

# Bank Recapitalization in the U.S. – Lessons from Japan

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## I. Introduction

The global financial crisis of 2008 is unique in its origins and the breadth and depth of the damage it has wreaked. Unlike the majority of the financial crises the world has witnessed since the early 1970s – the period since the collapse of the Bretton Woods System of fixed exchange rates that has become known as “The Second Age of Globalization” – this crisis started in the rich world. In fact, it began in the world’s largest, most innovative, and until recently, most profitable financial sector: the United States. Globalization of the banking industry meant that the crisis quickly spread around the globe to more than twenty other advanced economies. Shortly after, the sharp fall in world trade brought on by the combination of reduced demand in the advanced economies, the drying up of trade credit and appreciating currencies, spread the global recession to the developing world as well. Not only the breadth, but the depth of the crisis was historic. Dire predictions of the worst economic set-back since the great depression of the 1930s have come true in the rich countries. Even as signs of a stuttering recovery surface, unemployment rates in most high-income countries remain at historic highs.

While there are many things that set the recent global financial crisis apart from previous financial crises, for students of Japan’s banking crisis in the late 1990s, many of the events and most of the policy debates will feel all too familiar. As one of the only advanced economies with a significant presence in the global

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banking industry to have experienced a banking crisis in our current age of globalization, many pointed to the experience of Japan – both the successes and failures – for policy lessons in dealing with the global financial crisis.

Were these lessons heeded? On the heels of the termination of the United States Capital Purchase Program (CPP), which has injected over 200 billion dollars of capital in U.S. financial institutions, we frame our analysis by comparing the United States experience to the experience of Japan in the late 1990s. In particular, we compare the effectiveness of the CPP to Japan's Financial Crisis Management Account, which was similarly used for a major recapitalization of Japan's banks in the wake of the 1997 banking crisis.

The paper is organized as follows. The next section briefly reviews Japan's experience with bank restructuring and reviews the evidence of the effectiveness of the recapitalization program. Based on those empirical results, we draw three key lessons from the experience of Japan. Section three then takes up the bank restructuring program of the United States in the wake of the 2008 global financial crisis. We present evidence on whether U.S. policy makers heeded the lessons offered by the experience of Japan and then turn to an empirical evaluation of the effectiveness of the bank recapitalizations carried out in the United States as part of the Troubled Asset Relief Program (TARP). Section four reviews the findings presented for both Japan and the United States and concludes with some directions for future research.

## **II. Japan's Bank Recapitalization Program**

Japan's centerpiece legislation for dealing with its own banking crisis in late 1997 was the Financial Function Stabilization Plan, which allocated 30 trillion yen to stabilize financial markets. 13 trillion yen of that total was allocated to the Financial Crisis Management Account, which was to be used for recapitalization of the troubled banking sector. In March 1998, Japan carried out the first capital injection: a total of 1.8 trillion yen of public funds was used to purchase preferred shares of 21 banks. The following year, in March 1999, another 7.5 trillion yen in public funds was pumped into 15 major banks.

## 1. The Effectiveness of Japan’s Bank Recapitalization Program

Montgomery and Shimizutani (2009)<sup>(1)</sup> provide a quantitative assessment of the effectiveness of Japan’s bank recapitalization policies. Looking at the “business revitalization plans” banks filed with the government when they applied for recapitalization funds, they identify the objectives of the program as: (1) strengthen recipient banks’ capital base, (2) accelerate the write-off of NPLs, (3) increase loans, particularly to small and medium-sized enterprises (SMEs), and (4) promote restructuring. The authors conduct a quantitative analysis of the effects of the first and second rounds of public fund injections in March 1998 and March 1999 on the first three objectives.<sup>(2)</sup>

**Table 1: Effects of Bank Recapitalization in Japan**

		International banks		Domestic banks	
		1 <sup>st</sup> round	2 <sup>nd</sup> round	1 <sup>st</sup> round	2 <sup>nd</sup> round
Increase in capital adequacy ratio		1.90%	1.20%	-	0.60%
Increase in write-offs to total assets ratio		-	1.00%	-	1.70%
Growth in lending	All industries	-	4.40%	5.50%	2.20%
	SMEs	-	4.50%	-	2.40%

Notes: Measured in terms of the impact of a one percentage point increase in the ratio of capital received to total bank assets. “-” represent statistically insignificant figures.

