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Takeo Hoshi

Anil K. Kashyap

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Will the U.S. bank recapitalization succeed? Eight lessons from Japan ☆

Takeo Hoshi [a,b,c], Anil K Kashyap [b,d,e,*]

[a] School of International Relations and Pacific Studies, University of California, San Diego, 9500 Gilman Dr., La Jolla, CA 92093-0519, USA
[b] National Bureau of Economic Research, USA
[c] Tokyo Center for Economic Research, Japan
[d] Booth School of Business, University of Chicago, 5807 S. Woodlawn Ave. Chicago, IL 60637, USA
[e] Federal Reserve Bank of Chicago, USA

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ABSTRACT

During the financial crisis that started in 2007, the U.S. government has used a variety of tools to try to rehabilitate the U.S. banking industry. Many of those strategies were also used in Japan to combat its banking problems in the 1990s. There are also a surprising number of other similarities between the current U.S. crisis and the recent Japanese crisis. The Japanese policies were only partially successful in recapitalizing the banks until the economy finally started to recover in 2003. From these unsuccessful attempts, we derive eight lessons. In light of these eight lessons, we assess the policies the U.S. has pursued. The U.S. has ignored three of the lessons and it is too early to evaluate the U.S. policies with respect to four of the others. So far, the U.S. has avoided Japan's problem of having impaired banks prop up zombie firms.

1. Introduction

The U.S. government has taken a schizophrenic policy approach to the ongoing credit crisis that began in August 2007. For the first year of crisis, there were no significant legislative changes. Instead, the existing toolkit was stretched to combat problems as they appeared. By October 2008, in the midst of the panic that ensued after the failure of Lehman Brothers, the Treasury went to Congress proposing the idea of purchasing troubled assets to stabilize the financial system. Thus, the Troubled Asset Relief Program (TARP) became the central part of the Emergency Economic Stabilization Act. But within a week of passing the legislation, attention shifted to buying equity in financial institutions. Subsequently, the Capital Purchase Program (CPP) within the TARP was unveiled and within weeks $145 billion was allocated to nine major banks. Asset purchases were delayed.

By November, one of the recipients of the CPP, Citigroup, had received a second round of government

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* Corresponding author at: Booth School of Business, University of Chicago, 5807 S. Woodlawn Ave. Chicago, IL 60637, USA.
E-mail addresses: thoshi@ucsd.edu (T. Hoshi), anil.kashyap@chicagobooth.edu (A.K. Kashyap).

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assistance and in January 2009, Bank of America also was given additional government support. The Obama administration, upon assuming office, changed course again and called for a set of "stress tests" to determine the capital adequacy of major banks, and a new program for asset purchases was unveiled. Upon conclusion of the stress tests, banks were given target levels of capital that they were required to achieve. Some banks that initially received capital assistance were allowed to repay the government, while others began selling assets and issuing equity to meet the terms of the tests. The asset purchase programs through the middle of 2009 remained a minor component of the actual policies that were undertaken.

For anyone familiar with the Japanese financial crisis from a decade ago, these events would seem familiar.[1] Almost all of the policy options deployed in the U.S. were attempted in Japan. Because the Japanese episode is now complete, it seems useful to look at how the programs in Japan fared. The goal of this paper is to assemble the evidence on these programs, offer an assessment of their effectiveness, and reflect on the U.S. policy choices in light of the Japanese experience.

In retrospect, there were in fact three phases of the Japanese saga. The first part is from the early 1990s until November of 1997 when asset prices crashed and Japan's slow growth period began. The first set of government interventions in the financial system occurred during this period. But we argue that the most important lasting effect was from the political dynamics that developed over this period.

The second phase in Japan was from November of 1997 to March of 1999. We show that there were many very close parallels between this period in Japan and the developments in the U.S. from 2008 through mid-2009. This part of the Japanese slowdown was associated with exceptionally tight credit and a sharp growth contraction. In the three quarters after the failure of Lehman Brothers, U.S. growth also slowed abruptly and credit conditions tightened. Thus, the parallels between the two episodes relate to both the policy choices and the macroeconomic environment.

The third phase of the Japanese crisis, from 1999 through 2003, saw a resumption of lending. But the lending was misdirected and the economy underperformed. The lending problems during this period were no longer tied to the initial asset price declines that were important in the first phase of the crisis. Instead, they were a product of changes in lending that came in part from the policies adopted in phase two.

To be sure, the shocks hitting the Japanese and U.S. economies were not identical. There are some similarities that we identify, but there are some important differences too. Nonetheless, we identify eight lessons that emerge from Japan's many policies and use these lessons to inform discussions about the risks associated with various U.S. policies.

Overall, this paper makes three contributions. First, it provides a concise summary of the Japanese experience. While there are numerous studies of the Japanese financial crisis, we are not aware of any retrospectives looking across the whole 20 years of Japan's problems and focusing on the policy responses. Second, we provide new analysis of the main Japanese interventions that sheds light on the variation in success. This leads to the eight key lessons that we see from Japan for other countries. Third, we offer a brief comparison of the different U.S. policies through the lens of Japanese experience. A contemporaneous assessment is bound to be incomplete, and perhaps once all the events have concluded, may prove to be of limited use. But, at the very least, documenting things that were knowable when choices were being made should be useful for future accounts.

We start with a more detailed description on the three phases of the Japanese crisis in Section 2. Section 3 analyzes the success and failure of the various Japanese programs, so as to deliver some lessons for other countries. Section 4 reviews the U.S. policy responses in light of the lessons from Japan. Section 5 concludes.

2. Japan's crisis

Given an ever expanding set of surveys of the financial crisis in the U.S., we do not describe it here.[2] While there are also many discussions of the Japanese financial crisis, we are unaware of any that describe the whole episode with the goal of drawing out the salient aspects that are relevant for the U.S. crisis.[3] We also depart from past reviews of Japan's crisis by separating it into three phases.

2.1. Phase one: 1991–1997

After the collapse of asset prices in the early 1990s, the financial institutions that first got into trouble were the *jusen*, which were originally created as niche housing loan companies in the 1970s but moved more into high risk real estate lending in the 1980s.[4] After a couple of failed rescue attempts by the Ministry of Finance (MOF), the *jusen* were eventually liquidated in 1996.

The size of the *jusen* problem was substantially smaller than the non-performing loan problem of banks that would subsequently emerge. The MOF repeatedly orchestrated *jusen* rescues (mainly by founder banks), but the

[1] Udell (2009) points out further similarities in the evolution of the governments' responses in Japan and the US He summarizes by saying, "More generally, as new events unfolded in Japan, regulators…had to use a combination of existing tools, new tools that stretched the regulatory limits of existing institutions, and go to the legislature for new authority and funding. We witnessed the same combination in the evolution of the response of U.S. authorities."

[2] The working paper version of this paper (Hoshi and Kashyap, 2009) contains a brief discussion on the U.S. financial crisis to lay a common background to the policy evaluation. A detailed list of prominent events in the United Sates is available at http://timeline.stlouisfed.org/ and http://www.ny.frb.org/research/global_economy/Crisis_Timeline.pdf. For a lengthy discussion and analysis of the crisis, including global aspects, see Bank for International Settlements (2009).

[3] Contemporaneous descriptions and analysis of the Japanese banking crisis can be found in Cargill, Hutchison, and Ito (2000), Hoshi and Kashyap (2001, Chapter 8), and Nakaso (2001).

[4] Hoshi and Kashyap (2009) provide much more additional detail on their troubles and the government's policies towards them.

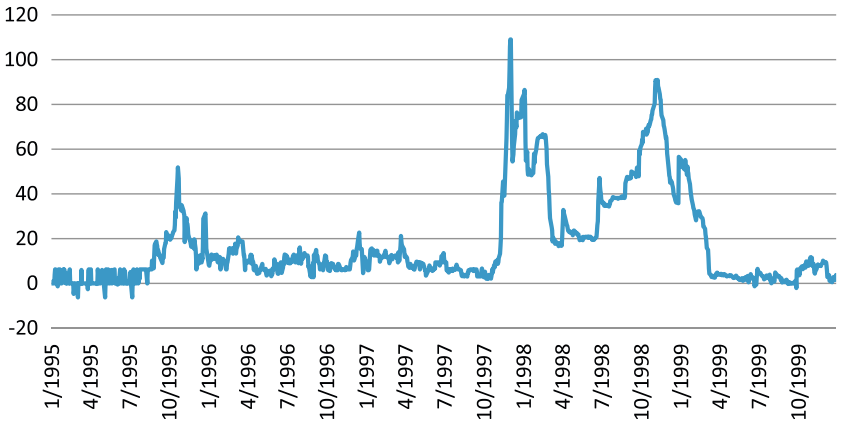

Fig. 1. Difference in inter-bank borrowing costs for Japanese and non-Japanese banks, 1995–1999. The figure shows the Japan premium calculated as the difference between 3-month Eurodollar Tokyo Interbank Borrowing Rate (TIBOR) and the 3-month Eurodollar London Interbank Borrowing Rate (LIBOR). We thank Kimie Harada and Takatoshi Ito for providing the data for the figure. Eurodollar TIBOR is calculated by QUICK (a Japanese data provider) as the average interbank rate of the middle nine of 13 reference banks (the highest two and the lowest two banks are excluded). The 13 banks include two non-Japanese banks, but their rates were almost always excluded as the two lowest, effectively making TIBOR the average rate for Japanese banks. Eurodollar LIBOR is calculated by the British Bankers Association as the average interbank rate of the middle eight of 16 reference banks. Three Japanese banks are included in the 16 reference banks, but their rates were almost always excluded as three of the four highest rates, effectively making LIBOR the average rate for non-Japanese banks. See Ito and Harada (2005). The units are basis points.

restructuring plans were often based on overly optimistic forecasts. Eventually, despite repeated promises that no taxpayer assistance would be needed, the government had to ask taxpayers to share the losses. Although the amount of public funds used was tiny (¥0.68 trillion), the public outrage over repudiation of the promise meant that passing the legislation was contentious and the opposition harnessed this anger to nearly cripple the government (Milhaupt and Miller, 2000). The legacy of this experience was long lasting because it made the government very reluctant to ask for the much larger sums that would be needed once the troubles of the commercial banks became evident.

In the same Diet legislative session as the one that passed the law to liquidate *jusen* companies, the Deposit Insurance Act was revised to allow the Deposit Insurance Corporation (DIC) to offer financial assistance that exceeded the cost of paying off insured depositors (up to ¥10 million per depositor). Thus, by 1996 Japan had a de facto policy of guaranteeing all deposits.

