

An Assessment of TARP Assistance to Financial Institutions

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How should economists and policymakers evaluate the assistance provided to financial institutions during the recent financial crisis, and in particular the assistance provided through the 2008 Troubled Asset Relief Program, commonly known as TARP? We examine that question in five parts: 1) What did policymakers do? 2) What are the proper objectives of interventions like TARP assistance to financial institutions? 3) Did TARP succeed in those economic objectives? 4) Were TARP funds allocated purely on an economic basis, or did political favoritism play a role? 5) Would alternative policies, either alongside or instead of TARP, and alternative design features of TARP, have worked better?

In assessing the TARP, we distinguish between the assistance provided to very large banks and that provided to other banks. The largest banks were treated very differently: they were pressured to participate in the initial TARP program, and some were also pressured to participate (through stress testing) in various second-stage programs. Furthermore, the second-stage investments made into these large institutions (which were justified by a belief that these institutions were special because they were “too big to fail”) sometimes took very different and riskier forms from the preferred stock and warrant investments made in other banks under the first phase of TARP.

TARP was not a single approach to assisting weak banks but rather a variety of changing solutions to a set of evolving problems. Understanding and evaluating it as

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such produces a healthy respect for the political constraints that bailout programs face and also points to shortcomings in the ways economists account for the costs of such programs. The political constraints that TARP confronted limited its structure and effectiveness and encouraged it to employ implicit options as a means of assistance, which made the costs of TARP assistance higher than conventional cost calculations have recognized.

Six years after the passage of TARP, it remains hard to measure the total social costs and benefits of the assistance to banks provided under TARP programs. TARP's passage was associated with significant improvements in financial markets and the health of financial intermediaries, as well as an increase in the supply of lending by recipients. However, a full evaluation must also take into account other factors: the risks borne by taxpayers in the course of the bailouts; moral-hazard costs that could result in more risk-taking in the future; and social costs related to the perceived unfairness of the bailouts and the evidence of corruption in the administration of TARP. These effects are difficult to measure. In addition, the TARP experience offers some lessons about how best to assist financial institutions when such assistance is deemed necessary. Going forward, it may be advisable to design a bank assistance program in advance so that its design features can reflect more thoughtful and less politicized judgments about optimal structure and about the social costs and benefits of mitigating systemic risk in the banking system.

The Crisis of 2007–2009 and the Creation of TARP Assistance for Financial Institutions

Policymakers initially responded to the financial crisis in late 2007 and into 2008 with various emergency initiatives: for example, new Federal Reserve lending facilities for banks and other financial institutions; Fed-assisted bailouts of the investment bank Bear Stearns in March 2008; the conservatorship and Treasury “bazooka” bailout of Fannie Mae and Freddie Mac in the summer of 2008; and the bailout of the insurance company AIG in September 2008.¹ The decision in September 2008 not to bail out another investment bank, Lehman Bros., coincided with the continuing deepening of the crisis, which was visible in the price declines suffered by risky assets and bank stocks. That deepening reflected a process of ongoing learning about the extent to which many financial institutions held positions related to deeply troubled assets—“subprime” and “Alt-A” mortgages and the securities backed by them.

By late September 2008, market prices for the shares of the largest banks, including Citigroup, Goldman Sachs, Morgan Stanley, and JPMorgan Chase, had fallen dramatically. The implied market equity ratios (the ratio of market value of equity to the market value of assets) of these banks had fallen so much that

¹ For an overview of the financial crisis of 2007–2009 and the various government responses to it, see Calomiris, Eisenbeis, and Litan (2011).

in some cases those ratios indicated market perceptions of potential insolvency (Calomiris and Herring 2013). As perceptions of default risk rose, banks found it hard to roll over their uninsured debts. Amounts and maturities shrank in markets involving overnight lending between large banks, like the federal funds and LIBOR (London Interbank Offered Rate) markets, and banks hoarded increasing amounts of cash (Heider, Hoerova, and Holthausen forthcoming; Gorton and Metrick 2012; Covitz, Liang, and Suarez 2013).

Amidst this turmoil, as the net worth of banks plummeted, some of the largest financial institutions succumbed to failure or acquisition, and the surviving ones scrambled to pay off maturing debts and restore confidence. Federal Reserve and Treasury officials became convinced that a systematic approach to financial system solvency risk was needed—not just expanded Fed lending programs and bailouts in response to some individual failures—to maintain confidence in the financial system and to ensure that banks continued to supply loans and other essential financial needs of the economy.