The main results are summarized in table 1, which reports the impact of a one percentage point increase in the ratio of capital received to total assets on a variety of the policy objectives. Broadly, the conclusion is that the impact of the second round of public fund injections was greater than the first round and that in both rounds of capital injections, the impact was greater for internationally active banks.

On the whole, the first round capital injection served mostly as a “band-aid” to help international banks meet the minimum capital adequacy ratio of

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(1) Readers interested in the events of Japan’s banking crisis in 1997 and the ensuing policy response are referred to Montgomery (2002) and Hoshi and Kashyap (2010).

(2) Corbett, Onji, and Vera (2010) provide an analysis of the restructuring aspect of Japan’s recapitalization program.

8% as required under the Basel accord. But the second round capital injection was effective in achieving other policy objectives as well. Round two had a positive impact on both international and domestic banks by not only raising capital adequacy ratios, but also accelerating NPL write-offs, and increasing lending, particularly to SMEs. Their research estimates that a one percentage point rise in the ratio of capital received to total assets increased lending activity of recapitalized domestic and international banks by more than 2% and 4%, respectively. These growth rates exceeded by far the average growth rate for all banks in Japan.

## **2. Lessons from the experience of Japan**

Japan's experience with bank recapitalization – especially the experience of two very different rounds of capital injections with quite different impacts - offered up several lessons to policymakers in the United States as they grappled with the question of how to handle bank restructuring in the aftermath of the 2008 global financial crisis. We distill this into what we feel are the most important of those lessons into the need for three conditions: speed, scale and customization.

### **(1) Lesson 1: Speed**

Speed is critical because the immediate objective of any policy response to a banking crisis is to stabilize the banking sector to prevent bank runs and systemic collapse. Most policy makers appreciate this point. Nevertheless, bank restructuring is usually not implemented immediately. In most advanced economies, monetary policy can react quickly to economic events thanks to the relative independence of the central bank from the political process. Bank restructuring on the other hand (and, it should be noted, fiscal policy responses as well) usually require legislative approval and can be politically unpopular. In a comprehensive study of banking crises since the 1970s, Laeven and Valencia (2010) find that the average time required to get a bank recapitalization program up and running was a year.

Japan's policy makers moved quicker than that average, but still probably not quick enough. Although "early warning signs" had trickled in much earlier, a true banking crisis can be dated as having erupted in Japan in November 1997. But largely because of public outrage over the *jusen* mortgage lender bailouts a year earlier, there was no discussion of use of public funds for bank restructuring until December of that year and the Financial Function Stabilization Plan was not passed by Diet until February of the following year. The capital injections didn't take place until the following month, in March of 1998, four months into the banking crisis.

## **(2) Lesson 2: Scale**

A second lesson, one that comes out clearly from the empirical evidence presented above, is that to have significant impact, recapitalization of the banking sector needs to be of significant scale as well. As discussed above, for the big international banks, the first round capital injections in Japan did little more than temporarily prop up capital adequacy ratios as required under the Basel Accord. One reason is that the magnitude of capital injected was simply too small. The 1.8 trillion yen injected the first round represents only about 0.35% of Japan's GDP in 1997.<sup>(3)</sup> The inadequate scale of the first round capital injections in Japan is apparent in the fact that the capital injections were on average less than a half of a percent of the recipient banks' total assets.

The second round bank recapitalization was much more effective. A big part of the reason is that the amount of capital injected in the second round, 7.5 trillion yen, was more than four times as large as that of the first round.<sup>(4)</sup> That increase was reflected at the individual recipient banks as well. As compared

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(3) Japan's Cabinet Office reports that Japan's GDP in fiscal year 1997 was about 514 trillion yen.

(4) Although, it should be noted, that even summing the two rounds of capital injections the amount is still small when compared to the size of capital injection in major countries affected by the 2008 global financial crisis, which was on average about 3.8 % of GDP (Author's calculation from data in Laeven and Valencia (2010). This amount includes other restructuring costs.).

to the first round injections 0.49 percent average, the second round capital injections were on average 2.03 percent of the recipient banks' total assets.

### **(3) Lesson 3: Customization**

The third lesson to be taken from Japan's experience is the need for customization. Japan's failure to achieve many significant results from the first round capital injection teaches us that it is unrealistic to expect results from mandatory capital injections implemented in a uniform manner.