2.2. The acute phase: 1997–1999

The acute phase of the crisis began when a midsized securities firm, Sanyo Securities, declared bankruptcy in early November 1997. This resulted in Japan's first interbank loan default. Two weeks later a major bank, Hokkaido Tokushoku, lost the ability to borrow in the interbank market and was forced to declare bankruptcy. This was the first major bank failure in postwar Japan. A week later one of the four major securities dealers, Yamaichi Securities, failed after rumors (subsequently shown to be true) that it had accumulated massive off balance sheet losses. Finally, before the month ended, Tokuyo City Bank, a regional bank, also failed.

Fig. 1 shows the Japan premium calculated as the difference between the 3-month Eurodollar Tokyo Interbank Borrowing Rate (TIBOR) and the 3-month Eurodollar London Interbank Borrowing Rate (LIBOR).[5] Relative borrowing cost for the Japanese banks jumped immediately on the news of Sanyo's demise (November 3, 1997).

In December 1997, the government decided that public funds would be needed to deal with the financial crisis. While the discussion of how to use the public funds was underway, the government approved a pair of accounting changes that were designed to allow the banks to make their public financial statements look better than was truly warranted. These rules allowed the banks to use either market or book values for the banks' holdings of stocks in other firms and for the banks' real estate holdings.

Virtually all the banks' real estate assets were on their books at the historical acquisition prices (typically decades old), so even though land prices were well below peak values, a switch to market values instantly raised the value of the banks' assets. Conversely, the banks were harvesting capital gains on their stock holdings in order to report positive earnings. By early 1998, the banks had about ¥24 trillion of stockholdings on their books. Typically, upon selling the shares to collect the capital gains, the banks would quickly buy back the shares to

[5] We thank Kimie Harada and Takatoshi Ito for providing the data for the figure. Eurodollar TIBOR is calculated by QUICK (a Japanese data provider) as the average interbank rate of the middle nine of 13 reference banks (the highest two and the lowest two banks are excluded). The 13 banks include two non-Japanese banks, but their rates were almost always excluded as the two lowest, making TIBOR effectively the average rate for Japanese banks. Eurodollar LIBOR is calculated by the British Bankers Association as the average interbank rate of the middle eight of 16 reference banks. Three Japanese banks are included in the 16 reference banks, but their rates were almost always excluded as three of the four highest rates, making LIBOR effectively the average rate for non-Japanese banks. See Ito and Harada (2005).

retain the relationships with their clients. By 1998, the market price for many of the shares that had been sold and repurchased was below the book value for these shares. Hence, the banks could further inflate the value of the assets by recording the value of the shareholdings at book value.

On February 16, 1998, the Diet passed the Financial Function Stabilization Act, which allowed the government to use ¥30 trillion of public funds (¥17 trillion for protecting depositors of failed banks and ¥13 trillion for bank recapitalization). The government used ¥1.8 trillion out of the ¥13 trillion to recapitalize major banks in March of 1998, but it was unsuccessful in stabilizing the situation. Public dissatisfaction with the government's response continued to build through the spring and in June, the Liberal Democratic Party (LDP), the dominant partner in the ruling coalition, lost 17 of its 61 seats in the Upper House election. The Hashimoto government resigned and a new government led by Keizo Obuchi assumed power.

The new government immediately began formulating further plans for dealing with the banking problems. By October, another major bank, Long-Term Credit Bank of Japan (LTCB), was on the brink of failure. The legislature at that point reached agreement on two pieces of compromise legislation (between the government and the leading opposition party) to deal with both insolvent institutions, which was the focus of the opposition, and to help solvent, but undercapitalized banks, which was the LDP's concern.[6] In October, LTCB was nationalized using the new framework. In December, Nippon Credit Bank, NCB, was nationalized.

The second major recapitalization of the banks using mostly preferred share purchases by the government was undertaken in March 1999. From Fig. 1, we can see that the Japan premium declined after this injection. At that time, some observers thought this would prove to be a turning point in the Japanese crisis.

One noteworthy aspect of this entire period was the divergence between the government's characterization of the condition of the banking industry and that of outsiders. For example, in the August 1998 International Monetary Fund (IMF) Article 4 consultation, the IMF's executive directors were very frank in calling for much more aggressive action by the government:

> Rigorous enforcement of the self-assessment framework is needed so that banks recognize and provision against the full extent of bad loans. Several Directors suggested that these results be published for individual banks to increase transparency.

In contrast, on February 2, 1999 as the second capital injection was being debated, Eisuke Sakakibara, the Vice Minister of Finance, declared that the banking crisis would be over within 2 weeks. By the end of the month the U.S. Deputy Treasury Secretary, Lawrence Summers, gave a speech asserting that even with the capital infusion anticipated by Sakakibara, the Japanese banks remained significantly undercapitalized.

2.3. Phase three: 1999–2003

The 1999 recapitalization calmed the financial markets. The Japan premium disappeared quickly and the credit started to flow (Peek and Rosengren, 2001). The market appeared to believe that either the Japanese banks were now well-capitalized or that the government would not permit the failure of the remaining banks. However, the problem of non-performing loans persisted and the capital shortage soon re-emerged. Kashyap (2002) reports, for example, estimates from six private-sector bank analysts on the health of the banking system showing that each analyst estimated that the system was insolvent as of August 2002. So the capital shortage was universally acknowledged by all parties except the government.

To give a rough benchmark of the size of the problems, Table 1 shows data from Fukao (2008) on the condition of capital in the banks. At the end of March 2002, for example, Japanese banks collectively had ¥30.2 trillion of core capital (equity capital and capital reserves) to buffer the risks associated with assets of ¥756.1 trillion, meaning that stated capital was equal to 4.0% of the assets. However, ¥10.6 trillion of core capital was in the form of deferred tax assets, which are tax deductions coming from past loan losses that the banks would be able to claim in the future if they became profitable. If the banks did not regain their profitability within 5 years, these tax credits disappear. Skinner (2008) reports some evidence suggesting that the Japanese government and banks were both complicit in using the deferred tax assets to improve the appearance of the banks and postpone any restructuring.

In addition to relying on questionable tax credits to boost capital, the banks provisioning practices were problematic. Fukao (2003) estimated the amount of under-reserving, which should really be written off from the current capital. This deficit represents a failure to set aside "adequate" reserves. To calculate adequate reserves, the amount of classified bad loans is multiplied by one minus the expected recovery rate for each class of loans, which is estimated using the data from the 1990s. This leads to two potential biases. On the one hand, because the recovery rate from bad loans improved after the late 1990s, this procedure is likely to overestimate the level of adequate reserves (and hence, under-reserving) during the 2000s. On the other hand, because many outside observers believed that the banks were consistently overstating the quality of their loans, the estimates for the level of adequate reserves would have been too low. As of March 2002, Fuako concludes that the reserves were ¥6.8 trillion too low.

To give a rough sense of the capital deficit, we subtract the deferred tax assets and under-reserving from the official capital to arrive at what we call "modified capital." As of March 2002, modified capital was just ¥12.8 trillion, of which ¥7.2 trillion had been contributed by the

[6] The Financial Revitalization Act set up the framework to restructure failing systemically important banks through nationalization, and the Prompt Recapitalization Act allowed the government to inject capital into healthy banks. See Fukao (2000) for more details on these laws.

Table 1
Capital in the Japanese Banking System.

Core capital, sometimes referred to as Tier I capital, includes equity capital, capital reserves, and other items. The units are trillion yen. Deferred tax assets are credits against future taxes that are counted in core capital. As described in the text, Estimated Under-reserving is the difference between adequate reserves for losses estimated by Fukao and actual loan loss reserves. Fukao estimates the adequate reserves as the sum of 100% of Category IV (uncollectible) loans, 70% of Category III (doubtful) loans, 20% of Category II (special attention) loans, and 1% of Category I (normal) loans. Capital held by the government is the value of equity owned by the government. Bank assets are total assets. Modified capital and the Capital gap are computed as indicated. Fukao also estimates that prior to 2001, there were substantial unrealized portfolio gains that could have been available as capital. The after-tax amounts he reports from 1996 to 2000 are 12.8, 6.7, 3.1, 2.6, and 6.1 trillion yen, respectively. Assets and core capital are from the Bank of Japan for all domestically licensed banks. Deferred tax and under-reserving estimates are from Fukao (2008) based on "Analysis of Bank Financial Statements," various issues, and securities reports for individual banks.

Date	Official core capital A	Deferred tax assets B	Estimated under-reserving C	Modified capital D≡A-B-C	Capital held by the government E	Bank assets F	Capital gap G≡0.03*F-D
Mar-96	27.9	0.0	NA	27.9	0.0	846.5	−2.5
Mar-97	28.5	0.0	15.0	13.5	0.0	856.0	12.2
Mar-98	24.3	0.0	4.9	19.4	0.3	848.0	6.0
Mar-99	33.7	8.4	4.0	21.3	6.3	759.7	1.5
Mar-00	35.6	8.2	5.8	21.6	6.9	737.2	0.5
Mar-01	37.6	7.1	7.5	23.0	7.1	804.3	1.1
Mar-02	30.2	10.6	6.8	12.8	7.2	756.1	9.9
Mar-03	24.8	10.6	5.4	8.8	7.3	746.3	13.6
Mar-04	29.0	7.2	5.7	16.1	8.9	746.7	6.3
Mar-05	31.4	5.7	6.9	18.8	8.1	745.9	3.6
Mar-06	37.3	2.3	8.3	26.7	5.2	766.9	−3.7
Mar-07	40.0	1.3	9.4	29.4	3.5	761.1	−6.5
Mar-08	34.8	3.6	10.2	21.0	3.1	780.7	2.4

government, so the Japanese banking sector had hardly any private capital.

As a point of reference, we can compare the modified capital to the capital that the banks would have if they had equity equal to 3% of assets. We call the difference between modified capital and this lower bound the capital gap. As shown in the last column of Table 1, this gap was consistently positive between 1997 and 2005. The gap declined after the 1999 recapitalization, suggesting the policy had a favorable impact, but grew again soon afterwards.

The nature of the non-performing loans seems to have changed during this period. Up to the acute phase of the crisis, the non-performing loans were most closely tied to real estate related lending. Using panel regression analysis, both Ueda (2000) and Hoshi (2001) found that the more a bank had exposure to the real estate industry, the higher was its non-performing loan ratio. From 2000 onward, problems associated with small and medium enterprise lending became important. The government required the banks that received public capital to increase lending to these businesses. This forced lending to poorly performing firms seems to have led to a new set of non-performing loans.