Treasury Secretary Henry Paulson and Fed Chairman Ben Bernanke testified numerous times together before Congress in mid- to late-September 2008 in favor of shoring up the banking system with additional measures to prevent a systemic collapse. Paulson proposed government assistance to banks in the form of support for selling troubled mortgage-related assets at prices that were more reflective of their long-term earnings potential, which he argued were far in excess of their current prices. The discussion in Congressional hearings of options for assistance was narrowly confined to the Secretary's proposal; independent voices with alternative views on whether or how to provide systemic assistance to the banking system were not invited to testify before Congress in the weeks it deliberated over TARP.²

Secretary Paulson appeared repeatedly to defend what became known as the Troubled Asset Relief Program (TARP). It took about three weeks for Congress to approve TARP. Some of the initial Congressional resistance to the bailout plan was eroded by the adverse stock market reaction to the failure to win passage of TARP on September 29. On October 3, 2008, the Emergency Economic Stabilization Act (EESA) of 2008, which established up to \$700 billion (outstanding at any one time) in TARP assistance, passed both houses of Congress and was signed by President Bush. On October 13, the Treasury announced a new plan to invest in bank capital via the Capital Purchase Program (CPP). On October 14, nine large

² Some alternatives were proposed, including Senator Charles Schumer's proposal, presented in a mid-September speech, in which he advocated the use of bank preferred stock purchases by the government alongside mortgage relief for homeowners. Schumer referenced the 1933 preferred stock purchases of the Reconstruction Finance Corporation. In his follow-up op-ed in the *Wall Street Journal* (October 14, 2008), he also advocated the prohibition of common stock dividends to banks receiving government preferred stock assistance, and for providing assistance in a way that would "encourage private investors to make similar investments." These proposals echoed the views of some academic policy advocates, including one of us (Calomiris 2008). Not all members of Congress were receptive to the shift in TARP from asset purchases to the capitalization of banks; the US Government Accountability Office (2009, p. 10) describes the reaction as a "backlash" and used it to support its recommendations of enhanced transparency and communications throughout its early oversight of TARP.

financial institutions (under the coordination and reportedly also the pressure of the Treasury), which together accounted for 55 percent of US banks' assets, announced that they would subscribe for a total of \$125 billion of TARP assistance (GAO 2012a, p. 7). The nine institutions were Bank of America, Citigroup, JP Morgan Chase, Wells Fargo, Morgan Stanley, Goldman Sachs, Bank of New York Mellon, State Street, and Merrill Lynch. Other publicly traded financial institutions were eligible to apply until November 14, 2008 (all of which presumably participated on a purely voluntary basis).

Secretary Paulson's initial vision of TARP was a mechanism through which the government would support the sale of the "troubled" assets of banks to the government through a complex process, or by having the government guarantee the value of the assets at prices in excess of crisis-affected market values. By raising the asset values of banks, TARP would restore market confidence in bank solvency, and allow debt and lending markets to be restored to normalcy. But the Treasury soon abandoned that approach in favor of direct government injections of capital into banks in the form of preferred stock purchases. Preferred stock purchases had been authorized under TARP almost as an afterthought; indeed, the authority for purchases of bank preferred stock is a bit hard to discern from reading the statute. Any purchases of securities (such as preferred stock) had to be accompanied by the granting of warrants (which allow future purchases of stock from the firm at a pre-established price) to ensure that taxpayers shared in the upside potential of recipient institutions, and those warrants should also include anti-dilution provisions "of the type employed in capital market transactions."

TARP's Conflicting Goals and Constraints

Although the first stated purpose for TARP (under Section 2 of the Act) was "to immediately provide authority and facilities that the Secretary of the Treasury can use to restore liquidity and stability to the financial system of the United States," its other stated purpose was "to ensure that such authority and such facilities are used in a manner that—(A) protects home values, college funds, retirement accounts, and life savings; (B) preserves homeownership and promotes jobs and economic growth; (C) maximizes overall returns to the taxpayers of the United States; and (D) provides public accountability for the exercise of such authority."