This principle sounds self-evident and is probably understood by policy makers. But it can be difficult to implement. One reason is that taking swift, significant measures while also carefully evaluating each bank to tailor recapitalization packages to their individual needs is a difficult balancing act. Japan's regulatory capacity was woefully inadequate when the banking sector started to collapse in the Autumn of 1997. An independent bank supervisor, the Financial Supervisory Agency, wasn't even created until after the crisis in June of 1998.

The advanced economies affected in the 2008 global financial crisis, and particularly the United States, were in a better position from the start in terms of regulatory capacity.<sup>(5)</sup> A more serious stumbling block in the current crisis was the reluctance of banks to accept the money. Banks often are reluctant to apply for government funds as it could be misconstrued as publicly announcing financial weakness, which can become a self-fulfilling prophecy. And they may simply not want the government interfering as a significant shareholder.

Refusal to accept financial assistance from the government was an issue in Japan in 1998. Policymakers addressed it by forcing all the large international banks to all accept nearly the same exact amount of assistance. The Bank of

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(5) Not all experts agree on this point. Keio University Professor and former Minister of State for Economic and Fiscal Policy Heizo Takenaka has emphasized that the 2008 crisis responses are not stringent enough in imposing non-performing loan disclosure requirements and made the much-noted point that the supervisory institutions in the U.S. desperately need consolidation (Takenaka, 2008).

Tokyo Mitsubishi reportedly initially refused a capital injection during the first round but was forced to accept the standard 100 billion yen being doled out to all the other large international banks (*Nihon Keizai Shimbun*, 1998).

But, as the results reported above illustrate, Japan's standardized approach in March 1998 clearly didn't work. With the second round of capital injections in 1999, the government took a customized approach. Before receiving any government funds, banks were required to submit "business revitalization plans" detailing how much capital they needed and how they would use it toward the government objectives and the recapitalization was tailored to each bank's individual plan. That approach seems to have worked. Banks still came forward to receive funds and the funds were disbursed depending upon the needs and proposals put forth in the business revitalization plans. In the end, not only was the second round capital injection larger, it was more variable, ranging from 0.97 percent (Sumitomo Bank) to 4.24 percent (Mitsui Trust) of the recipient banks' total assets, a range of 3.27 percent.<sup>(6)</sup>

### **III. The U.S. Bank Recapitalization Program**

In the United States, the Emergency Economic Stabilization Act (EESA), signed into law by President Bush on October 3, 2008, allowed the Federal Reserve to begin paying interest on deposits of financial institutions, increased deposit insurance provided by the Federal Deposit Insurance Corporation (FDIC) from 100,000 dollars to 250,000 dollars per deposit account, and, as its centerpiece, allocated up to 700 billion dollars<sup>(7)</sup> to the Troubled Assets Relief Program (TARP). As its name implies, TARP was originally envisaged

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(6) As noted above, the large international banks almost all received a standard amount of 100 billion yen in the first round capital injection, but there was still some variation in how much this translated into as a percent of bank total assets. The first round injection ranged from 0.12 percent (the former Tokyo Mitsubishi Bank) to 1.83 percent (the former Yasuda Trust Bank) of the recipient banks' total assets.

(7) The \$700 billion ceiling originally imposed was reduced to \$698.7 billion by the Helping Families Save their Homes Act of May 2009 and later reduced further to \$475 billion by the Dodd-Frank Act of July 2010.

as a program to purchase troubled assets – in particular, mortgage backed assets – to stabilize the financial system. But immediately after passage of the EESA, attention shifted from troubled asset markets to the need for bank restructuring. On October 14, 2008 the Treasury announced the Capital Purchase Program (CPP), which under TARP would use the bulk of the funds toward recapitalization of the banking system.

Under the CPP, Treasury would recapitalize the U.S. banking system through purchases up to 250 billion dollars in senior preferred stock of U.S. controlled financial institutions.<sup>(8)</sup> The objectives of the program, as we interpret them from statements by the Department of the Treasury, were to (1) boost bank capital, both directly and indirectly by increasing “confidence in our banks...in a way that attracts private capital as well” (2) increase lending by encouraging banks to “deploy, not hoard, their capital” and (3) in particular, increase mortgage roll-overs in order to “avoid foreclosures” (U.S. Department of the Treasury, 2008b).

## **1. Were the lessons heeded?**

Were these lessons – the need for speed, adequate scale and customization of the response – heeded by U.S. policymakers?