Table 2 reports a cross-sectional regression analysis of non-performing loan ratios of Japanese banks. The specification of regressions is very similar to those in Ueda (2000) and Hoshi (2001): the ratio of the reported amount of non-performing loans to total loans is regressed on the proportion of loans to the real estate developers and the proportion of loans to small and medium enterprises. Dummy variables to distinguish five types of banks (city banks, long-term credit banks, trust banks, Tier I regional banks, and Tier II regional banks) are also included in the regression, although we do not report the coefficient estimates on those dummies. To conserve degrees of freedom, we allowed for only a single lag of the past loan percentages to affect bad loans, but we experimented with different lag lengths. So each column header in the table describes a different regression specification. For example, "lag 1" means that the non-performing loan ratio of this year is regressed on the proportions of real estate loans and small and medium enterprise loans in the last year.

Each cell shows the coefficient estimates on the proportion of loans to the real estate developers and the proportion of loans to the small and medium enterprises with their standard error estimates in parentheses.[7] From 1997 to 2000, we see that the coefficient estimate on the proportion of loans to the real estate developers is statistically significant, but that on the proportion of loans to the small and medium enterprises is not significant. Starting in 2001, the small and medium enterprise loans become the more important determinant of the overall non-performing loans ratio with real estate loans often losing their statistical significance. This is especially clear for 2004 and 2005: the small and medium enterprise loan ratio is highly significant and the real estate loan ratio is not. The results do not appear too sensitive to the assumed lag length in the specification.

Though simple, our regression analysis suggests the nature of the non-performing loan problem in Japan shifted in the early 2000s. The problem ceased to be tied

[7] Due to mergers and failures, the number of observations for the different regressions declines over the sample period from 142 at the beginning to 111 at the end. The *R*-squared ranges from 0.102 to 0.574.

Table 2
Changes in the determinants of non-performing loans over time.

The dependent variable is the amount of non-performing loans divided by total assets. The columns labeled "Lag" show different regression specifications. In each case, one independent variable is the ratio of real estate loans divided by total assets and another is small and medium enterprise (SME) loans divided by total assets. The independent variables are lagged by the number of years indicated at the top of the column. Separate regressions are estimated for each year (specified by row). Each regression also includes the constant term and four bank-type dummies (long-term credit bank, trust bank, Tier I regional bank, or Tier II regional bank). Due to mergers and failures, the number of observations for the different regressions declines over the sample period from 142 at the beginning to 111 at the end. The *R*-squared ranges from 0.102 and 0.574. The numbers in parentheses are standard errors, corrected for potential heteroskedasticity.

Year	Independent variable	Lag 1	Lag 2	Lag 3	Lag 4
1997	Real estate loan	.221	.215	.225	.242
		(0.058)	(0.045)	(0.041)	(0.045)
	SME loan	0.040	0.057	0.036	0.037
		(0.025)	(0.024)	(0.017)	(0.022)
1998	Real estate loan	.348	.359	.317	.312
		(0.083)	(0.081)	(0.063)	(0.065)
	SME loan	0.038	0.028	0.053	0.027
		(0.026)	(0.027)	(0.020)	(0.021)
1999	Real estate loan	.653	.687	.687	.684
		(.174)	(.176)	(.171)	(.165)
	SME loan	−0.021	−0.036	−0.049	−0.051
		(0.041)	(0.047)	(0.050)	(0.053)
2000	Real estate loan	1.534	10.042	1.136	1.132
		(.573)	(.537)	(.549)	(.553)
	SME loan	−0.082	−0.010	−0.025	−0.029
		(.114)	(.102)	(.106)	(.108)
2001	Real estate loan	.430	.374	.330	.388
		(.164)	(.240)	(.220)	(.233)
	SME loan	.201	0.067	0.083	0.075
		(0.083)	(0.035)	(0.036)	(0.041)
2002	Real estate loan	.242	.308	.307	.213
		(0.079)	(.108)	(.103)	(0.069)
	SME loan	.111	0.081	0.054	0.062
		(0.024)	(0.026)	(0.045)	(0.032)
2003	Real estate loan	0.141	0.148	0.172	0.134
		(0.056)	(0.060)	(0.061)	(0.059)
	SME loan	0.108	0.090	0.086	0.083
		(0.018)	(0.019)	(0.020)	(0.019)
2004	Real estate loan	0.009	0.038	0.032	0.045
		(0.044)	(0.046)	(0.049)	(0.048)
	SME loan	0.101	0.107	0.103	0.097
		(0.014)	(0.016)	(0.017)	(0.017)
2005	Real estate loan	0.006	−0.015	−0.024	−0.039
		(0.054)	(0.052)	(0.054)	(0.054)
	SME loan	0.066	0.075	0.085	0.085
		(0.017)	(0.015)	(0.017)	(0.018)

to the collapse of land prices in the early 1990s and instead became more dependent on the exposure of small and medium enterprises. That lending to the latter set of borrowers was explicitly encouraged as a condition of receiving public capital suggests that the conditionality did not seem to have helped the banks.

In September 2002, the new minister in charge of the Financial Services Agency (FSA), Heizo Takenaka, finally started to address the non-performing loans problem seriously. Within a month of his appointment, Takenaka announced the Financial Revival Program (*Kin'yū Saisei Program*) that called for (1) more rigorous evaluation of bank assets, (2) increasing bank capital, and (3) strengthening governance for recapitalized banks (Omura, Mizukami, and Kawaguchi, 2006, p. 4).

The FSA followed the "Takenaka Plan" and became tougher in its audits of the banks. In the early part of 2003, this pressure led many of the largest banks to issue shares (typically through private placements) to improve their capital ratios. Resona Bank's capital ratio for March 2003 fell below 4% after it was not allowed to count 5 years worth of tax deferred assets as capital. The FSA used the Deposit Insurance Act (Section 102-1) and injected capital into Resona Bank.

In August 2003, the FSA also issued business improvement orders to 15 recapitalized banks and financial groups, including five major ones (Mizuho, UFJ, Mitsui Sumitomo, Mitsui Trust, and Sumitomo Trust) for failing to meet their profit goals for March 2003. They were required to file business improvement plans and report their progress each quarter to the FSA.

UFJ Holdings was found to have failed to comply with its revised plan in March 2004 and received another business improvement order. The chief executive officers (CEOs) of UFJ Holdings, UFJ Bank, and UFJ Trust were forced to resign, and the salaries for the new top management were suspended. The dividend payments (including those on preferred shares) were stopped. Salaries for the other directors were cut by

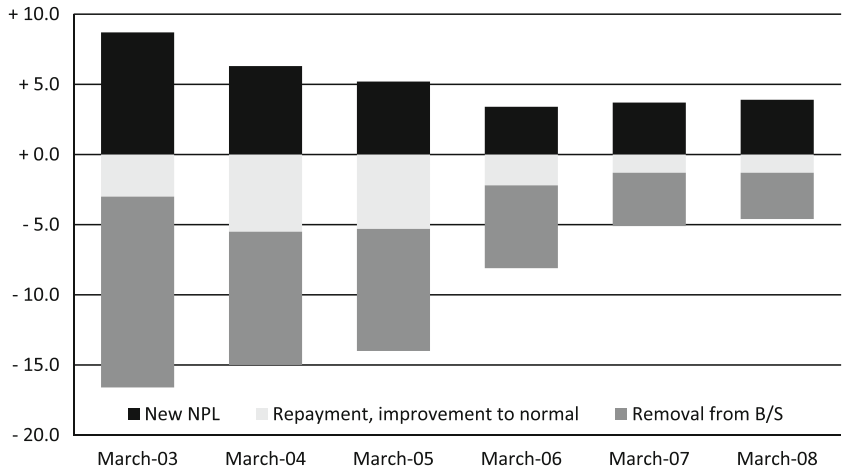

Fig. 2. Changes in non-performing loans. The figure shows the amount of change in non-performing loans broken into three factors for each fiscal year from 2002 (ending in March 2003) to 2007 (ending in March 2008). "New NPL" is the non-performing loans that were recognized for the first time during the fiscal year. "Repayment, improvement to normal" is the amount of loans that were classified non-performing at the end of the previous fiscal year, but collected or moved to normal loan category during the fiscal year. "Removal from B/S" is the amount of loans that were classified as non-performing at the end of the previous fiscal year, but removed from the balance sheet (through charge-offs or sales) during the fiscal year. The units are ¥ trillion. The data come from Table 2 (breakdown of factors affecting changes in NPLs of All banks based on the FRA) of a press release by the Financial Services Agency ("FSA publishes the status of banks' non-performing loans as of end-March 2009") on August 7, 2009. The English translation of the press release can be found on http://www.fsa.go.jp/en/regulated/npl/20090807.html.

50%, their bonuses had already been suspended, and the retirement contributions for the management were also suspended. The number of regular employees was reduced and their bonuses were cut by 80%.[8]

There was also a shift in the government's policy regarding distressed borrowers. The Industrial Revitalization Corporation of Japan (IRCJ) was created in April 2003 as the government institution to buy non-performing loans from non-main banks and work with the main banks to reorganize the poorly performing customers to restore their health. The Resolution and Collection Corporation (RCC), a government asset management company that already existed, also shifted their activities to put much more emphasis on reorganizing troubled borrowers. Fig. 2 shows that the origination of new non-performing loans (shown in the top half of the graph) began to slow from 2003 onwards. Perhaps more importantly, from 2003 to 2005, a substantial number of bad loans were removed from the banks' balance sheets, suggesting the powerful effect of government's increased emphasis on reorganizing troubled borrowers.

Following Takenaka's reform, the Japanese banks finally started to rebuild their capital.[9] From March of 2003 to March of 2007, the banks' official capital grew by ¥15 trillion. There were two big sources of gains. The first was improved operating performance that led to higher retained earnings. This is consistent with the improved loan loss performance indicated in Fig. 2. The second major contributor was capital gains on the stock portfolio.

The operating performance improved sharply in 2006 and 2007. The profitability in the prior 2 years was unremarkable. This is particularly interesting because gross domestic product (GDP) growth was respectable from 2003 onwards. So there was a lag between the macroeconomic improvement and the performance of the banks. Looking more closely at the income and expense data shows that 2006 was the time when the banks were able to substantially raise revenue and cut costs.

The second, hardly surprising, observation is that the capital gains tracked the movements in aggregate stock prices. The Nikkei 225 average showed two big jumps during this period, one between March 2003 and March 2004 and then a second between March 2005 and March 2006. Combining these two observations suggests that in Japan, the performance of the aggregate economy was paramount in the recovery of bank capital.

