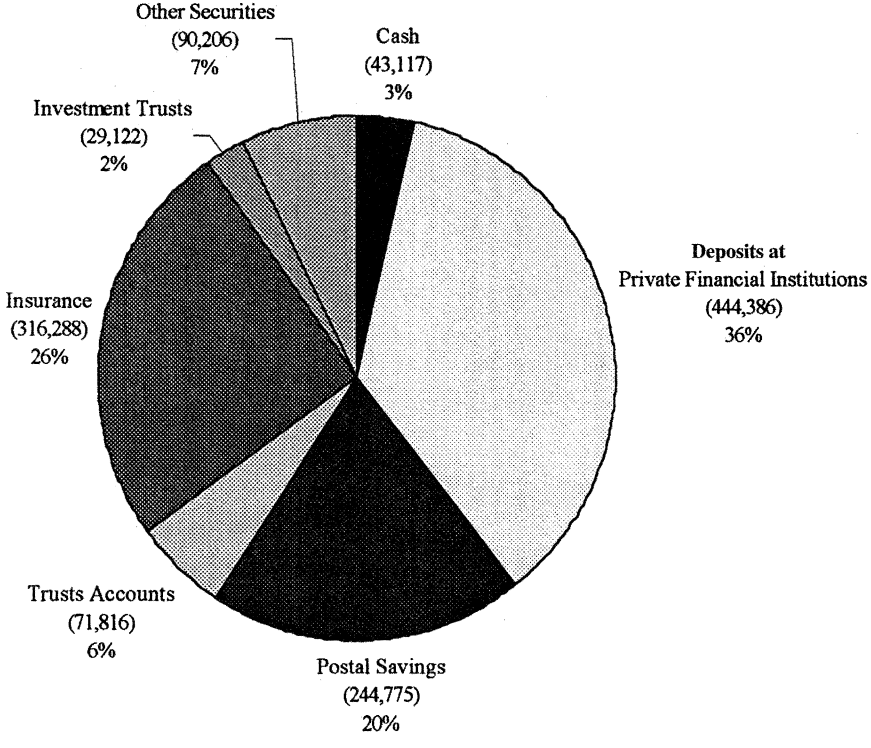
A second plausibility check involves exploring what our forecast will imply for depositors. The evidence in Section 3 suggested that in the past Japanese individuals have not abandoned the banks. One obvious question is whether our medium-term forecast implies incredible shifts in the behavior of depositors.

Figure 9 shows how (as of June, 1998) Japanese households allocated their ¥1,200 trillion of financial assets. As we pointed out in Table 9, the Japanese households historically have heavily relied on deposits. Figure 9 indicates that currently 59% of household financial assets are in cash and deposits (including postal savings). A 30% rate of shrinkage for bank loans translates into ¥133 trillion reduction (using 1998 2nd-quarter data from *Quarterly Report of Incorporated Enterprise Statistics*). If we consider an extreme case, then deposits at these institutions also must fall by 30%. This would reduce the total amount of cash and deposits (including postal savings) by 18%, and its proportion in total financial wealth would fall to 48%. In the deposit-to-GDP ratio we would also expect a decline of 18%, which would reduce the ratio to 1.69.

Looking at Table 9, we note that a deposit-to-GDP ratio of 1.69 would still be higher than what is found in any of the other industrialized countries shown in the table. The prediction that the proportion of cash and deposits in the household financial assets will decline to 48% is also plausible—this would still leave Japan with more deposits relative to wealth than other G7 countries. Similarly, the Japan Economic Research Center (JERC) (1997) forecast that the proportion of cash and deposits in household financial assets will decline to 45% by 2010 and to 35% by 2020.

Their forecast is premised on a massive shift of household assets from deposits to investment trusts, which they see growing from their current level of 2.3% to 9.1% by 2010 and to 20% by 2020. In our scenario, if we assume all the decline in household deposits is matched by an increase in investment trusts, then we would expect the share of investment trusts to increase to 13%. Thus, our scenario also implies a huge boom for investment trusts.

Figure 9 JUNE 1998 DISTRIBUTION OF HOUSEHOLDS' SAVINGS ACROSS DIFFERENT INSTRUMENTS
Total wealth is ¥1,239,710 billion. (Category totals in billions of yen are shown in parentheses.)



Source: Flow-of-funds accounts.

There are many other analysts who forecast similar gains for investment trusts. For instance, Naito (1999) argues that because of a 1998 change in regulation, investment trusts are the most appealing financial product for households. The 1998 change allowed "company-based" investment trusts, which are closer to U.S. mutual funds than are "contract-based" investment trusts, which have existed in Japan throughout the post-war period. Perhaps more importantly, the change allowed banks and insurance companies to sell investment trusts at their counters starting in December 1998. According to the Nihon Keizai Shinbum (November 12, 1999), the amount of investment trusts purchased through banks and insurance companies through October 1999 was already ¥2.4 trillion. The total amount of investment trusts out-

standing also had increased to ¥53 trillion. Given these considerations, we do not find the implications of forecasts for bank deposits to be implausible.