### **(1) Lesson 1: Speed**

On the first point, Western leaders seem to have learned from Japan’s mistake. In the global crisis of 2008 it seems that policymakers around the globe understood the need to move quickly. Public recapitalization programs were implemented with unprecedented speed. In the affected countries, bank recapitalization programs were in place on average in less than a month.

The swift response of the United States in particular was impressive. The financial crisis struck full-force on September 7, 2008, with the nationalization

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(8) Treasury also received “warrants to purchase common stock with an aggregate market price equal to 15 percent of the senior preferred investment” (U.S. Department of the Treasury, 2008a).

of government sponsored mortgage companies Fannie Mae and Freddie Mac.<sup>(9)</sup> A string of historically significant bankruptcies, bailouts and hastily arranged mergers of financial institutions followed. The United States Department of Treasury proposed legislation that included the power to move forward with bank restructuring on September 20. The plan was controversial and failed to pass the House of Representatives on September 29, 2008, sending shockwaves through financial markets around the globe. But the proposal passed after some modifications and bipartisan statements of support from both presidential candidates: Barack Obama and Senator John McCain. President George W. Bush signed it into law on October 3, 2008.

The swiftness of the response has allowed policymakers to coordinate bank restructuring with other financial sector stabilization policies. As noted in Shimizutani and Montgomery (2008), in general, Japan's policy responses to the banking crisis were poorly coordinated and policy measures were implemented piecemeal. U.S. policy makers, in contrast, have made policy coordination central to their response, taking a multi-pronged approach that linked recapitalization with other policy measures such as purchases of troubled assets, liquidity provision, raising deposit insurance limits, and facilitating consolidation in the banking sector.

## **(2) Lesson 2: Scale**

The scale of the U.S. government intervention was also impressive at first glance. 125 billion dollars was injected into nine major U.S. banks on just the first day of the U.S. bank recapitalization scheme, a sum larger than the total amount of capital invested in Japanese banks over two rounds of recapitalizations carried out over two years.

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(9) Investment bank Bear Stearns' failure in March 2008 was also very significant but doesn't meet the usual criteria for declaring a systemic banking crisis because it would not be considered "the closure, merging, takeover or large-scale government assistance of an important financial institution that marks the start of a string of similar outcomes for other financial institutions" (Kaminsky & Reinhart, 1999).

But compared to the larger size of the U.S. economy, actually the U.S. response was smaller. Our calculations reveal that the TARP's 700 billion dollars works out to just 4.87% of the United States GDP in 2008, and that percentage shrinks to 3.31% if we only consider the 475 billion dollars the plan was later reduced to by congress. Japan's overall package of 30 trillion yen is actually substantially larger, at 5.84% of Japan's GDP in 1997. This finding holds when we compare the size of the funds allocated solely to capital injections in the two countries and the actual amount of capital injected. Japan's allocation of 13 trillion yen to the Financial Crisis Management Account amounted to 2.53% of GDP in 1998, while the United States allocation of up to 250 billion dollars to the CPP represents just 1.74% of U.S. GDP in 2008. Considering both rounds of capital injections in Japan, just less than 2% of GDP was actually used toward recapitalization, but the same is true for the U.S., where, even considering the total investments of the CPP over the two years of its existence, the total amount invested amounts to only about 1.5% of GDP.

### **(3) Lesson 3: Customization**

Not only was the scale of the recapitalization by the CPP probably not sufficient, the amounts invested in each financial institution were not customized to reflect the business and financial conditions of recipient banks.<sup>(10)</sup> The first use of CPP funds, which went into the biggest international bank holding companies on October 28, 2010 was fairly uniform at 25 billion dollars each, the upper limit set by the U.S. Treasury. Exceptions were made for the two newly converted investment banks, Goldman Sachs and Morgan Stanley, who got 10 billion each, and for State Street Corporation (2 billion dollars) and Bank of New York

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(10) This "one size fits all" approach may have changed in the second year of the CPP. In the first half of 2009, the Department of Treasury and bank supervisors conducted comprehensive "stress tests" of the nation's largest banks, the Supervisory Capital Assessment Program (SCAP). Unfortunately, due to data limitations (2010 financial data not being available yet), we are not able to explore the SCAP and impacts it may have had on the CPP in the current study.