Items (A) and (B) presented special challenges, especially if the Treasury acquired troubled assets through direct asset purchases under Section 101 of the law. Any acquisition of mortgages or mortgage-backed securities by the Treasury would put it in the position of having to determine the extent of relief to homeowners, which would require weighing the direct financial costs to taxpayers against the benefits to homeowners and the economy (and the consequent indirect benefits to taxpayers). Under Section 109, the Secretary was charged with implementing a plan that both "seeks to maximize assistance for homeowners" while "considering net present value to the taxpayer." No wonder the Treasury opted to abandon direct asset purchases. Not only was it impossible to establish fair prices for such assets, but doing so would have put Treasury directly in charge

of mortgage restructuring, while facing an impossible mandate to meet an amorphous objective of “maximizing assistance” while minimizing costs to taxpayers.

The constraints contained in items (C) and (D) of Section 2 were also serious, and they applied to all forms of TARP assistance. In reaction to Lehman’s failure, Warren Buffett had just purchased a substantial amount of Goldman Sachs preferred stock and had received warrants to purchase equity in addition to the promised coupon payments on the preferred stock. Item (C) seems to have been intended in part to ensure that taxpayers’ investments in preferred stock were treated as similarly profit-making investments. Purchases of assets under TARP were supposed to be priced to maximize taxpayers’ returns (broadly defined). Government guarantees of assets under Section 102(c) were even more constrained by an explicit requirement to earn an actuarially fair market insurance premium. TARP also included limits on executive compensation, designed to prevent profiteering from government assistance (especially with respect to golden parachutes for executives), and those compensation limits were tightened over time.

The Emergency Economic Stabilization Act of 2008, which established TARP, did not require that purchases of preferred stock assistance be provided on market terms, as it allowed the Secretary of the Treasury, under Section 113(a), when minimizing the “long-term negative impact on the taxpayer” to take into account not only “the direct outlays, [and the] potential long-term returns on assets purchased,” but also “the overall economic benefits due to improvements in economic activity and the availability of credit, the impact on the savings and pensions of individuals, and reductions in losses to the Federal Government.” In other words, the Secretary was told to take into account the positive externalities taxpayers accrued through expanded credit and economic activity.

TARP took the unusual step of requiring the Office of Management and Budget (OMB) and the Congressional Budget Office (CBO) to perform a *true economic cost accounting* for TARP (under Section 202) that “shall be calculated by adjusting the discount rate . . . for market risks” (Section 123). The conclusions of that accounting had to be included in federal budgetary accounts as supplementary materials (Section 203). In other words, any subsidies provided to banks would be explicitly estimated using economic measures of opportunity cost, and under Section 113(a), it would be the obligation of the Secretary of Treasury to ensure that indirect benefits to taxpayers equaled or exceeded those costs.

In this politicized environment, operating under these conflicting and unclear mandates, the Treasury focused on preferred stock purchases. Doing so allowed it to avoid the zero-subsidy constraint applicable to asset guarantees and the potential problems associated with buying troubled mortgages at defensibly fair prices and managing them under the conflicting mandates of the law. As of the end of 2009, a total of 707 financial institutions received a total of \$205 billion under the Capital Purchase Program.

The Treasury set uniform terms for preferred stock purchases under the Capital Purchase Program, requiring a 5 percent initial coupon on preferred stock, rising to 9 percent after five years, and demanding 15 percent of preferred stock infusions

be in the form of 10-year warrants to purchase common stock. It limited participation to “qualifying” banks, which in practice meant banks that were not so deeply troubled that they were likely to fail even after receiving preferred stock assistance. Investments under the CPP initially were limited to between 1 and 3 percent of a bank’s risk-weighted assets and were capped at \$25 billion (US GAO 2012a, p. 4).³

Although the banks may have felt the Treasury’s preferred stock investment terms were expensive, the terms Warren Buffett negotiated with Goldman Sachs for Berkshire Hathaway, in a deal announced on September 23, 2008, allowed Berkshire an even higher return. Berkshire Hathaway, had received 100 percent of the \$5 billion preferred stock issue in warrants with a five-year term, and a 10 percent coupon on the preferred stock. The Goldman Sachs preferred stock offered to Berkshire was callable at any time at a 10 percent premium.⁴