Finally, we ask whether there are any methods one might use to estimate the future size of the banking sector that do not rely on assumptions about loan demand. Moody's (1999) offers a prediction based on profitability. It argues that a reasonable benchmark is to assume that Japanese banks will need to have the same ratio of tangible equity to assets as is found in other countries.[42] They estimate that as of March 1999 Japanese banks have a tangible-equity-to-asset ratio of 4.2%, while large U.S. banks have a ratio of around 6.5%. Assuming that equity issuance is not possible, this leads Moody's to forecast a reduction of over ¥100 trillion in risk-weighted assets to reach the U.S. level.[43] As they note, in the short run this can be done partially by securitizing loans. But ultimately this seems like another way to arrive at the conclusion that a large contraction in the sector is needed.

An alternative prediction is available from a long-term forecast published by the Japan Economic Research Center (1997). The JERC forecasts the levels of financial assets and liabilities for each sector identified by Bank of Japan flow-of-funds statistics. Although they do not reveal detailed assumptions behind their forecasts, some of their predictions are based on assumptions very similar to ours. For instance, they assume the Japanese corporate financing patterns will move toward the U.S. model. Looking at their forecasts for the market values of financial assets and liabilities, we find that their prediction implies that the bank-debt-to-asset ratio for the corporate sector will decline from 0.4461 in 1995 to 0.2395 by 2020. Since they use the market values, the numbers are not directly comparable to our numbers, but the magnitude of the decline in the bank-debt ratio (46% in 25 years) is as large as what our analysis implies.

Because they assume rather high rate of growth in assets (3.3% per year for 25 years), they forecast the level of bank loans to rise from ¥555 trillion in 1995 to ¥675 trillion in 2020 (0.76% growth per year). Assuming a more reasonable growth rate for assets, their prediction would imply a reduction in the absolute level of loans. For example, if the assets grew only at 1.5% per year, then bank loans would be projected to decline to ¥432 trillion by 2020, a 22% drop.

42. The ratio they consider is Tier 1 capital (as defined by the Basle banking accord) minus state capital minus preferred securities, divided by risk-weighted assets (see Moody's, 1999, p. 24 for details).

43. Loans are roughly ¥450 trillion, so if the reduction were made entirely by cutting loans, this would imply a 22.2% decline.

6. *Conclusions*

We have argued that the disequilibrium created by the gradual and lopsided deregulation in the Japanese financial system played an important role in the current banking crisis. The deregulation allowed large bank customers to quickly shift from bank financing to capital-market funding. Meanwhile, the deregulation did relatively little for savers, so banks continued to attract deposits. However, the deregulation of bank powers also was slow and gradual. This meant that if the banks were to keep lending they would need to seek out new customers. The banks did take on many new small customers. They also expanded their real estate lending. Ultimately these bets proved to be unprofitable.

In support of this story, we present a variety of evidence. One finding is that the banks' performance was worse in the 1990s than would be predicted just on the basis of macroeconomic conditions. Similarly, across banks, we find that the banks that were most at risk for losing customers to the capital markets performed worse than others. Both these results suggest the importance of the deregulation. We also document that large Japanese firms (particularly in manufacturing) are now almost as independent of bank financing as comparable U.S. firms.

We argue that once the Big Bang financial deregulation is complete, even the relatively small firms will start following the route already taken by the large firms by cutting their dependence on bank loans. By assuming other firms' financing patterns will also converge to the U.S. patterns, we calculated how much the Japanese banking sector must shrink in the steady state. Uniformly, the scenarios that we examined imply a massive contraction in the size of the traditional banking business in Japan.

While there are many reasons why one might quibble with the details of the calculations in Table 19, we think they at least provide a reasonable benchmark. To overturn the basic thrust of the calculations, one must argue that the basic U.S. benchmark is inappropriate. We believe we have made a compelling case that for the large firms the benchmark is reasonable. For the small firms, we concede that there is much more guesswork involved. But, even if we take our most conservative scenario where full convergence in bank dependence is only assumed for large manufacturing firms and all remaining firms move halfway toward the U.S. levels, we still end up projecting more than a 20% decline in loan demand. This forecast is comparable to the one Moody's (1999) arrived at by making quite different assumptions.