Mellon (3 billion dollars), all of which were significantly smaller in terms of total assets. In the end, the average amount of capital received by the eight large international banks<sup>(11)</sup> that got the first infusion of cash on October 28, 2008 was fairly uniform at about 2% of total assets.

The U.S. government even followed in Japan's footsteps by infusing capital into banks that didn't want the government's money. Wells Fargo Chairman Richard Kovacevich reportedly insisted to U.S. Treasury Secretary Hank Paulson that his bank did not need a bailout, thank you very much. Readers may be reminded of similar rumors of protestations from Tokyo Mitsubishi in 1998. But as was the case with Tokyo Mitsubishi, regulators applied moral suasion. In a surprise one-day private meeting at the U.S. Treasury offices in Washington D.C., Secretary Treasury Paulson apparently presented the heads of the biggest U.S. banks with a one page memo agreeing to accept purchases of preferred stock by the government, and informed them they would not be leaving the room until it was signed. All, including Kovacevich, did.

So, while applauding the swiftness of their response and success in coordinating a multi-pronged approach to the crisis, we fear U.S. policymakers may have followed in the footsteps of Japan and underestimated the scale of the funds needed to restructure the troubled financial system and the importance of examining the management plans and financial health of recipient banks in order to tailor a plan to allocate the public funds appropriately. These tactical errors may have seriously impaired the effectiveness of the recapitalization program.

## **2. The effectiveness of the U.S. policy response**

In the remainder of this paper, we take up that concern in an empirical examination of the effectiveness of the U.S. capital injections of 2008.

Using a panel of data from 1,243 bank holding companies' balance sheets and income statements for the years 2005-2009 we estimate the following

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(11) Eight, down from the original nine who were called into the U.S. Treasury after Merrill Lynch agreed to a merger with Bank of America around the same time.

reduced form equation based up a model of bank behavior presented in Montgomery (2004):

$$Y_{i,t+1} = K + AY_{i,t} + BX_{i,t} + \Gamma Z_{i,t} + \varepsilon_{i,t+1} \quad \text{Eqn. 1}$$

In equation 1,  $Y_{i,t+1}$  represents the dependent variable: we examine the growth (as proxied by the log change) in bad loan write-offs and total lending at time  $t+1$  for bank  $i$ . The effectiveness of the capital injections on regulatory capital ratios is also examined by estimating an accounting identity whereby capital in the current period is determined by capital in the last period, plus operating profits, minus bad loan write-offs. Vector  $X_{i,t}$  includes the banks' regulatory capital ratios, as well as the variable of interest, the capital injection as a percent of total bank assets. This variable takes the value of zero for those banks which did not receive a capital injection. Vector  $Z_{i,t}$  denotes a vector of control variables that control for bank specific factors such as the banks' loan to deposit interest rate spread. We also include time dummies for each year to control for macroeconomic effects such as business cycles.  $\varepsilon_{i,t+1}$  is an error term that in most specifications is assumed to take the form of a general time specific error term plus a bank-specific error term:  $\varepsilon_{i,t+1} = \varepsilon_{i,t+1} + \mu_i$ .

### **(1)Data**

Balance sheet and income statement data was compiled from Bureau Van Dijk's Bankscope data set. The amount of capital injected into individual institutions is based upon the TARP "Transaction Reports", which are made publicly available by the U.S. Treasury Department Office of Financial Stability.

Table 2 reports the summary statistics of the data used in our analysis.

**Table 2: Summary Statistics for U.S. Institutions (2005-2009)**

	Mean	Standard Deviation	Min	Max
Capital Adequacy Ratio	13.39	4.17	-13.80	55.39
$\Delta \log$ (Bad Loan Write Offs)	38.70	61.40	-143.48	318.50
$\Delta \log$ (Total Loans)	6.79	13.07	-70.90	91.21
Interest Rate Spread, $r^L - r^D$	1.62	1.95	-5.66	11.67
Operating profits / Assets	0.52	1.94	-39.41	17.50
Loan write-offs / Assets	0.52	0.92	0	13.51
Capital Injection 2008 / Assets	0.08	0.50	0	17.89

## (2) Results

Empirical results are presented in Table 3. The results are reported using a fixed effect model, as suggested by a Hausman test.