Finally, we would be remiss if we did not note that the main cost of allowing the banks to operate with a capital shortage was not a prolonged credit crunch. Rather the undercapitalization limited the banks willingness to recognize losses and they took extraordinary steps to cover up their condition and in doing so, retarded growth in Japan (Caballero, Hoshi, and Kashyap, 2008; Peek and Rosengren, 2005).[10] More specifically, the slowdown in productivity that extended the slump was concentrated in the parts of the economy where zombie firms were most prominently being supported by weak banks.

[8] UFJ Holdings, 2004, *Keiei no Kenzenka no tame no Keikaku no Gaiyo* (*Management Revitalization Plan: Abstract*). (http://www.fsa.go.jp/kenzenka/k_h160924/ufj_a.pdf).

[9] The exact year-by-year data for the statements in the next two paragraphs are shown in Hoshi and Kashyap (2009), Tables 3 and 4.

[10] See Peek (2008) for a survey of the evidence on the behavior of the banks in the 1980s and 1990s. He also presents new analysis showing that bank assistance to distressed firms during the 1990s was different (and less effective) than the aid in the 1980s.

Table 3
Asset management companies in Japan.
Target purchases describe the set of assets and set of institutions permitted to sell the assets to the asset management companies. The amount spent includes the undiscounted total amounts spent by the asset management company, along with the original value of the purchased assets where available. The amount collected is the total amount realized over time from asset sales and loan collection. The units are in trillion yen.

Name	Dates (purchases)	Target purchases	Actual amount spent [book value]	Amount collected	Comments
Cooperative Credit Purchasing Co.	12/1992–3/2001	Non-performing loans with land collateral of contributing banks	5.8 [15.4]	NA	Bank financed, created tax benefits by buying loans; liquidated in 3/2004
Tokyo Kyodo Bank	1/1995–4/1999	Initially assets of failed credit unions, later assets of any failed banks	4.718 [NA]	5.362	Reorganized as Resolution and Collection Bank (RCB) in 9/1996
Housing Loan and Administration Corp. (HLAC)	7/1996–4/1999	Loans of failed *jusen* (specialty housing loan companies)	4.656 [NA]	3.233	Financed with mix of public and private money
Resolution and Collection Corp.	4/1999–6/2005	Combined RCB and HLAC, mandate extended to allow purchases of assets from solvent banks	0.356 [4.046]	0.649	Starting in 2001 also reorganized loans, ultimately involved in restructuring 577 borrowers
Industrial Revitalization Corp. of Japan	5/2003–3/2005	Buy non-performing loans through 2005, restructure them within 3 years	0.53 [0.97]	NA [0.094 surplus as of 5/2007]	Restructured 41 borrowers with 4 trillion total debt; closed in 5/2007

3. Japan's policy responses

We continue by examining the major responses by the Japanese government to the financial crisis and deriving some general lessons. We group the policy responses into four categories: (1) asset management companies, (2) recapitalization programs, (3) resolution mechanisms of failed banks introduced by the Financial Revitalization Act of 1998, and (4) the Takenaka Plan of 2002. After reviewing the various programs, we offer our conclusions about the strengths and weaknesses of the different options.

3.1. Asset management companies

Assessing the asset purchase plans is complicated because this was done in a piecemeal fashion over more than a decade. The full list of entities spawned during the crisis is presented in Table 3.

The first asset management company (AMC) in Japan was the Cooperative Credit Purchasing Company (CCPC) established in December 1992. The CCPC, described best by Packer (2000), was a private entity. The government was not involved because of the vigorous public resistance to proposals to use taxpayer funds to rescue banks. Failing to get direct government help, the private-sector banks then created the CCPC, presumably with encouragement from the government.

The CCPC used funds loaned by the founding banks to buy bad loans. The loan sales to the CCPC generated tax benefits for the banks because upon the transfer to the CCPC, the selling banks could recognize losses immediately that reduced their taxes. The CCPC was also supposed to collect on or sell the purchased loans, but this process was extremely slow. In the first 5 years, the CCPC sold only a third of the loans it bought. Its loan disposal became somewhat faster after 1998. The CCPC was liquidated in 2004. Over the 12 years of its existence, the CCPC bought the bad loans of only ¥15.4 trillion in face value and ¥5.8 trillion in appraised value.

A second asset management company, Tokyo Kyodo Bank, was set up in January 1995 using a combination of government and private funds. The Bank of Japan financed more than 90% of its capital. The rest of the capital came from private-sector banks. Tokyo Kyodo was originally formed to manage the assets held by two failed credit unions in Tokyo, Tokyo Kyowa Credit Union and Anzen Credit Union. Later, Tokyo Kyodo absorbed assets of other failed credit unions and was renamed the Resolution and Collection Bank (RCB).

A third asset management company, the Housing Loan and Administration Corporation (HLAC), was established in 1996 to manage loans of failed *jusen* that were taken over by the government and wound down in 1996. The HLAC was financed by both private banks and public funds. Both the RCB and HLAC dealt with assets of failed institutions and did not buy loans from supposedly solvent banks. Because the regulators were not able to put banks into receivership until the passage of the Financial Revitalization Act in 1998, the scope and effectiveness of these entities was necessarily limited.

The RCB and the HLAC were merged to create the Resolution and Collection Corporation (RCC) in 1999. This new institution was allowed to buy bad loans from solvent banks (though solvent banks were not compelled to sell anything) and was charged with managing the assets of failed financial institutions. From 1999 until when the RCC stopped buying assets in June 2005, the RCC spent a mere ¥353 billion to purchase 858 loans with a face value of ¥4.0 trillion from solvent banks.

Starting in 2001, the RCC also started to reorganize the borrowers behind the non-performing loans. From 2001 to 2008, the RCC restructured 127 borrowers. The RCC also participated in the reorganization of 450 borrowers in

Table 4
Capital injection programs in Japan.

Securities used describe the types of securities obtained by the government in exchange for the capital it contributed. Number of financial institutions reports the total number of institutions that actually sold securities to the government in the program. The outstanding balance shows the number of participating institutions with securities that were still outstanding as of July 2009. Amount injected is the total amount spent by the government. Amount sold is the total proceeds collected by selling the securities owned by the government through July 2009. The units are in trillion yen. The data come from Deposit Insurance Corporation of Japan (DIC). http://www.dic.go.jp/english/e_katsudou/e_katsudou3.html.

Legislation	Date of injection	Securities used	Number of financial institutions (# with nonzero outstanding balance)	Amount injected	Amount sold or collected to date (as of July 2009)
Financial Function Stabilization Act	3/1998	Preferred shares, subordinated debt	21 (2)	1.816	1.653 [1.626 (book)]
Prompt Recapitalization Act	3/1999–3/2002	Preferred shares, subordinated debt	32 (10)	8.605	8.820 [7.817 (book)]
Financial Reorganization Promotion Act	9/2003	Subordinated debt	1 (0)	0.006	0.006 [0.006 (book)]
Deposit Insurance Act (Article 102-1)	6/2003	Common shares, preferred shares	1 (1)	1.960	0.111 [0.035 (book)]
Act for strengthening financial functions	11/2006–3/2009	Preferred shares	5 (5)	0.162	0.000

its role as a major creditor. In total (for these 577 borrowers), ¥6.2 trillion of debt was restructured.

The RCC also started selling and collecting the loans aggressively. From March 2001 to March 2008, the amount of loans on the RCC balance sheet declined by ¥4.7 trillion (from ¥5.8 trillion to ¥1.1 trillion).[11] Most of those loans were sold at prices above the RCC acquisition prices: from 2001 to 2008, the total revenue from disposing of these loans amounted to ¥6.2 trillion.

The final AMC, the Industrial Revitalization Corporation of Japan (IRCJ), was established in 2003 with the purpose of restructuring the bad loans they purchased and turning around the borrowers. The IRCJ was set up as a joint stock company almost exclusively owned by the Deposit Insurance Corporation and its debt was guaranteed by the government. The IRCJ had 2 years to buy non-performing loans and an additional 3 years to finish restructuring them. IRCJ bought and successfully restructured non-performing loans for 41 borrowers of the total face value of ¥4.0 trillion, which included several notable companies like Daiei and Kanebo, and finished all the restructuring by April 2007, 1 year earlier than the initial deadline.

3.2. Bank capital injections in Japan

To attack the undercapitalization more directly, the Japanese government eventually opted for a series of public recapitalization programs. A list of the programs is shown in Table 4.

As mentioned previously, the Financial Function Stabilization Act made ¥13 trillion of government money available to buy subordinated debt (or preferred shares in a few cases) in undercapitalized, but supposedly solvent banks. Subordinated debt can be counted as a part of regulatory capital (as long as it does not exceed Tier I capital) and would give the purchasing bank a buffer to absorb losses without having to default on promises to depositors.

This program was initially shunned by the banks, but after some cajoling by the government, each of the major banks applied for almost an identical amount of public funds. Table 5, Panel A, compiled from the data on the Deposit Insurance Corporation web site (http://www.dic.go.jp/english/e_katsudou/e_katsudou3-2.pdf), shows the amount and type of public funds each bank received. Eight of nine received ¥100 billion in the form of subordinated debt or loans, although the interest rate on subordinated debt was different, presumably reflecting the perceived health of the institution. The other one (Dai-ichi Kangyo) received almost the same amount (¥99 billion) in return for preferred shares which included an option to convert them into common shares. The focal amount of ¥100 billion was set at the level that the healthiest bank, Bank of Tokyo Mitsubishi, was willing to ask for, so for most of the banks, the amount was far less than they needed to restore their capital. In total, only ¥1.8 trillion was distributed to 21 banks in the spring of 1998.

Nippon Credit Bank (NCB) and Long-Term Credit Bank of Japan (LTCB), the two banks that would fail later in the year, each received funding under this program in the form of preferred shares. For both banks, the government also acquired the option to convert the preferred shares into common shares starting on October 1, 1998. The conversion period was 9.5 years for the LTCB and 19.5 years for the NCB. Thus, the NCB, which was then considered to be the weaker of the two, was subject to a longer threat of (partial) government takeover. NCB also applied for a ¥230 billion subordinated loan, but the loan was not approved (*Kin'yu Business*, May 1998, p. 8). Ultimately the preferred shares of these two banks were converted into common shares when each was nationalized (October 28, 1998 for LTCB and December 17, 1998 for NCB).

The second recapitalization, briefly mentioned earlier, took place on the heels of these failures in the spring of

[11] The accounting figures are from the RCC Web site: http://www.kaisyukikou.co.jp.

Table 5
Details of government capital injections.