What would a 20% decline imply for the configuration of the banking sector? There are many possible ways that this could shake out. However,

given the current debate over how much public money should be used to prop up the banks, one natural question to ask is how many weak banks would have to completely exit to eliminate the excess capacity in the industry. To pursue this, we took the ranking of 142 Japanese banks as of September 1998, put forward in the March 1999 issue of *Kin'yu Business*, and calculated the share of loans for each bank.[44] This allows us to examine how many banks must exit so that the cumulative shrinkage in loans is sufficient to bring the system to its new steady state.

We find that a 20% reduction in lending requires a complete exit of the lowest-rated 45 banks of a total of 142 banks. These include Long-Term Credit Bank (LTCB) and Nippon Credit Bank (NCB), which were nationalized in late 1998, and the regional banks that were put into receivership in the first half of 1999. Perhaps more importantly, this set of 45 banks would include 3 of the 15 major banks (Daiwa, Tokai, and Chuo Trust) that received a government capital injection in March 1999. If we consider a 30% shrinkage, which is closer to the average of the Table 19 estimates, the number of weak banks that would have to be eliminated jumps to 69, including three more (Yokohama, Asahi, and Toyo Trust) of the 15 banks which received government money. Even if the relatively healthy banks can somehow be convinced to cut back on some of their lending, it is hard to escape the conclusion that any transition looks like it will involve the exit of a number of major banks.

Because any assessment of banks' health is somewhat subjective, we also looked at the Moody's Investor Service (1999) rankings. They estimate the "financial strength" of 51 Japanese banks. Their ratings range from B (Shizuoka Bank) to E (10 banks including LTCB and NCB). Moody's assessment differs from the *Kin'yu Business* ranking in that it focuses on solvency and looks at not only obligations of the parent but also those of supported subsidiaries. Nonetheless, the *Kin'yu Business* ranking and Moody's rating identify very similar sets of weak banks. For

44. They rank ordinary banks (city banks and regional banks) and trust banks separately by looking at size (measured by the average amount of funds), profitability (measured by business-profits-to-asset ratio and interest margin), efficiency (measured by expense ratio and interest income per employee), and solvency (measured by capital ratio, nonperforming-loan ratio, provision ratio for nonperforming loans, and market-to-book ratio of securities holdings). In order to combine two separate rankings, we reranked city banks, trust banks, and a long-term credit bank (Industrial Bank of Japan) using eight of the nine indicators used by *Kin'yu Business*. The last indicator (market-to-book ratio of securities holdings) was not easily available. We established the rankings of trust banks and IBJ in the list of ordinary banks by comparing them with city banks included in the list. For example, we rank Sumitomo Trust after DKB (ranked 12 in *Kin'yu Business*) and before Fuji (ranked 28), since Sumitomo Trust is located more or less between DKB and Fuji according to the indicators we are looking at. Finally, we added the two banks that were nationalized in late 1998, Long-Term Credit Bank of Japan and Nippon Credit Bank, at the bottom of the ranking.

example, 10 of the 45 lowest-ranked banks in *Kin'yu Business* are rated by Moody's, and of those 8 have the lowest rating (E) and the other 2 are the next lowest rating (E+), Among *Kin'yu Business*'s 69 worst banks, 15 are rated by Moody's, and of those 9 have E and the other 6 have E+. Thus, the weakest banks in the *Kin'yu Business* ranking are also rated very low by Moody's.

Given this overlap, it is therefore not surprising that if we base our exit forecasts on the Moody's data we get a very similar picture. If we assume that 10 banks with E ratings will disappear, their cumulative loans amount to 11.5% of total loans in the banking sector. Three of 15 banks (Daiwa, Chuo Trust, and Mitsui Trust) that have received capital injections are included in this group. If all the banks with E ratings and E+ ratings were to exit, their cumulative loans would be 49% of total loans, suggesting a much bigger contraction than we expect. However, included in the set of E and E+ banks are 13 of the 15 banks that received government money, so it still seems like a nontrivial fraction of these banks may be redundant.

How long will it take for such a shift in the Japanese banking to be completed? The speed of adjustment will primarily depend on three factors: how fast corporations adjust their financing, how fast households shift their funds out of bank deposits, and how fast the banking industry is reorganized. The previous experience suggests that the adjustment by corporate borrowers will be fairly quick. Although the restrictions on corporate financing options were only gradually loosened, many firms adjusted quickly and most completed their adjustments in less than 10 years. The deregulation of the remaining restrictions on corporate financing will be rapid. Thus, we expect the adjustment on the corporate finance side to be complete well within 10 years.

How fast will the households move? Because the most significant elements of the liberalization of savers' options have started only very recently, this question is much harder to answer. As we saw above, the dependence on deposits by Japanese households starts from such a high level that even a modest change towards the patterns observed in other OECD economies would be sufficient to support our forecast. We believe that a modest shift can take place in ten years, but there is a considerable amount of uncertainty in this conjecture.