**Table 3: Statistical Results for U.S. Institutions**

	1	2	3
	Capital Adequacy Ratio	$\Delta\text{Log}$ (Bad Loan Write-Offs)	$\Delta\text{Log}$ (Total Loan)
<b>Capital Injection 2008 / Assets (t)</b>	<b>0.58***</b> <b>[0.081]</b>		
Operating profits / Assets(t)	0.44*** [0.045]		
Loan write-offs / Assets(t)	-0.41*** [0.090]		
<b>Capital Injection 2008 / Assets (t-1)</b>		<b>1.70</b> <b>[2.399]</b>	<b>-1.53***</b> <b>[0.455]</b>
Interest Rate Spread, $r^L - r^D$ (t-1)		-12.53*** [2.415]	3.33*** [0.456]
Capital Adequacy Ratio (t-1)	0.26*** [0.031]	0.66 [0.921]	1.02*** [0.179]
$\Delta\text{Log}$ (Bad Loan Write Offs) (t-1)		-0.47*** [0.026]	
$\Delta\text{Log}$ (Total Loans) (t-1)			-0.05* [0.024]
Constant	9.32*** [0.431]	108.34*** [12.214]	-20.33** [2.391]
Specification as implied by Hausman Test	FE	FE	FE
Observations	2,703	2,703	2,703
Number of Institutions	1,002	1,002	1,002

Note: Standard errors in brackets below each coefficient estimate. \*, \*\*, \*\*\* indicate statistical significance at the 10, 5 and 1 percent level respectively.

The effect of capital injection on regulatory capital ratios is reported in column 1. Coefficient estimates on the lagged regulatory capital ratio and operating profits normalized by assets are both positive and highly statistically significant. The coefficient estimate on bad loan write-offs normalized by assets is negative and statistically highly significant. These results are as expected and confirm the accounting identity that institutions that earn high profit are able to boost their capital while financial institutions that need to write-off significant amounts of bad loans find their capital position deteriorated in the following period.

Turning to the variable of interest, the capital injection in 2008 normalized by assets, the coefficient estimate is positive and statistically highly significant, indicating that the capital injection in 2008 was effective in increasing regulatory capital ratios. Note that the estimated coefficient is quantitatively in the range that we might expect as well. The parameter estimate indicates that a 1% increase in the amount of capital injected (as a ratio to institution's assets) in 2008 boosted the institutions' regulatory capital ratio by nearly 0.6%. This is close to but less than 1%, as we would expect since regulatory capital ratios are calculated as the ratio of capital to risk-weighted assets, not total assets as we use in normalizing our capital injection data.

Next, the effect of capital injection of the previous period on the log change in loan write-offs in the present period is reported in column two. The coefficient estimate on lagged bad loan write-offs is negative and highly significant, meaning that institutions that wrote-off bad loans in the previous period tend to write-off less in the present period. Also, the coefficient estimate of lagged interest rate spread is negative and highly significant, meaning that institutions that earn higher spreads (of loan interest rates relative to deposit interest rates) – and therefore perhaps profits, at least on their “bread and butter” banking activities - tend to make fewer write-offs.

The coefficient estimate on lagged regulatory capital ratios is positive as we expect, but not statistically significant. This can be explained by the fact that, while a higher cushion of capital above the required regulatory amount certainly allows financial institutions more leeway to write-off bad debts, the amount of write-offs in each year clearly may depend more significantly on other factors such as the riskiness of the loan portfolio on the institutions books or the managers attitudes toward risk.

The coefficient estimate of the lagged capital injection in 2008 as a percent of institutions' asset – the variable of interest – is also positive but not statistically significant. This indicates that the capital injection in 2008 was not significant in prompting banks to increase their write-offs of bad loans. This is consistent with the finding reported above that capital adequacy ratios

do not seem to significantly impact bad loan write-offs. Also, unlike the bank recapitalization program implemented in Japan in 1997, boosting bad loan write-offs was not a major policy objective of the CPP.

Finally, the effect of capital injection of the previous period on loan growth as proxied by the log change in loan amount is reported in column 3. The coefficient estimate on lagged total loans is negative and marginally significant, meaning that institutions that increase loan amount in the previous period tend to reduce the amount of lending in the present period. Although this result is not highly statistically significant, it may reflect institutions fluctuation around some target of average loan growth.

The coefficient estimate on the interest rate spread and regulatory capital ratio are both positive, as expected, and statistically highly significant. These results indicate that institutions that earn a higher spread on the rate charged for loans relative to that paid for deposits, and institutions with relatively high capital ratio in the previous period tend to have higher loan growth.