S&P Rating shows the rating of the bank's long-term debt given by Standard & Poor's as of March 1998 in Panel A and March 1999 in Panel B. We thank Kaoru Hosono for sharing the rating data. Total funds show the total amount of public capital injected into each bank. The units are in billion yen. If preferred shares were used for injection, the type of preferred shares (convertible or not), the amount purchased, the dividend rate, the date when the government can start converting preferred shares into common shares (if convertible), and the date after which the government has to convert the preferred shares into common shares (if convertible), are shown under the columns beneath the heading Preferred shares. In Panel A, if subordinated debt or a subordinated loan was used, the type of subordinated debt (bond or loan and maturity), the amount purchased, the interest rate for the first 5 years, and the interest rate after the first 5 years, are shown under the columns beneath the heading Subordinated debt/loans. In Panel B, if subordinated debt or a subordinated loan was used, the type of subordinated debt (bond or loan and maturity), the amount purchased, the interest rate before the step-up date, the interest rate after the step-up date, and the step-up date, are shown under the columns beneath the heading Subordinated debt/loans. For both panels, we use the following shorthand notations. L: 6-month yen LIBOR, CPS: Convertible preferred shares, SDP: Perpetual subordinated debt, SLP: Perpetual subordinated loan, SD(n): (n)-year Subordinated debt. For example, SD10 denotes 10-year subordinated debt.

Panel A: *March 1998 capital injection terms*

			Preferred shares					Subordinated debt/loans			
	S&P rating	Total funds	Type	Amount	Dividend rate	Conversion start date	Forced conversion date	Type	Amount	Yield for 5 years	Yield after 6th year
City banks:											
Dai-ichi Kangyo	BBB+	99	CPS	99	0.75	7/1/1998	8/1/2005				
Fuji	BBB+	100						SDP	100	L+1.10	L+2.60
Sakura	BBB	100						SDP	100	L+1.20	L+2.70
Sanwa	A-	100						SD10	100	L+0.55	L+1.25
Sumitomo	A-	100						SDP	100	L+0.90	L+2.40
Tokyo Mitsubishi	A	100						SDP	100	L+0.90	L+2.40
Asahi	BBB+	100						SLP	100	L+1.00	L+2.50
Daiwa	BBB-	100						SLP	100	L+2.70	L+2.70
Tokai	BBB+	100						SDP	100	L+0.90	L+2.40
Long-term credit banks:											
Industrial Bank of Japan	A-	100						SD10	100	L+0.55	L+1.25
LTCB of Japan	BBB-	177.6	CPS	130	1.00	10/1/1998	4/1/2008	SLP	46.6	L+2.45	L+3.95
Nippon Credit Bank	NR	60	CPS	60	1.00	10/1/1998	4/1/2018				
Trust banks:											
Mitsubishi Trust	A-	50						SDP	50	L+1.10	L+2.60
Sumitomo Trust	A-	100						SDP	100	L+1.10	L+2.60
Mitsui Trust	BBB+	100						SDP	100	L+1.45	L+2.95
Chuo Trust	NR	60	CPS	32	2.50	7/1/1998	8/1/2018	SLP	28	L+2.45	L+3.95
Toyo Trust	NR	50						SDP	50	L+1.10	L+2.60
Regional banks:											
Bank of Yokohama	BBB	20						SLP	20	L+1.10	L+2.60
Hokuriku Bank	NR	20						SLP	20	L+2.45	L+3.95
Ashikaga Bank	NR	30						SDP	30	L+2.95	L+4.45

Table 5. (*continued*)

Panel B: March 1999 capital injection terms

			Preferred shares					Subordinated debt/loans				
	S&P Rating	Total funds	Type	Amount	Dividend rate	Conversion start date	Forced conversion date	Type	Amount	Yield	Yield after step-up	Step-up date
City banks:												
Dai-ichi Kangyo	BBB	900	CPS	200	0.41	8/1/2004	8/1/2006	SD10	100	L+0.75	L+1.25	4/1/2004
			CPS	200	0.70	8/1/2005	8/1/2008	SD11	100	L+0.75	L+1.25	4/1/2005
			NCPS	300	2.38							
Fuji	BBB+	1,000	CPS	250	0.40	10/1/2004	2/1/2009	SDP	200	L+0.65	L+1.35 L+2.15	4/1/2004 4/1/2009
			CPS	250	0.55	10/1/2006	2/1/2011					
			NCPS	300	2.10							
Sakura	BBB	800	CPS	800	1.37	10/1/2002	10/1/2009					
Sanwa	BBB+	700	CPS	600	0.53	7/1/2001	8/1/2008	SDP	100	L+0.34	L+1.34	10/1/2004
Sumitomo	BBB+	501	CPS	201	0.35	5/1/2002	2/27/2009					
			CPS	300	0.95	8/1/2005	2/27/2009					
Asahi	BBB+	500	CPS	300	1.15	7/1/2002	12/1/2009	SLP	100	L+1.04	L+2.54	4/1/2009
			CPS	100	1.48	7/1/2003	12/1/2014					
Daiwa	BB+	408	CPS	408	1.06	6/30/1999	4/1/2009					
Tokai	BBB-	600	CPS	300	0.93	7/1/2002	3/31/2009					
			CPS	300	0.97	7/1/2003	3/31/2009					
Long-term credit bank:												
Industrial Bank of Japan	BBB+	600	CPS	175	0.43	7/1/2003	9/1/2009	SDP	250	L+0.98	L+1.48	4/1/2004
			CPS	175	1.40	9/1/2003	9/1/2009					
Trust banks												
Mitsubishi Trust	BBB	300	CPS	200	0.81	7/31/2003	8/1/2008	SDP	100	L+1.75	L+2.25	4/1/2004
Sumitomo Trust	BBB	200	CPS	100	0.76	4/1/2001	3/31/2009	SD12	100	L+1.53	L+2.03	4/1/2006
Mitsui Trust	BBB-	400	CPS	250.3	1.25	7/1/1999	8/1/2009	SLP	150	L+1.49	L+1.99	3/31/2004
Chuo Trust	NR	150	CPS	150	0.90	7/1/1999	8/1/2009					
Toyo Trust	NR	200	CPS	200	1.15	7/1/1999	8/1/2009					
Regional bank:												
Bank of Yokohama	BBB	200	CPS	70	1.13	8/1/2001	7/31/2009	SDP	50	L+1.65	L+2.15	4/1/2004
			CPS	30	1.89	8/1/2004	7/31/2009	SL10	50	L+1.07	L+1.57	4/1/2004

1999. The size of the second program was larger, with ¥25 trillion available for recapitalization.[12] All the major banks except for the healthiest one (Bank of Tokyo Mitsubishi) applied. This time, the government (specifically, the Financial Reconstruction Commission (FRC)) evaluated the applications using the inspection information provided by the FSA and the Bank of Japan (BOJ). Perhaps most importantly, the FRC checked whether the amount of capital each bank requested would be sufficient to cover the under-reserving for non-performing loans once they applied reasonable provision rates (70% for doubtful loans and 15% for loans requiring special attention, for example).

Although the FRC did not turn down any applications, this time, the capital injections after the bank inspections were better conceived than the ones in 1998. The government ultimately put ¥7.5 trillion into the 15 banks in the form of preferred shares and subordinated debt with various terms and conversion options into common shares. Nakaso (2001) argues that this amount was sufficient to cover the under-reserving and unrealized capital losses of shareholdings at these 15 banks.

Table 5, Panel B, created from the data published by the Deposit Insurance Corporation (http://www.dic.go.jp/english/e_katsudou/e_katsudou3-1.pdf), shows the deals for each bank. Most banks sold multiple instruments to the government. As with the previous year's plan, most of the preferred shares gave the government an option to convert them into common equity over a certain interval. If the government still held any preferred shares at the end of the interval, the government was required to convert all of these shares into common shares. This requirement implies that the government would suffer a capital loss if the conversion option was out of the money at the end of the interval.

It would have been possible to design these securities so that weak banks would face the threat of conversion and dilution of existing shareholders sooner than healthy financial institutions, but this is not what happened. If anything, the tables show a tendency for healthier financial institutions to have earlier initial conversion dates. Stronger banks would favor earlier conversion so that they could lower the dividend rate on preferred shares.

The government did not seem to optimally exercise the conversion option. For instance, Omura, Mizukami, and Yamazaki (2002) give an example where the fair value of the convertible preferred shares exceeded what the government had paid early in the conversion period, but the government failed to exercise the option before the bank stock declined. Had the government acted, it could have recovered twice as much as was possible in 2002. They suspect that the government never intended to exercise the options. Instead, this instrument could rationalize the low dividend rates that were intended to provide a subsidy to the banks. The use of multiple securities with various terms also obscured the cost of the bailout.

The Prompt Recapitalization Act expired on March 2001, but capital shortages continued to be a problem and so the government put together a couple more small-scale recapitalization programs. First, the revision of the Deposit Insurance Act allowed the government to provide public capital to banks. Specifically, Section 102-1 of the revised Deposit Insurance Act justified the use of public funds to help troubled (but not failed) systemically important banks. This was used to prop up Resona Bank in June of 2003. The government bought ¥0.33 trillion of common shares and ¥1.66 trillion of preferred shares of Resona.

Second, the Act of Strengthening Financial Functions (ASFF) was passed in June 2004. The law allowed the government to inject public capital into banks without justifying their systemic importance. In 2006, ¥40.5 billion was injected into two regional banks under this law. It expired at the end of March 2008, but was revived in December 2008 so that the government could continue to inject capital into the banking sector when it deemed it necessary. In March 2009, ¥121.0 billion was provided to three regional banks.

3.3. Nationalization of failed banks

Despite the 1998 capital injection, the financial crisis deepened over the course of that year, leading the government to pass the Financial Revitalization Act, which allowed a government committee to reorganize insolvent (or near insolvent) banks through temporary nationalization or receivership. The Financial Reconstruction Commission (FRC) was created, and, in October 1998, it nationalized the Long-Term Credit Bank of Japan (LTCB) and, in December 1998, the Nippon Credit Bank (NCB). The management of nationalized banks was replaced by new teams immediately. In evaluating the value of assets and liabilities of each bank, the FRC concluded that both were insolvent at the time of nationalization and the fair share price (both common and preferred) was zero.

Both LTCB and NCB were long-term credit banks, which raised funds mainly through issuing financial debentures rather than collecting deposits. All the liabilities, including deposits, debentures, interbank loans, and derivative transactions were protected, using financial assistance from the DIC.

The balance sheets of nationalized banks were cleaned up by separating uncollectible loans from collectible loans. The loans that were considered uncollectible were sold to the DIC and then to the RCC. After selling off the non-performing loans, the government started to find new investors to buy the nationalized banks.