Finally, the shrinkage of bank loans will imply a substantial exit in the banking industry unless Japanese banks shift away from traditional banking business very aggressively. The speed of such a reorganization obviously depends on the government's policy stance toward bank failures. As we saw in Section 4, the Japanese government seems finally to have begun addressing the bad-loan problem. The next step

will require more closures of insolvent banks. If the current tough stance of the FSA and the FRC continues, the days of the convoy system of rescues will be over.

Nevertheless, once the restructuring begins in earnest, we imagine that it will take several years for the doomed banks to exit. Importantly, the mergers among the largest banks in the fall of 1999 are not the kind of restructuring we have in mind, unless contrary to the initial descriptions of these alliances, they facilitate reductions in assets that would not otherwise be possible. Combinations of organizations that do not promote downsizing are likely to be counterproductive. A particularly salient benchmark is Hokkaido Takushoku which, although it has been dead for more than two years, still has most of its assets in the banking system. Our forecasts require that the assets of a failed institution be disposed of, not merely moved into other banks. The Hokkaido Takushoku experience suggests that the reorganization could take years, although we see no reason to expect it to take more than a decade. Thus, overall, we expect the transition to the new steady state to be fairly complete by the end of the next decade.

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Comment

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Takeo Hoshi and Anil Kashyap have given an insightful and comprehensive account of the Japanese banking problem, and offer us a picture of an industry likely to be in continuous turmoil over the next decade or so as banking is downsized in favor of open financial markets. The authors make several important points. First, Japanese banks are under severe competitive pressure, mainly due to unbalanced financial regulation allowing large firms to go to open markets but not allowing banks to compete effectively. Second, the asset price bubble and subsequent recession are neither the only, nor perhaps the primary, reasons for banking distress in Japan. Third, the Big Bang in Japan will eventually lead the structure of Japanese finance to converge to the U.S. norm. Fourth, convergence to the U.S. norm implies that the demand for loans by Japanese firms will decline dramatically over the next decade or so, indicating a *huge* contraction in the Japanese banking sector.

I agree with most of the points made in the paper and believe the authors do an admirable job in supporting their arguments. It should be a key reference work for everyone interested in Japanese banking and finance. In my comments, I focus on two points: (1) the role of the asset price collapse and subsequent recession in explaining the banking problem in Japan, and (2) the extent to which bank-loan demand determines the size of the banking sector.

1. Banking Problems: Long-Run Decline in Competitiveness or Asset Price Collapse and Recession?

The question of what caused the banking problem is reviewed in the paper. An important part of the story is that banks have been under severe competitive pressure and have changed their principal business operations due to shifts in the flows of funds and unbalanced deregulation of the financial services industry. The response of borrowers is that large firms, but not small firms, have reduced their dependence on bank lending, at least up to 1990 (before the Big Bang). Savers in Japan, on the other hand, continue to be highly dependent on bank deposits as a major investment vehicle. Why have they stayed in low-interest deposits? The authors argue that the poor service of investment trusts and the slow introduction of new products are the major reasons. The upshot is that banks at present continue to have a large deposit base but have lost

their primary function in financing large firms' investment projects. How have they utilized the funds? By pursuing other forms of lending outside their traditional customer base, such as real estate, private finance, and other relatively high-risk lending activities.

A major point of the paper is that long-run competitive pressure is an important factor in the decline in the return on assets (ROA) in the banking sector and in large part responsible for the banking crisis in Japan. The authors' view is that the present crisis and consolidation in the industry should be seen in the context of a longer-term trend towards contraction in the industry. Another explanation, perhaps complementary, would be that macroeconomic developments (viz., a lengthy and deep recession) and idiosyncratic temporary factors (viz., the asset price collapse) are primarily responsible for the banking crisis in Japan in the 1990s. The empirical section of the paper is important in that it provides evidence for the authors' contention that low ROA in the banking sector has a significant long-run trend component, and is likely to result in a large-scale contraction of the banking sector.

The authors present time-series evidence on this point. They estimate an equation with macroeconomic variables prior to the period of deregulation (1983 is the date the authors argue that deregulation of the bond market began in earnest) to see what helps explain the secular decline in the accounting rates of return. Data on the accounting rate of return (after-tax net income divided by total assets) reported by the firms are employed after adjusting for the sales (gains and losses) or revaluation of securities. Banks have generally tried to smooth their reported returns, however, using flexible accounting practices to push returns higher during bad times and lower in good times. Since bad times (good times) generally correspond with regressions (upturns), it is perhaps not surprising that cyclical fluctuations in the macroeconomic variables do not generally enter the regressions significantly. The smoothing of the ROA data can't hide the secular trend decline, however, and perhaps this is why the most significant explanatory variables in the regressions are the time trend and the lagged dependent variable.