Government preferred stock purchases required participating issuers to freeze their common stock dividends, but issuers were not forced to shrink dividends as a requirement for participating in the Capital Purchase Program (implying that recipient banks were effectively able to subordinate preferred stock through the payment of common stock dividends). Limits on dividends have been shown to be very useful in limiting abuse of government protection (Calomiris and Mason 2004; Hovakimian, Kane, and Laeven 2012), but these limits reportedly were not feasible in light of the desire to encourage all large banks (including those not in need of the assistance) to participate. Secretary Paulson effectively forced the largest US banks to participate in the CPP (Veronesi and Zingales 2010; Kim and Stock 2012), and those that did not need the assistance balked at any limit on their dividends. Paulson may have agreed to permit the continuing payment of common stock dividends in order to achieve the policy goal of uniform participation, arguably a symbolic victory.

Phase Two: The SSFI, AGP, CAP, and TIP Programs

After the 2008 election, TARP assistance changed. Attention turned to evaluating and addressing the circumstances of particular large institutions whose financing structure remained problematic, and the nature of assistance was more varied. Although funding through the Capital Purchase Program continued, new sources of funding were designed to deliver customized assistance, alongside the more general approach. The four parts of the second phase included: the Systemically Significant Failing Institutions (SSFI) Program, the Asset Guarantee Program (AGP), the Targeted Investment Program (TIP), and the Capital Assistance Program (CAP).

³ In May 2009, this provision was amended so that qualifying financial institutions with total assets less than \$500 million would receive investments between 3 and 5 percent of risk-weighted assets.

⁴ In fact, the preferred stock was called by Goldman Sachs in March 2011. Rather than exercising its warrants, Berkshire ended up making a settlement in March 2013, exchanging its warrants for roughly 13 million shares of Goldman Sachs common stock (2.8 percent of the company). All told, from September 2008 to March 2013, Berkshire Hathaway made roughly \$3.7 billion in income on its \$5 billion initial investment in preferred shares. Information about the Berkshire Hathaway purchase of Goldman Sachs securities is from Goldman Sachs (2008). Returns on this investment are based on various news stories and on authors’ calculations.

The SSFI, AGP, and TIP were created to meet the needs for what the Treasury termed “exceptional assistance” by three institutions: AIG, Citigroup, and Bank of America.

Assistance remained controversial during this second phase of TARP, and growing public resentment over high compensation in assisted banks led to stricter limits on executive compensation for TARP recipients. This not only resulted in greater reluctance of banks to apply for TARP funding, it also resulted in substantial repurchases of preferred stock as a means of exiting from the discipline of the increasingly stringent compensation regulations that were attached to government investments.

By the end of 2009, \$70.7 billion of \$204.6 billion disbursed under the Capital Purchase Program had been repurchased by participating banks. Five of the large banks that were among the nine original participants repurchased their CPP securities in June 2009 (GAO 2009, pp. 8, 13). The CPP was closed to new investments at the end of 2009, and as of September 20, 2010, two years after TARP had been passed, the Capital Purchase Program had been largely wound down with \$152 billion of investments under that program having been repaid (GAO 2011b, p. 13). Participants that did not exit TARP by 2012 were relatively weak, had larger loan losses, and increasingly displayed problems in paying dividends and maintaining profitability (GAO 2013b, p. 5). In November 2013, the Treasury estimated the eventual nominal gains on all CPP investments would be roughly \$16 billion (GAO 2014, pp. 1–5). The program had succeeded in improving banks’ capital levels, thereby enhancing their ability to borrow and lend.

The first new program under the post-election phase of TARP was the Systemically Significant Failing Institutions plan, announced on November 10, 2008, to purchase AIG preferred stock (the only use ever made of SSFI; SSFI was later renamed the AIG Investment Program). The AIG situation is discussed in the paper by Robert McDonald and Anna Paulson in this symposium. Total Treasury and Fed exposure to AIG reached an astounding \$172.4 billion at the end of 2009—nearly equal to the entire amount disbursed under the Capital Purchase Program. Its form changed over time from relatively senior obligations (preferred stock) to junior ones (common stock). The changing structure of that assistance is so complex that it took a 70-page report by the General Accountability Office just to describe the program’s evolution. On December 14, 2012, the Treasury announced that it had received the proceeds from its final sale of AIG stock, ending the government’s complex program of assistance to AIG, and resulting in a slight income of \$2.3 billion over its funds invested in AIG (US GAO 2013a, p. 5).