After long negotiations, the LTCB was sold for ¥1 billion to a group of investors led by Ripplewood, a U.S. fund (Tett, 2003). The new investor group added ¥120 billion for common shares and the government added ¥240 billion in the form of preferred shares, using the framework of the Prompt Recapitalization Act. The new bank, Shinsei Bank, eventually recovered and was listed on the Tokyo Stock Exchange in February 2004.

[12] The government also set aside ¥18 trillion for nationalization of failed banks. Combined with the ¥17 trillion for depositor protection (mentioned earlier), the total size of the financial stabilization package was ¥60 trillion.

The NCB was sold to a group of investors led by Softbank for around ¥1 billion. Softbank group added about ¥100 billion in common shares and the government injected about ¥260 billion in preferred shares. The new bank, Aozora Bank, also came back to be listed on the Tokyo Stock Exchange in November 2006, but suffered a loss of ¥200 billion for the accounting year ending in March 2009, including losses associated with investments placed with Bernard Madoff.

In both cases, the sales contract included a provision allowing the buyer to force the Japanese government to buy back loans that have lost substantially more than expected. Both Shinsei and Aozora used this "put option" to return impaired performing loans to the government.

3.4. Takenaka plan

As we noted in Section 2, the capital shortage of Japanese banks continued despite the repeated recapitalization programs. The Takenaka Plan that started in late 2002 played an important role in narrowing the capital gap. Takenaka (2006), in his memoirs, explains that he attempted to use six measures to end the non-performing loans problem at major Japanese banks. Specifically he sought (1) to have banks make more rigorous evaluation of assets using discounted expected cash flows or market prices of non-performing loans, (2) to check cross-bank consistency in classifying loans to large debtors, (3) to publicize the discrepancy between the banks' self-evaluations and the FSA's evaluations, (4) to be prepared to inject public funds if necessary, (5) to prohibit banks from declaring unrealistically large deferred tax assets, and (6) to impose business improvement orders for banks that substantially underachieved the revitalization plans.

Some of these measures were actually implemented before Takenaka became the Minister. For example, the FSA conducted special inspections of major banks from October 2001 to March 2002 and published the results in April 2002 (http://www.fsa.go.jp/news/newse/e20020412-1.html). However, the use of the discounted cash-flow method in an attempt to achieve consistent evaluation of non-performing loans to large debtors was new, and introduced as part of Takenaka's special inspection for March 2003. He was successful in implementing all of these six measures with the possible exception of (5) (which in the end, he had to leave to the discretion of banks and their accountants).

The FSA followed the Takenaka Plan, inspecting the banks' books more rigorously, and forcing many banks to recapitalize themselves. This stopped the process of ever-growing non-performing loans and the banks started to accumulate capital through retained earnings over the next 5 years.

3.5. Total costs

It is natural to try to conclude our review by providing an estimate of the total spending by the government during the crisis. The Deposit Insurance Corporation of Japan (DICJ) periodically reports the total amount of financial assistance it has made to financial institutions and the corresponding amount recovered.[13] Since much of the government's support flowed through DICJ and most of it happened during the acute phase of the crisis, this expenditure gives a lower bound for the estimated total spending.

As of the end of March 2009, financial assistance provided through the DICJ totaled ¥47.2 trillion.[14] The cumulative amount of recoveries (through sales of assets and repayment of injected capital, for example) was ¥25.4 trillion.[15] Since the cumulative loan losses incurred by the private-sector banks through 2005 were around ¥96 trillion (Table 6), the DICJ figure implies that the total gross government spending was on the order of 50% of private losses, and net expenditures was about 25%.

These figures, however, must be interpreted carefully. First, the figures include only the assistance provided through the special accounts at the DICJ. For example, the public assistance provided in the liquidation of the *jusen*, and the DICJ transfer to the RCC to compensate it for some losses are not included in these totals. Second, as we saw with the capital injection programs, the amounts spent seem to have been partly designed to provide a subsidy to the banks. It is conceivable that a direct, but smaller outright gift would have been more effective. More generally, the intentional opaqueness of the programs was a recurring feature of the policies pursued in Japan. The same has been said about many aspects of the U.S. assistance during the current crisis.

3.6. Eight lessons from the Japanese experience

The Japanese experience with various policies provides a number of useful lessons. The most obvious is that offering government assistance means that policies may encounter political resistance. In Japan, political backlash was at times very important. Because there are so many ways that the political constraints can arise and we expect all policymakers to try to garner political support, we will not dwell on this issue—even if it might be the most critical challenge in a financial crisis. Instead, we will concentrate on the lessons regarding the design aspects of the specific policies that were pursued in Japan.

Lesson 1: Possibility that banks will refuse equity assistance.

First, banks may refuse public funds, as we observed for the 1998 recapitalization program in Japan. There are two reasons why the banks might not have wanted the assistance. One explanation is that the banks feared applying for the funds would be admitting to larger future losses than had been previously disclosed (or that

[13] The report for March 2009 is at http://www.dic.go.jp/english/e_katsudou/e_katsudou1-4-20090630.html.

[14] This consisted of ¥18.9 trillion in grants to temporarily nationalized banks, ¥9.8 trillion for assets purchases, ¥12.5 trillion for capital injection programs, and ¥6.0 trillion for other purposes including the repurchase of non-performing assets that were required to honor guarantees on asset quality in restructured banks.

[15] This includes ¥9.7 trillion from asset sales, ¥10.8 trillion from recapitalization programs, and ¥4.9 trillion from other sources.

Table 6
Loan losses in Japan.

"Loan losses" report the amount of loan losses (charge-offs and losses from loan sales) that Japanese banks incurred during the accounting year ending at the "Date." "Cumulative loan losses since 4/1992" is the cumulative amount of such loan losses from the accounting year ending in March 1993 to date. The units are trillion yen. The last column (Number of major banks) is the number of major banks (city banks, former long-term credit banks, and trust banks) that were in operation at the end of the accounting year. The universe of major banks are identified in the notes to Table 5 ("Transition of Total Losses on Disposal of Non-Performing Loans of All Banks") of a press release by the Financial Services Agency ("FSA publishes the status of banks' non-performing loans as of end-March 2009") on August 7, 2009. The English translation of the press release can be found on http://www.fsa.go.jp/en/regulated/npl/20090807.html.

Date	Loan losses	Cumulative loan losses since 4/1992	Number of major banks
3/1994	3.872	5.512	21
3/1995	5.232	10.744	21
3/1996	13.369	24.113	20
3/1997	7.763	31.877	20
3/1998	13.258	45.135	20
3/1999	13.631	58.766	17
3/2000	6.944	65.710	18
3/2001	6.108	71.818	18
3/2002	9.722	81.540	15
3/2003	6.658	88.198	13
3/2004	5.374	93.572	13
3/2005	2.848	96.420	13
3/2006	0.363	96.783	11
3/2007	1.046	97.829	11
3/2008	1.124	98.953	11
3/2009	3.094	102.046	11

their ability to raise funds elsewhere would be missing). This negative signal would push down the value of existing equity.

A second logical possibility is that the banks balked because new securities would be senior to the existing equity claims. Were the banks to recover, the existing owners would not be able to reap the benefits until after the government's claims were paid. This type of debt overhang problem would be particularly likely if the bank had long-term debt that was trading at a deep discount, in which case the value of the debt would appreciate from the additional financing. As a legacy of Japan's past banking restrictions, up until 1998, only long-term credit banks could issue long-term debt. Hence, as a practical matter, debt overhang considerations do not seem to have been important in Japan.

Nonetheless, accounting for the incentives of the existing equity holders may be important in designing recapitalization schemes.[16] In the Japanese case, the problem was solved by all major banks asking for the same amount of public funds, which turned out to be too small to resolve the capital shortage for most banks.

Lesson 2: Make the rescue packages large enough.

Many programs, including the 1998 recapitalization and many asset purchase programs, were too small. The public outrage over the handling of the *jusen* must have been an important consideration in the government's responses. Table 6 shows the history of loan losses in Japan. Cumulatively over the years between 1992 and 2005, Japanese banks wrote off about ¥96 trillion, roughly 19% of GDP.[17] So the size of the problem required considerably more resources than most of the AMCs were given. Even the most comprehensive of the recapitalization programs, under the Prompt Recapitalization Act, injected only ¥8.7 trillion. While this was more than ten times the size of the *jusen* bailout that nearly toppled the government, it was still only about 1% of total bank assets (and less than 2% of total loans). Thus, the second lesson that the Japanese experience suggests is that programs of asset purchase and recapitalization must be big enough.

How much bigger a recapitalization would have been sufficient? To answer this question, Table 7 shows the financial situation as of March 2002 for the major banks that received capital injections in 1998. We calculate the modified capital and capital gap for each bank using the same approach as the one we use for the banking sector as a whole in Table 1. The last row shows the total for these 18 banks.

The official capital for the major banks at this point stood just below ¥19 trillion. But deferred tax assets were over ¥8 trillion. Moreover, the level of reserves set aside against losses appeared to be about ¥10 trillion less than required. Hence, modified capital is estimated to have been less than ¥0.4 trillion, leaving a capital gap of ¥15.4 trillion. Aside from Shinsei and Aozora, which had already been scrubbed up, all the other banks were seriously short of capital.

As with Table 1, this calculation trades off two biases. First, the estimated level of necessary reserves may have been too high when the recovery rates on bad loans started to improve. Since this improvement had not really started in early 2002, this bias is expected to be small for this calculation.

The second bias, however, can be large. Through 2002, it was widely believed that the banks were still under-reporting their problem loans. In August 2002, just before

[16] See Diamond and Rajan (2009) for a theoretical model of why this would be rational and why asset sales may not succeed either.

[17] The figures are from the Web site of the Financial Services Agency: http://www.fsa.go.jp.

Table 7
Capital gaps of major banks: March 2002

The original bank balance sheet data are taken from Nikkei Financial Database for Financial Institutions. Core capital includes equity capital, capital reserves, and other items shown in Table 3. Deferred tax assets are credits against future taxes that are counted in core capital. Loan loss reserves are what each bank reports on the balance sheet. Following Fukao (2003), we estimate the adequate reserves as the sum of 100% of Category IV (uncollectible) loans, 70% of Category III (doubtful) loans, 20% of Category II (special attention) loans, and 1% of Category I (normal) loans. Capital held by the government is the value of equity owned by the government. Bank assets are total assets. Modified capital and the Capital gap are computed as indicated. The units are billion yen.