The cross-section evidence is stronger. The idea is to see if banks that were more dependent on large firms or interest income *before* deregulation would be particularly hard hit, in terms of lower ROAs, during the period following deregulation. The maintained hypotheses are that banks (1) that lend to large firms (firms that were more able to take advantage of deregulation and find alternative forms of financing in domestic bond markets abroad), or (2) that are more concentrated in traditional lending operations (that would come under increasing competition with deregulation) would show particularly large declines in ROAs. The authors find

fairly strong evidence of this effect on the decline in ROA in the 1990s, supporting their argument that the loss of traditional markets was an important contributing factor to the banking crisis.

2. *Size of the Banking Contraction*

Even accepting that deregulation and other forces are exerting long-term competitive pressures on banks, essentially forcing a contraction in the entire industry, the eventual steady-state size of the industry is still uncertain. The authors attempt to quantify the projected contraction of the Japanese banking sector by using the U.S. case as a benchmark model. The basic idea is that a falloff in loan demand by Japanese firms, bringing them more in line with firms in the U.S., will reduce the size of banks. Banking customers are anticipated to leave banks in favor of direct finance, with the decline in loan demand driving a reduction in the size of the banking sector. Making a number of simplifying assumptions, and given the constraints imposed by limited U.S. data, the authors consider several alternative scenarios about how large the reduction in bank loans might be over the *medium term*, as the Big Bang facilitates the development of more open and deeper financial markets. All of these scenarios indicate a large reduction in loan demand and contraction in the Japanese banking sector ranging from about 30% to over 50%.

These medium-term projections seem plausible, but there are a number of uncertainties and caveats surrounding the scenarios. The paper is really about declining loan demand and not about the size of the banking sector. There is an implicit assumption that Japanese banks will not be nimble enough to reinvent themselves in new lines of business—even, the authors argue, if they are able to keep the high share of deposits that they currently enjoy. This seems to be borne out by recent experience indicating that Japanese financial institutions continue to dominate the low-margin traditional areas such as retail banking, corporate lending, and straight corporate bond issuance. Foreign firms, by contrast, are rapidly growing in asset management and other areas that have higher margins.

The authors conjecture, however, that the Japanese banks that end up being sold to foreign financial institutions (with more expertise in new financial services and more capital) may be able to effectively pick up new lines of business while they shed loans. The issue appears to boil down to who owns the banks and, if the controlling interests are Japanese, whether they can marshal the capital and expertise to compete in new financial services. The decline in traditional banking business—where low margins have contributed to the current bank problem—need

not signal the end of the prominent position of banks in Japan or a contraction of the banking industry. And the powers that banks have to enter investment banking, securities business, and insurance will be virtually complete by the year 2001. There is already a scramble in Japan to form new alliances and tie-ups to take advantage of these opportunities. The authors document over 60 tie-ups and mergers in the Japanese financial services industry announced in 1998 and early 1999. Banks, flush with funds from their huge deposit base, would seemingly have some advantage in entering these new markets. The prospect of a form of universal banking along Swiss and German lines may be real.

The 1980s was a dynamic period for Japanese banks, especially on the international front. Japanese banks grew rapidly, eventually topping the list of the world's largest banks, and Tokyo because a leading international financial center. The 1990s has been a decade of contraction, consolidation, and pessimism for the industry. The Big Bang has changed the playing field for Japanese finance in the new millennium, however, and some Japanese banks appear to be in a good position to take advantage of new opportunities. A 30–50% decline in loan demand need *not* translate into an equally gloomy projection of banking-sector decline, but clearly signals a new form of banking in Japan.

Comment

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This paper provides a thoughtful and exhaustive analysis of the banking problems that have plagued the Japanese economy over the last decade. It is a useful reference for anyone interested in the issue.

Two basic premises motivate the analysis.

The first is that the weak financial health of the banking system is a central factor underlying the prolonged stagnation of the Japanese economy. Over the past decade, heavy loan losses have seriously depleted the capital base of Japanese banks. Loan losses have amounted to about 7% of GDP, as compared to the roughly 2% experienced during the banking crisis in the United States. This extraordinary contraction of bank capital, in turn, has impeded the ability of banks to lend: Adequate capital helps banks both to guarantee their uninsured liabilities (thus allowing them to attract loanable funds) and also to meet regulatory minimum requirements on the ratio of capital to assets. If capital is insufficient, bank lending may be constrained. Bernanke and Lown

(1991) provide evidence that this kind of phenomenon played an important role in the 1990–1991 recession in the United States. In the present context, Woo (1998) has shown that depletion of bank capital was a significant factor in the 1997 recession in Japan.