Citigroup was the only financial institution to participate in the Treasury’s Asset Guarantee Program, although Bank of America also considered participating. On January 15, 2009, Citigroup arranged for loss protection on a \$301 billion portfolio of assets, which created a potential exposure of \$5 billion for the Treasury, and paid for that protection with preferred shares and warrants. Over its lifetime, the total net income the Treasury gained under this guarantee program was \$3.9 billion.

Citigroup and Bank of America were the only banks to receive assistance under the Targeted Investment Program, under agreements finalized, respectively, on

December 31, 2008, and on January 15, 2009. Under TIP, the Treasury invested \$20 billion in each and received preferred stock and warrants. TIP imposed looser standards for approval than the Capital Purchase Program and was directed toward banks with special systemic importance. Consistent with the targeted nature of this assistance, receiving TIP assistance was also associated with “stringent regulations regarding executive compensation, lobbying expenses, and other corporate governance requirements” (US GAO 2009, p. 73). The Treasury’s TIP investment in Citigroup was converted into common stock in September 2009. The ultimate recoveries from the various TIP-related investments exceeded the cost basis of Treasury TIP investments by \$4.0 billion (GAO 2013a, p. 5).

Treasury Secretary Timothy Geithner assumed office under the Obama administration in January 2009 and initiated a Financial Stability Plan, which established new stress tests to gauge the fragility of the largest banks and linked TARP assistance to the results of those stress tests. On February 17, 2009, Title VII of the American Recovery and Reinvestment Act (ARRA) amended the Emergency Economic Stabilization Act of 2008 to establish new compensation rules for TARP assistance to financial institutions and to permit those that had received Capital Purchase Program assistance to buy back preferred stock and warrants with the approval of their regulators. The Capital Assistance Program was established February 25, 2009, mandating that banks with assets in excess of \$100 billion accept government injections of capital (issuing preferred stock convertible into common stock) if privately raised capital proved inadequate in light of new forward-looking loss assessments usually called the “stress tests.” Banks that had previously received CPP assistance were permitted to convert those issues into the new convertible preferred shares.

Under the Capital Assistance Program, it was announced on May 7, 2009, that 10 of the 19 banks subjected to stress tests needed to raise additional capital (of approximately \$75 billion in total). They were given six months to do so privately; if they were unable to do so, they had to accept government injections of convertible preferred stock to cover the gap identified by the stress test. Setting up a contingent source of government funding ensured that markets would not be rattled too much by any announced deficiencies, which also made the stress tests more credible as an exercise, as regulators would be more likely to honestly identify deficiencies if doing so was unlikely to roil markets.

No funds were actually disbursed under the Capital Assistance Program, and the program was terminated in November 2009, but the capital deficiencies identified by the May 7, 2009, stress test announcement did produce additional capital raising in private markets and also were associated with major restructuring of the Treasury’s investment in Citigroup. In June 2009, Citigroup and Treasury agreed to swap \$20 billion in cumulative perpetual preferred stock (issued under the Targeted Investment Program and the Asset Guarantee Program) for a form of preferred stock (so-called trust preferred securities) that counts for regulatory purposes as providing more protection to deposits than other preferred stock, which had the effect of raising Citigroup’s tier-1 capital ratio. Citigroup also agreed to swap \$25 billion in its Capital Purchase Program preferred stock for an equal amount

Table 1

Cumulative Income by Program, 2008–2013

(\$billions)

<i>Program</i>	<i>Maximum exposure</i>	<i>Income^a</i>
Capital Purchase Program (CPP)	204.6	16.0
Systemically Significant Failing Institutions (SSFI)/AIG ^b	172.4	15.0
Asset Guarantee Program (AGP)	5.0	3.9
Targeted Investment Program (TIP)	40.0	4.0
Total	422.0	38.9
Total for only Citigroup and AIG	222.4	28.4
Total subtracting Citigroup and AIG	199.6	10.5

Sources: US Government Accountability Office (various).^a Cumulative income on CPP includes estimates on income and losses expected for outstanding investments.^b Includes some non-TARP programs.