The coefficient estimate of the lagged capital injection in 2008 as a percent of institutions' assets – the variable of interest – is negative and highly statistically significant. The parameter estimate is also quantitatively significant, suggesting that a 1% increase in the amount of capital injected (as a ratio to institutions' assets) in 2008 resulted in about 1.5% decrease in loan growth in the following year. This finding suggests that institutions that received a capital injection were under pressure to boost capital adequacy ratios and to meet that objective were forced to readjust their asset portfolios away from higher-risk assets such as loans and into lower-risk assets.

In summary, the empirical analysis presented in table 3 confirms that the US recapitalization policy in 2008 did boost the regulatory capital ratio of the recipient institutions. However, the recapitalization policy did not prompt banks to increase bad loan write-offs. Further, there is evidence that financial institutions that received government funds cut back on lending, likely in order to adjust their risk-weighted-assets in order to boost their regulatory capital ratios.

#### **IV. Conclusions and directions for future research**

Our findings demonstrate that the Capital Purchase Program(CPP) was successful in achieving at least one policy objective of the program: boosting recipient institutions regulatory capital ratios. But we find that the program failed to achieve another important policy objective, to stimulate bank lending. To the contrary, we find evidence that recipient banks reduced lending, presumably because of the pressure to cut highly risk-weighted assets in order to increase their capital adequacy ratios. Although encouraging banks to increase bad loan write-offs was not an explicit policy objective of the CPP according to our reading of statements from the Department of Treasury, we also look at the impact of the program on bad loan write-offs and find no evidence that recapitalization stimulated bad loan write-offs either.

The main empirical results here echo the findings of analysis of Japan's bank recapitalization program in 1997, which served mostly as a temporary "band-aid" to help international banks meet the minimum capital adequacy ratio of 8% required under the Basel Accord. In Japan's case. The second round capital injections in 1998 were of significantly larger scale and more tailored to meet the needs of recipient banks, which increased the effectiveness of the policy intervention. Future research will investigate whether the United States followed a similar pattern and the CPP recapitalizations of 2009 were more effective than those made in the first year of the program.

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## **Bank Recapitalization in the U.S. — Lessons from Japan**

<Summary>

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This study empirically investigates the effectiveness of the Capital Purchase Program (CPP), the centerpiece of the United States 700 billion dollar policy response to the global financial crisis of 2008. We frame our analysis of the United States policy response against the backdrop of Japan's banking crisis and policy response in the late 1990s. As one of the only advanced economies with a large global presence in international finance, Japan's banking crisis of 1997 and the effectiveness of the policy response offered important lessons to U.S. policymakers in 2008. Based on empirical studies of Japan's bank recapitalization program, we distill the most crucial lessons to be the importance of speed, adequate scale and customized restructuring in forming recapitalization packages.

The United States and other economies affected by the 2008 global crisis took this first lesson to heart and reacted with unprecedented speed to events in the Autumn of 2008. But despite the large headline figure of 700 billion dollars, the program was not of adequate scale and was actually smaller than Japan's recapitalization program of 1997-1998 in relative terms. More critically, program implementation in the first year was standardized and there was no investigation into the recipient banks' business plans or financial condition to

allow restructuring to be tailored to each individual recipient bank. These latter two points significantly hampered the effectiveness of the bank recapitalization program.

Our findings demonstrate that the program was successful in achieving at least one policy objective of the program: boosting recipient banks regulatory capital ratios. But we find that the program failed to achieve another important policy objective, to stimulate bank lending. To the contrary, we find evidence that recipient banks reduced lending, presumably because of the pressure to cut highly risk-weighted assets in order to increase their capital adequacy ratios. Although encouraging banks to increase bad loan write-offs was not an explicit policy objective of the CPP according to our reading of statements from the Department of Treasury, we also look at the impact of the program on bad loan write-offs and find no evidence that recapitalization stimulated bad loan write-offs either.

The main empirical results here echo the findings of analysis of Japan's bank recapitalization program in 1997. In Japan's case, the second round capital injections in 1998 were of significantly larger scale and more tailored to meet the needs of recipient banks, which increased the effectiveness of the policy intervention. Future research will investigate whether the United States followed a similar pattern and the CPP recapitalizations of 2009 were more effective than those made in the first year of the program.