The second underlying premise, which follows from the first, is that recapitalization of the banking system is critical to the recovery in Japan. This problem of how to recapitalize is complex, however. Due to informational problems and the like, it is expensive for banks to recapitalize simply by floating new equity issues. Retained earnings are the usual method by which banks rebuild capital, but this can be a long, drawn-out process. Typically, in situations like the one now prevailing in Japan, some kind of public intervention involving taxpayer funds is necessary. An expectation of public bailouts, however, may create adverse incentives for excessive risktaking.

The absence of a straightforward solution to the problem has prompted a heated debate in the Japanese Diet over the path of recapitalization. It is this debate that provides the paper's explicit point of departure. On the one hand, the Liberal Democratic Party (LDP) favors directly injecting public funds to prop up the existing system. On the other, the Democratic Party favors nationalizing and restructuring the system in a way that would likely involve a downsizing. As of this writing, a compromise approach has been adopted, with some tilt toward the LDP position.

The authors observe that the debate reflects fundamentally differing views of the future of the Japanese banking system. They interpret the LDP position as reflecting the belief that the postcrisis banking system will look a lot like the precrisis one, implying the need for large capital replenishment. The Democrats, they argue, envision a smaller system, implying less need for public injections of bank capital. Given this interpretation of the debate, the authors focus their analysis on providing a rough estimate of the future scale of the Japanese banking system, in order to get a sense of what the future capital needs may really be.

I agree that the kind of exercise the authors perform is central to resolving the issue. There is, however, another important dimension to the debate: namely, differing views on the incentive effects of public subsidies. At issue is not only how much capital is needed, but also what is the best mechanism by which to undertake the recapitalization. In this vein, I interpret the LDP position as being that injections of public funds will relax capital constraints and thereby stimulate bank credit extension and economic activity, with minimal bad side effects on risktaking incentives. On the other hand, the Democratic Party perceives the incentives for excessive risktaking as being a first-order problem, with the channeling of funds into risky, negative-present-value projects being the likely

outcome of a bailout. In particular, in the Democratic view, for banks well below minimum capital standards, incremental injections of public funds are not likely to deter excessive risktaking, especially in the absence of fundamental reforms of the supervision and regulatory system.

Though it is not the focus of the paper's analysis, the issue of the incentive effects of the restructuring is central to the question at hand and at least as important as the matter of how much capital is needed. For both questions, the U.S. experience with banking problems is instructive.

The first question is: why such a mess? The answer: as before, but worse. As in the case of the United States, we can trace the beginning of the story in Japan to a major deregulation of financial markets that occurred in the late 1970s and early 1980s. To be clear, the problems did not simply evolve from deregulation, which in principle is a good thing. Rather, they evolved from the failure of the authorities to adjust the supervision and regulatory system adequately in light of the new environment. In particular, the opening up of capital markets and the emergence of nonbank intermediaries afforded by the deregulation led to greatly increased competition for commercial banks. Banks, as a consequence, lost high-quality borrowers. They responded by moving into riskier ventures, such as commercial real estate finance. The problem was that the implicit lender-of-last-resort protection of banking remained unaltered. As with the United States, this unadjusted protection served to encourage excessive risktaking in the face of increased competitive pressures.

But why was the Japanese debacle so much worse than what occurred in the United States? Here the authors provide a convincing answer: relative to the United States, capital markets before deregulation in Japan were far more heavily distorted in favor of banks. The authors make a convincing case that the powerful Japanese megabanks were the product less of greater efficiency than of basic regulatory distortions, in regard to both the financial instruments available to savers and the sources of funds available to borrowers. Everything else equal, accordingly, it is only natural that deregulation brought more additional competition for Japanese banks than for their U.S. counterparts.

Another important factor, I believe, involved regulatory forbearance, i.e., lax supervision. Here the problem was very much like the U.S. savings-and-loan crisis, where failure to enforce capital requirements led to sustained high-stakes gambling by zombie-like financial institutions. The scale of this type of behavior was simply much larger in Japan. Why? First, it is likely that the strong performance of the Japanese economy until the early 1990s masked the heavy underlying risk exposure in the banking system. The United States had the (perverse) luxury of the

S&L crisis to provide a wake-up call to regulators in the mid-1980s, who as a consequence were better positioned to address the subsequent problems in commercial banking. In Japan, in contrast, everything hit at once, beginning in 1993. The failure to anticipate the crisis, in conjunction with a weak overall system of supervision and regulation, is thus an important aspect of the crisis.

What role did macroeconomic factors play? I agree with the interpretation that the authors give in the revised version of the paper: Poorly planned deregulation raised the exposure of the banking system to macroeconomic shocks, such as the decline in asset prices and the overall poor performance of the economy. Further, given that Japanese banks hold equity directly, it is hard to believe that the stock-market crash did not have an important impact on bank capital. In this vein, I am concerned that the authors' inability to find a significant role for macroeconomic factors in recent years may reflect measurement problems. Their measure of bank profitability, return on assets, is an accounting concept rather than a market-based one. But in the current draft the authors offer a careful qualification of their findings.