of various interim securities, which were converted into common stock shares on September 3, 2009, making the US government a major junior stakeholder in Citigroup. The Treasury Department sold its common stock in Citigroup in 2010, with the last of those sales completed in December 2010. It auctioned its Citigroup warrants in January 2011, and liquidated the last of its Citigroup-related securities (subordinated notes it had received from the Federal Deposit Insurance Corporation in 2012 as part of the compensation for Citigroup’s Asset Guarantee Program coverage) on February 4, 2013. All told, the Treasury received \$58.4 billion from its \$50 billion investments in Citigroup.⁵

How “Junior” Was Born: Bagehot’s Rule Meets “Too-Big-To-Fail”

During the post-election phase of TARP, common stock became an important part of the Treasury’s portfolio of investments in financial institutions. Interestingly, the returns earned on the common stock investments in AIG and Citigroup were similar to the returns on the Capital Purchase Program investments made in other financial institutions. As Table 1 shows, total cumulative income on investments in AIG and Citigroup were 12.8 percent of maximum exposures (\$28.4 billion relative to \$222.4 billion), while the income on the remaining investments (which did not include common stock) were only 5.3 percent of maximum exposures (\$10.5 billion relative to \$199.6 billion). On an annualized basis, the returns for these two subsets of investments were similar, reflecting the fact that the durations of the Citigroup and AIG common stock investments were longer than the roughly one-year average

⁵ The Treasury improperly refers to its return relative to a \$45 billion investment in Citigroup, which omits its \$5 billion of loss exposure on the AGP program. For the details of the timing of the various Treasury sales of Citigroup’s shares, warrants, and debt, see Braithwaite and Guerrea (2010), Griffen (2011), and US Treasury (N.d.).

duration of the portfolio of CPP investments in other banks. The duration of the Treasury's investments in Citigroup were more than two years, and the average duration of the government's investments in AIG was even longer. However, neither of these returns compares favorably with Berkshire Hathaway's 74 percent cumulative return over 4.5 years on its preferred investment in Goldman Sachs.

Of course, the success of TARP should not be measured solely or even primarily on the basis of realized returns. Realized returns on common stock investments generally should be higher than realized returns on preferred stock investments, but in the case of TARP, that was not true because investments in common stock were made *selectively*. Preferred stock and debt investments were converted into common stock in Citigroup and AIG precisely because of the continuing weak financial condition of these firms in 2009 and 2010. Thus, it is no surprise that realized returns on their common stock were meager. In other words, any TARP investment in a too-big-to-fail bank *had always been* an implicit contingent common stock investment, which would convert to common stock as needed to preserve the "too-big-to-fail" institution. It was unlikely that the government would use its preferred status in the states of the world where it would be financially useful to do so (in bankruptcy or receivership) because the government would convert to common stock in order to prevent bankruptcy or receivership.

This contingent equity aspect of TARP investments in too-big-to-fail institutions highlights one of the respects in which TARP differed from conventional debt or preferred stock programs of bank assistance like, for example, collateralized lending by a central bank under "Bagehot's Rule," or the Reconstruction Finance Corporation's (RFC) preferred stock program initiated in March 1933.⁶ Collateralized lending to banks relies upon the use of relatively high-quality assets to make government loans less risky to the central bank or taxpayers. This form of assistance can be effective in resolving pure liquidity problems (where banks lack cash but their problems do not reflect a significant increase in their risk of insolvency). Collateralized lending does not work, however, when bank illiquidity is a symptom of substantially increased default risk of the bank. In such circumstances, the use of collateralized lending can actually exacerbate the liquidity problems of a bank by effectively subordinating the bank's depositors to the central bank or government lender (as depositors' claims become effectively junior to the new lender and are backed by relatively risky assets). Under such circumstances, a collateralized loan that raises the riskiness of deposits might even cause a depositor run rather than prevent one.

With that specific problem in mind, the Roosevelt administration implemented a preferred stock program for assistance to financial institutions as part of the Emergency Banking Relief Act of March 9, 1933. Investments of preferred stock were not

⁶ For studies of policies of the Reconstruction Finance Corporation and their effects on bank survival and lending see Mason (2001), Calomiris and Mason (2004), Calomiris, Mason, Weidenmier, and Bobroff (2013), and additional references in these studies. On theory of preferred stock as an effective tool, see Philippon and Schnabl (2013).

collateralized, were junior to all bank debt, including deposits, and failure to pay a preferred stock coupon did not force a bank into conservatorship. Thus, preferred stock added protection to deposits. At the same time, preferred stock was senior to common stock, which served as a buffer against losses on assets.