Bank name	(A) Core capital	(B) Deferred tax assets	(C) Loan loss reserves	(D) Adequate reserves	(E) Modified capital ≡ (A−B+C−D)	(F) 3% of total assets	(G) Capital gap≡ (F-E)
Industrial Bank of Japan	1,091	632	359	852	−34	1,172	1,206
Shinsei Bank	617	18	371	727	244	251	7
Aozora Bank	476	10	293	298	461	171	−291
Daiichi Kangyo Bank	1,924	901	853	1,789	87	1,560	1,474
Fuji Bank	2,063	763	477	1,102	675	1,497	823
Bank of Tokyo-Mitsubishi	2,450	746	1,036	2,023	717	2,207	1,490
Asahi Bank	752	424	533	985	−124	751	876
UFJ Bank	2,452	1,218	1,376	3,297	−688	2,064	2,752
Sumitomo Mitsui Banking	3,196	1,741	1,972	3,666	−238	3,062	3,301
Daiwa Bank	418	285	397	901	−370	442	812
Ashikaga Bank	130	166	99	357	−295	159	454
Bank of Yokohama	448	142	105	363	48	320	272
Hokuriku Bank	179	103	157	348	−116	179	295
Mitsubishi Trust & Banking	741	255	397	614	269	610	341
Mizuho Trust & Banking	268	141	132	290	−31	189	219
UFJ Trust Bank	374	24-	127	381	−119	222	341
Chuo Mitsui Trust & Banking	527	382	177	552	−229	390	619
Sumitomo Trust & Banking	652	247	217	494	128	503	375
Total	18,758	8,414	9,077	19,038	384	15,749	15,365

the Takenaka reforms began, Kashyap (2002) surveyed a number of prominent bank analysts and private-sector economists following the Japanese economy and asked for "their estimate of the difference in the market value of Japanese banks' assets and liabilities." The lowest estimate reported was ¥19 trillion. Keeping in mind that this would leave the banks with zero equity value, it seems likely the estimate in Table 7 is exceptionally conservative. Given that these banks received slightly less than ¥8 trillion in the 1999 recapitalization, our calculation suggests that a recapitalization that was at least two and a half times bigger in 1999 was needed; put differently, this extremely conservative estimate of the Japanese capital shortage would suggest that another 3% of GDP was needed.[18]

While 3% of GDP is a large amount under normal conditions, it is useful to keep in mind that Japanese debt grew by more than 60% of GDP during the crisis, with little discernible effect on interest rates. We think there is no doubt that the government could have marshaled more resources to combat the problem if it had wanted to do it. Indeed, Kashyap (2002) quotes Paul Sheard, Chief Economist for Japan at Lehman Brothers at that time, as saying, "to restore the health and credibility of the banking system would probably require ¥30 to ¥50 trillion." Sheard went on to say, "the deposit insurance fund has ¥49 trillion of untapped capacity. Thus, the infrastructure and budgeting are in place if there were political will to act." So, even contemporaneous accounts indicate that lack of resources was not the problem.[19]

Lesson 3: Limits of asset purchase programs in fixing solvency problems.

A third, more fundamental lesson is that buying troubled assets alone is not likely to solve the capital shortage. It is possible that a much bigger, comprehensive program might have eliminated the uncertainty of the value of assets that remained on banks' balance sheets and allowed them to find willing investors to contribute new capital. But, because none of the Japanese AMCs were designed to overpay for the bad loans, just removing some of the assets did not rebuild capital. The Japanese experience suggests that a recapitalization program is necessary in addition to an assets purchase program in order to solve the capital shortage.

Lesson 4: The importance of tying assistance to credible inspection programs.

Fourth, recapitalization programs must be preceded by rigorous inspection to determine the size of the problem. The 1998 recapitalization program just distributed capital to major banks without any inspections, in part to induce the banks to accept the public capital without stigma. As a result of the banks' hesitation to appear needy, the size of the program ended up too small. The 1999

[18] Another reason why this is a lower bound is that this figure does not count the public funds that were used to clean up the balance sheets of two nationalized banks.

[19] It is more likely that a rescue of this size would have been framed as being on the order of 50 times the size of the *jusen* rescue.

recapitalization was better in that it followed inspections of those banks. Allen, Chakraborty, and Watanabe (2009) provide statistical evidence that the 1999 capital injection increased lending by the recipient banks while the 1998 capital injection had no such effects. Even with the 1999 recapitalization, however, the regulators did not force the banks to clean up their non-performing loans. Instead, they were allowed to operate even with huge amounts of non-performing loans on their books. The amount of non-performing loans (disclosed by banks) actually increased from ¥29.6 trillion (March 1999) to ¥42.0 trillion (March 2002), and started to decline only after rigorous inspections under the Takenaka Plan.

Lesson 5: Importance of restructuring troubled assets.

Fifth, troubled assets purchased by AMCs need to be put back into the private sector or restructured swiftly in order to prevent further deterioration of the value of those assets. Especially in early years, the Japanese AMCs were slow in selling off the loans they purchased and just functioned as warehouses of bad loans. Land prices were still falling and they presumably did not want to realize capital losses. Not until the early 2000s did they begin attempting to restructure the loans and rehabilitate the underlying borrowers, thus addressing the source of the bad-loan problem.

Lesson 6: Value of having adequate resolution Authority.

Sixth, nationalization can be useful to wind down systemically important banks. It is important to note that both LTCB and NCB had international counterparties. So the winding down of these institutions was not just a purely domestic matter. As part of the nationalization, the international transactions were guaranteed and the resolution process did not create much turmoil in the financial markets.

These observations are all the more impressive considering that Japan had to put the resolution rules in place during the acute phase of its crisis and with weakened power of the LDP government at that point. While political paralysis and procrastination characterized many aspects of the policies during the crisis, the legislation of the new resolution mechanism was a remarkable exception.

Lesson 7: Dangers of politically directed lending.

Seventh, targeting total lending or lending to specific sectors can be counterproductive. As we saw in Section 3, the nature of the non-performing loan problem changed in the early 2000s, and the loans to small and medium enterprises, which the government required the recapitalized banks to increase, became the central problem rather than the real-estate related loans.

Lesson 8: Critical role that macroeconomic growth plays in bank recovery.

Finally, recapitalization was ultimately driven by macroeconomic recovery. Since macroeconomic recovery also depends on a healthy functioning of the financial system, the causality runs two ways. In the Japanese case, export expansion to large and growing economies, especially China and the U.S., contributed to the macroeconomic recovery in the mid-2000s independent of the recovery of the financial system. To the extent that macroeconomic policy can successfully stimulate the recovery, that will also help recapitalization.

4. Evaluating U.S. policies

In assessing U.S. policies during the crisis, it is essential to realize that there are some noteworthy respects in which the U.S. and Japanese crises differed. Most importantly, the problems in the U.S. regarding the breakdown of securitization and the collapse of the "shadow banking system" were not an issue in Japan. Hence, many of the bold and most controversial programs instituted in the U.S. have no parallels in Japan.

Accordingly, we limit our evaluation to the areas where Japan's experience could be informative. As we point out, in some cases the solutions suggested from Japan might help with the unique aspects of the U.S. crisis. For example, Diamond and Rajan (2009) show that cleaning up of the balance sheets of financial institutions and recapitalization could help with the credit crunch problem. Our focus will be on the largest banks in both countries. In both countries many smaller banks got into trouble and were closed by regulators.[20] The existing regulatory tools in both countries made this possible, whereas the political and regulatory options for the larger organizations are much more complicated. To organize the discussion, we focus on the eight lessons from Japan that were just described and ask whether they informed the U.S. choices.

4.1. Lessons not learned

There are at least three of the eight Japanese lessons that were either not heeded or had to be relearned. Most obvious was the hesitation of the banks to admit publicly their need for government assistance. Some of the original TARP 9 institutions were adamant in their insistence that they did not need public support. Soon after receiving TARP money in October, both Citigroup and Bank of America ended up needing much more assistance. Though the case of Bank of America may be explained by a surprisingly large capital shortage caused by the acquisition of Merrill Lynch, Merrill was also one of the TARP 9 and it was not transparent about its capital needs.

The initial TARP capital purchases were also done without rigorous audits and inspections. It is an interesting counter-factual scenario to think about how the AIG, Citigroup, and Bank of America bailouts would have been structured if more accurate information had been available at the time the funds were committed.

The third area where the Japanese history seems to have been ignored regards the willingness to nationalize an institution and wind it down. At least at the time of the second Citigroup intervention, the government could have tried to buy a controlling stake in the firm and pushed the

[20] An analysis of failures of small banks in Japan can be found, for example, in *Yokin Hoken Kenkyu* (*Research on Deposit Insurance*), Volume 4 (September 2005), published by Deposit Insurance Corporation of Japan.

company into bankruptcy. The government has discussed a longer term plan to split Citigroup into two parts. Even if this eventually happens, however, it will not force the long-term debtholders of Citigroup to bear losses, whereas a bankruptcy would have.

A major constraint on the government throughout the crisis has been the lack of a resolution procedure that could work for a complex financial holding company. To take one example, existing law makes it impossible for the government to take over a company and continue to run its swap contracts. This makes the resolution costs much higher than if the government could assume the contracts and continue making and receiving payments, rather than having to close them out. Had the U.S. tried to buy Citigroup and push it through bankruptcy using the existing law, it would have been operating in uncharted territory.

In contrast, in Japan a major piece of the legislation was enacted during the crisis precisely to make it possible to fail major financial institutions. The Japanese government also used this authority in at least two very visible cases. Federal Reserve and Treasury officials have repeatedly asked Congress to pass a bill creating the authority to resolve a large, complex financial institution. With more than 2 years having passed since the start of the crisis, the lack of any movement on this front suggests that the Japanese experience was ignored.

While it is impossible to know why many of the decisions made during the crisis were made, Wessel (2009) offers a fascinating contemporaneous description of the U.S. policymakers' thinking in 2008 through early 2009. The lack of progress on a resolution mechanism seems to have stemmed from a misunderstanding between the Treasury and the Fed on the one hand, and the Congress on the other. Wessel describes some testimony and private conversations between Treasury Secretary Paulson, Federal Reserve Chairman Bernanke, and Congressman Barney Frank, the head of the House of Representatives Committee on Financial Services, in July 2008. Bankruptcy reform was one of the issues discussed. According to Wessel (p. 179):

> Frank, Paulson and Bernanke came away from their private conversation and the hearing with different interpretations. Frank concluded that Paulson and Bernanke couldn't make a strong case that they needed more power to deal with the "next Bear Stearns," so Congress didn't need to do anything urgently. Paulson and Bernanke concluded that there wasn't any point in asking Congress – unless the crisis intensified to the point where there were no other options. Either way, it boiled down to the same result: waiting until it was too late.