What will happen in the future? To what level will the Japanese banking system converge? Here the authors undertake what I regard as an eminently sensible exercise. They begin with the premise that, given that the legal regulatory structures in the two countries are now reasonably similar, the banks in Japan should converge to the point where they are providing roughly the same fraction of overall firm financing as their counterparts in the United States. Given this benchmark, they proceed with a calibration exercise to compute the future equilibrium level of bank assets in Japan. They forecast a decline of something between 20% and 50% in the size of the Japanese banking system, depending on the scenario.

In the spirit of calibration, no standard errors are to be found. But overall, I find the forecast to be reasonable. The only quibble I would have is that the authors only consider directly held, i.e., on-balance-sheet, assets. In the United States, commercial banks have gone heavily into off-balance-sheet activities, which include providing backup lines of credit, derivatives trading, and so on. These off-balance-sheet activities entail risk, and banks are required to hold capital in proportion to their credit equivalents (i.e., the measure of on-balance-sheet assets that would entail equivalent risk; see Boyd and Gertler, 1994). Thus, any attempt to measure bank capital needs, in my view, should include off-balance-sheet activity as well as traditional on-balance-sheet assets.

Again, the U.S. example is instructive. Measures based simply on on-balance-sheet assets suggest that U.S. commercial banks are steadily

declining in relative importance. I show in my work with John Boyd, however, that after allowing for off-balance-sheet activities, the reverse is in fact true: U.S. commercial banks have actually grown in relative importance. It is true that Japanese banks have been slow to move into these nontraditional lines of business. However, if the Japanese financial system evolves toward the U.S. system, as assumed here, then we should similarly expect to see a rise in off-balance-sheet business. Firms that issue open-market debt in the United States, for example, often secure this debt by obtaining backup lines of credit from commercial banks. We should also expect a similar reliance on backup credit lines at banks to support direct financing in Japan. I am not suggesting that allowing for nontraditional bank activities will reverse the authors' results, but I do think that it is important to do so in any debate over the future size of Japanese banking.

I conclude with one final message from the U.S. experience. The recovery of the U.S. banking system involved not only replenishment of capital, but also the adoption of a tougher supervision and regulatory system. In addition, macroeconomic policy, and monetary policy in particular, helped provide a stable climate for banks to operate. For Japan to succeed, it must follow the United States in these two important dimensions.

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Discussion

In his reply to the discussants, Anil Kashyap agreed that macroeconomic factors had probably played some role in the Japanese banking crisis. The authors' intention had not been to deny the role of macro factors, but to highlight the part played by deregulation, as well as the likely convergence of Japanese banking to U.S. norms. He noted that there was no fundamental disagreement between the authors and the discussants about the forecast of a large contraction in the Japanese banking sector. Kashyap conceded that it is possible, as Mark Gertler suggested,

that expansion of off-balance-sheet activities might mitigate the shrinkage, but he also pointed out data in the paper showing that fee income relative to total income for Japanese banks is the same now as it was in 1979, implying little growth in such activities. The policy implication of their work, Kashyap said, was that funds should not be injected into the banking system indiscriminately, since many banks are unlikely to survive in any case.

Michael Mussa said that prior to 1995 no bank among the largest twenty banks in Japan had reported an annual loss and that, more generally, the short-run accounting numbers are not to be believed. This poses obvious econometric difficulties when one tries to estimate the sensitivity of the rate of return on bank assets to macroeconomic disturbances; one will find coefficients that are much too low. Mussa also commented that one of the key issues is who will ultimately be stuck with the bill for the losses that are on the balance sheets of the banks now. If taxpayers foot the bill, banks will be more able to expand into other businesses, but if the banking industry as a whole bears much of the cost, their competitive disadvantage will be increased. Mussa concluded that if the Japanese banks are handed the bill, the authors' estimates of the ultimate size of Japanese banking system may turn out to be too high.

Hoshi responded to Mussa's comment by saying that transactions in "hidden assets" are the most popular method used by Japanese banks to smooth out returns. Banks sell these securities in the market, realize accounting capital gains, and then buy back the securities at market prices. Hoshi said that the authors plan to subtract capital gains from the current income of the banks to obtain what might be a more accurate measure of profits from operations. On Mussa's second point, Hoshi thought that Japan has been moving toward increasing the contribution of taxpayers and reducing that of banks.

John Fernald asked whether financial and banking reforms were of great consequence in Japan. The usual argument is that the financial system's health affects the allocation of capital, but Fernald cited Michael Gibson's work which emphasizes the importance of corporate governance. Gibson has argued that many features of the Japanese corporate governance system insulate managers from shareholder pressure to a much greater extent than in the United States. Absent reform in this dimension, banking reform may not improve the allocation of capital. Moreover, if Japanese corporate governance differs radically from the U.S. case, the argument for convergence of the two banking systems is less compelling. Fernald also raised the issue of how exactly the downsizing will occur: he felt that layoffs, shutdowns, and attempts to diversify into new businesses would all prove difficult.

Nouriel Roubini commented that the banking crisis in Japan resembles the banking crises in the rest of Asia. In particular, in both cases deregulation, liberalization of the capital account, poor regulatory supervision, and poorly designed deposit insurance on the banking side, as well as poor corporate governance, led to excessively risky lending to the real estate and manufacturing sectors. As the number of nonperforming loans grew, policymakers compounded their errors by turning a blind eye, leading to further risktaking on the part of both lenders and borrowers. In short, Roubini agreed with Fernald that banking-system reform is only half of the story; the other half is reform of corporate governance and corporate restructuring. Hoshi agreed that there are similarities between Japan and other East Asian cases. A difference, however, is that in Thailand and Korea bad loans made as part of cozy bank–firm relationships were partly responsible for the crisis, whereas in Japan the issue was not relationship banking but rather its collapse, which happened before the crisis. He argued that corporate governance (as it evolved under the keiretsu and main bank systems) might have been better in Japan before deregulation, so that deregulation worsened governance.

Martin Feldstein suggested that, while U.S. banks began to take up liability management when they understood that their good lending opportunities were shrinking, the Japanese banks didn't worry about such issues because of their confidence that the government would protect them. In short, the market had not been allowed to work in Japan. Feldstein asked why the Japanese government had deregulated in the first place and whether U.S. influence was important. Kashyap downplayed possible U.S. influence on the decision to deregulate, emphasizing instead the 1974 recession that led the Japanese government to run big deficits. To place the resulting bonds the government had to liberalize the bond market, and once that had been done, political pressure increased to liberalize other financial markets as well. Feldstein responded that in the early 1980s there had been attempts by the U.S. government to get the Japanese to Americanize their financial system, because some U.S. officials apparently thought that this would help to improve the bilateral trade balance.

Rick Mishkin suggested that not only deregulation but also changes in information technology have made it easier to use nonbank finance. He also cited the need for more sophisticated supervision with, in particular, an emphasis on overall risk management rather than on the quality of individual loans or the level of accounting capital. Similar problems are likely to be encountered in Europe to those in Japan, Mishkin said, as changing markets and deregulation proceed but supervision doesn't keep up. Kashyap said that in 1998, when the Financial Supervisory Agency

was formed in Japan, many people, including him, were pessimistic: The FSA had only 400 bank supervisors for all of Japan, and they were the same people who, as employees of the Ministry of Finance, had presided over the whole debacle in the first place. To Kashyap's surprise, however, the new FSA turned out to be vigilant, tough, and sophisticated. Michael Hutchison interjected that perhaps it should not be a surprise that institutional changes matter; in particular, having a separate FSA directly under the prime minister and with political support is a very different situation from what existed before. Hutchison added that after all the praise that had been heaped on the "Asian model," supposedly characterized by the close and willing cooperation of banks, government, and corporations, it was interesting to see how quickly many participants had left the system when the opportunity presented itself.

Ben Bernanke asked a question about the flow of funds. If the savers are still putting their money into deposits but suddenly the firms can go to the capital markets, where are the funds in the capital markets coming from? He suggested that retained earnings might be a major source of corporate financing, which if true suggests that the source of the decline in loan demand is not deregulation so much as a corporate sector that is increasingly self-financed. Julio Rotemberg added that, in light of Japan's large current-account surplus, somebody has to be acquiring claims on foreigners; perhaps this is being done through banks. Feldstein said that banks and insurance companies are large net purchasers of dollar-denominated bonds.

Bernanke said that, based on earlier work by the authors with David Scharfstein, he had the impression that close bank–firm relationships were beneficial in that they reduced information and incentive problems in lending. Yet when deregulation occurred, the big firms abandoned their bank relationships as quickly as they could. Why did that happen? Kashyap answered that the main bank system and the attendant regulation had benefits but also costs, such as reduced flexibility of financing options. Hoshi added that the benefits of relationship banking were relatively larger for small firms, so that when deregulation occurred large firms had the stronger incentive to leave their relationships.

Stephen Zeldes pointed out a common theme in this paper and Heaton and Lucas's paper in this volume, which is increased participation of consumers in financial markets. For example, as Japanese savers begin to hold diversified stock portfolios, perhaps Japanese stock prices will rise, as Heaton and Lucas argue happened in the United States. Higher stock prices would have the side benefit of helping the banks. Kashyap acknowledged the possibility, but reiterated the point that liberalization for savers has proceeded relatively slowly in Japan.