In a second insider account of the post-Lehman period, Phillip Swagel (2009), a senior Treasury official, argues that legal constraints were a major factor in a number of choices made during the crisis. For instance, he reports (pp. 39–40) that the use of government money to support an acquisition of Lehman was illegal.

A September 2009 survey by the *Wall Street Journal* of their panel of economists suggests that market participants do not believe this to have been the case. The *Journal* reported that "27 of 35 economists who responded to a question about the collapse of Lehman Brothers challenged the official view that the Fed and Treasury didn't have the legal power to keep Lehman out of bankruptcy."[21]

4.2. The ambiguous cases

Ultimately, the U.S. did pursue the stress tests, and the initial market reactions once the results were announced were quite favorable. It is too early to tell whether they will be deemed a long-run success. There are two open questions that must be resolved to reach a longer term judgment.

At its core, the stress test amounted to a comparison of impending losses with the resources available to buffer the losses. The technical document by the Board of Governors of the Federal Reserve (2009), released in conjunction with the tests, was very transparent about the assumed loss rates for various types of assets. For instance, the loss assumptions used by the Fed can be easily compared to those used by the International Monetary Fund (2009)—see Tables 1 and 1.3 respectively—and show the Fed's estimates are quite reasonable.[22] Indeed, the commentary we have seen on these assumptions and our own judgment leads us to conclude that these estimates were credible.

This stands in clear contrast to the assumptions regarding future earnings prospects for the banks. There is no recent history that can be used to judge how profits will evolve if the unemployment rate rises and continues to stay high (say above 10%) through 2010. Some banks are insistent that they can generate substantial profits. In fact, at least one firm, Wells Fargo, has publicly announced that it does not intend to raise as much capital as the stress test suggests is necessary because during the first three quarters of 2009, they expect to earn more than the regulators assumed in the stress test.

Alternative forecasts of even near-term earnings for the banks show considerable heterogeneity.[23] For instance, the IMF assume that the entire banking system in the U.S. will have $300 billion in net retained earnings over 2009 and 2010, while the Fed's estimates for just the

[21] See "Economic confidence rebounds: Consumer optimism rises; Forecasters in survey predict 10.2% unemployment peak," *Wall Street Journal*, September 11, 2009, http://online.wsj.com/article/SB125261100485400509.html.

[22] For a very detailed description of worst-case loss assumptions, see Mattu and Subramanian (2009). The Fed's total two-year loss assumptions were $599 billion for the top 19 bank holding companies, while the IMF's were $550 billion for the industry. Mattu and Subramanian's range with their extreme loss rates range from $1.1 trillion to $1.4 trillion for the industry.

[23] One challenge in comparing estimates is that until the Fed released its findings, the details of how the calculations would be conducted were not known, so other analyses differ in the exact definitions of the various inputs to the calculations. A further challenge is that pre-provision net revenues is not an accounting number that analysts typically concentrate upon.

19 organizations in the stress test assumes $362 billion in resources available to absorb losses. The IMF numbers suggest extremely low earnings, and many industry forecasts for earnings are much higher than those used in the stress tests. For instance, Goldberg (2009) notes that even if pre-provision operating income were forecast to decline by 7% in 2009 and another 7% in 2010, yielding the worst performance for the banking industry since 1938, then earnings available as a buffer would still be $343 billion. Grasek (2009), writing before any 2009 performance data were available, estimates that over 2009 and 2010 the banking industry could earn roughly $570 billion. Given the unusual macroeconomic environment, any forecast is bound to be fraught with error, so we see no convincing way to judge whether the earnings numbers assumed in the stress test were unreasonably high or low.

The second major question is whether the threshold level of capital that is mandated in the stress tests is high enough. The banks are being asked to have more common equity than the regulatory minimum, and to meet the minimum level of capital after absorbing the losses foreseen in the stress test. Presumably this would be enough to prevent insolvency if any subsequent interventions are done promptly.

But the larger motivation for the government's intervention was to prevent a meltdown of the financial system from crushing economic growth—the two-way causality problem. The amount of capital that banks may need to expand their balance sheets and support a recovery could be much higher than the minimum. Thus, it is unclear whether the resources that have been marshaled to combat the crisis will prove adequate.

Two of the major lessons from Japan involved the use and design of asset management companies. The U.S. record in this regard is mixed. The U.S. has avoided the Japanese mistake of trying to do small asset purchases to solve a serious capital shortage problem.

The ambiguity comes because even though essentially no money has been spent until recently, the U.S. government has spent a lot of time trying to design asset purchase plans and made various public announcements suggesting that asset purchases were impending. The two publicly discussed cases involve the original TARP plan, which was abandoned, and the Public-Private Investment Program (PPIP), which has been very slow to start.[24] In addition, many press reports suggest that during the period between President Obama's election and his inauguration, considerable planning to create an aggregator bank was undertaken.

These efforts have been costly in tying up Treasury and Federal Reserve staff and management on programs which were not critical. More importantly, they have created some confusion with the public and politicians over the intended government response. The various stops and starts have left doubts about the government's commitment to remove non-performing assets from the financial system. This in turn has left doubts about why so much emphasis was placed on asset purchases if they are not needed.

In the meantime, the troubled assets still remain on most institutions' balance sheets. This leads to three ongoing problems. First, the management of the banks must continue to devote effort and capital to monitoring the risks associated with holding these assets. Some commentary from regulators suggests that this diversion of attention is costly.

Second, to the extent that any of the major banks are still seriously undercapitalized, the presence of the assets creates an incentive to gamble for reclamation. For a clearly solvent bank, the decision to hang on to or dispose of the assets would be based on a profit-maximizing motive. For a bank that is close to insolvent, the incentive to remove the risk is much lower. If the assets lose value and drive the bank into insolvency, then the inability to resolve such an institution could create a zombie bank.

Lastly, the presence of the impaired banks that are filled with hard-to-value securities can distort the incentives of other healthy institutions. As modeled by Diamond and Rajan (2009), if the troubled banks could wind up being forced to sell the assets quickly so that prices are depressed below fundamentals, other potential buyers of the assets (i.e., the healthy banks) would choose to avoid making loans that tie up their capital. The presence of the banks that they dub the "walking wounded" can, therefore, create a credit crunch.

Collectively, these three considerations suggest that there are costs to leaving the toxic assets on the balance sheets. But notice that the costs are greatly reduced if the banks are well-capitalized. Well-capitalized banks have no incentive to gamble for reclamation. A well-capitalized bank that finds that the assets are diverting attention can afford to sell them, and if many banks are clearly solvent, there would be plenty of potential buyers so that a fire-sale would be much less likely. Hence, we see the uncertainty over asset quality being intimately tied to the size of the capital shortage.

Finally, on the big question of how much sustained macroeconomic growth will help the bank recapitalization, it is too early to tell. On the one hand, in Japan export growth was a driver of macroeconomic growth in the mid-2000s. Yorulmazer (2009) suggests that the same was true in the Swedish banking crisis in the early 1990s. Given the size of the exports in the U.S. economy, it is unlikely that a pure export boom would be enough to lift bank profitability on a sustained basis if the domestic economy remains weak.

On the other hand, U.S. macroeconomic policy has also been very different than in Japan. The Federal Reserve cut the policy rate almost down to zero and has been trying various non-traditional means to stimulate the economy. A massive fiscal stimulus package was also applied within 18 months of the onset of the crisis. If these policies deliver growth, the prospects for bank recapitalization in the U.S. will be much brighter.

4.3. The good news

Finally, the U.S. scores well on avoiding policies that force the banks to have lending targets either in aggregate

[24] PPIP finally started in late September 2009. As of early November 2009, the Treasury announced the creation of Private-Public Investment Funds of $16 billion (http://www.financialstability.gov/latest/tg_11052009.html).

or to specific sectors. Perhaps the closest policy in this respect is the funding to the auto industry. The support given to General Motors Acceptance Corporation is at risk for being used to support purchases that might temporarily prop up one of the troubled auto companies. But thus far, the banking problems have not spilled over to create a set of non-financial zombie companies.

5. Conclusions

The U.S. financial system remains in fragile condition. It is too early to tell how the crisis will play out. As the events unfold, it may be helpful to judge them against two very extreme alternatives. Both scenarios turn on three crucial dimensions: growth, exit from current programs, and regulatory reform.

In the optimistic outcome, the macro recovery proceeds smoothly. This alone will help the banks rebuild their capital. Stabilizing the economy and financial system were the goals behind many of the policy actions. The confidence boost from a growing economy will lend support to the other policy actions needed to complete the rest of the recovery.

The second dimension would be a successful winddown of many of the extraordinary guarantee and liquidity programs. Growth could continue without sustained government support for the financial system. The best case would include minimal losses to the taxpayer for the assistance that has been provided in the course of the crisis.

The third element of a favorable ending is that policies are put in place to limit the likelihood of another crisis or at least give the government authorities a full set of tools to manage better in another crisis. There are many aspects of the crisis that extend beyond the bank recapitalization that has been the focus of our analysis. Reforms to address many of the weaknesses described by the U.S. Department of Treasury (2009) would occur. Within the confines of the banking problems, the obvious missing tool is a resolution procedure that could have been used for the large financial firms including bank holding companies.

Perhaps the most daunting task in the optimistic outcome is to undo the moral hazard that has been created through the myriad of government interventions. It would take a whole other paper to thoroughly discuss this challenge and the potential ways to address it. But the issue is likely to be important well after a recovery takes hold.

The pessimistic scenario is made up of the opposite outcomes on the three key dimensions. The starting point would be an anemic recovery that involves very little growth. The weak macroeconomic environment would weaken the banks and renew the negative feedback between the condition of the economy and the health of the banks. The fiscal position of the government would constrain additional policy options. If another bout of panic similar to the fall of 2008 erupts, political paralysis would be likely and the adverse effects may go on for some time.

In this scenario, the exit strategy from the various guarantees and liquidity programs would be complicated. They may be extended because the financial system is so impaired that it cannot operate without them. The eventual taxpayer losses from the programs would be substantial.

Furthermore, the moral hazard from the various rescue packages would have created even more distortions in the financial system. The Federal Reserve would be under siege for its decisions that will have turned out badly. Regulatory reform will have been sidetracked due to the finger pointing from the failed rescues.

Neither of these extreme scenarios is particularly likely. The actual outcome will be somewhere between these, depending on how growth, the exit strategy, and general regulatory reform proceed.

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