Preferred stock investments in banks, however, are not appropriate for assisting all banks. As fixed income investments that are senior to common stock, they contribute to highly leveraged banks' risk-management incentive problems, which are also known as the "debt overhang" problem (Jensen and Meckling 1976; Myers 1977; Hoshi and Kashyap 2010). The existing shareholders/managers of a bank that is close to insolvent or actually insolvent see little gain to themselves from limiting the risk of bank investments or finding good loan customers that would raise the bank's revenues as reductions in risk or expansions of cash flow would mainly accrue to other (senior) bank claimants. Providing more preferred stock to such a bank will add to its debt overhang problem and further discourage efforts to raise common stock, identify good loan customers, and manage risk properly and therefore may be socially wasteful.⁷

What can the government do when debt overhang makes preferred stock an undesirable means of assistance? One option is to force the bank to become a target in an assisted merger. This approach is often taken by the Federal Deposit Insurance Corporation for undercapitalized or insolvent banks, but it may not be feasible for a large bank given the difficulty in finding a large acquirer quickly (a problem further complicated by concerns about the increased concentration of banking in an already highly concentrated banking system). It is important to emphasize the speed with which resolution of a financial institution should occur. Global banks are counterparties in numerous short-term transactions; in order to avoid disruption to their operations and the operations of their counterparties, a bank must be resolved immediately upon any regulatory intervention that places it into conservatorship. Another option would be to place the bank into receivership and liquidate its assets without trying to find an acquirer. But institutions like Citigroup or AIG were regarded as "too big to fail," owing to their global scope, the complexity of their subsidiary structures, and their widespread linkages throughout the global financial system.

Still another option in the presence of debt overhang would be to purchase the institution's assets at above-market values, or to provide a subsidy to the institution in a way that guarantees those assets' values. Either of those actions would raise the market value of the equity of the institution, thereby alleviating its debt overhang problem. In a similar vein, the government could attach guarantees (effectively offering a put option) to public offerings of common stock issues by the institution,

⁷ The debt-overhang problem can be solved in some cases by requiring issues of subsidized preferred stock to be matched by new common stock issues (Calomiris 1998, 2008). However, when banks are in a very severe debt overhang situation, the ability to offer subsidies on preferred stock to encourage such matching is limited by the zero-coupon bound (the maximum subsidy that can be given for issuing preferred stock), and severely indebted banks may not be willing or able to satisfy such matching requirements.

which would raise the price of those offerings to an extent that would make offerings of new equity appealing to existing shareholders. In a later section, we assess these sorts of interventions. When neither speedy acquisition nor liquidation seem appropriate, and when subsidized put options on assets or new stock offerings are unappealing for some reason, government common equity investments become the path of least resistance for providing assistance to an insolvent, or nearly insolvent, “too-big-to-fail” institution like Citigroup or AIG.

The Objectives of Government Intervention to Assist Financial Institutions

Given the financial costs and design challenges of assisting banks, what prospective benefits may justify such costs? During the Depression, Irving Fisher and John Maynard Keynes articulated various channels through which weak banks can amplify macroeconomic downturns through reduced lending and asset price declines. This thinking became more integrated into macroeconomic thinking (not coincidentally) during the 1980s, particularly as the result of Bernanke’s (1983) work on the Great Depression and his and others’ empirical work on the macroeconomic consequences of US banks’ losses of bank capital in the 1980s (for example, Bernanke and Lown 1991).⁸

Banks are highly leveraged entities that act as repositories of private information about borrowers and securities issuers. Theories of financial intermediation show why their role as information repositories tends to be associated with high leverage (Diamond 1984; Calomiris and Kahn 1991; Krasa and Villamil 1992; Diamond and Rajan 2009). High leverage, however, also means that banks play a central role in propagating economic downturns (Bernanke and Gertler 1989). When shocks to banks’ borrowers produce loan losses, some banks fail and survivors’ capacity to bear risk declines, forcing cuts in lending.

As Adrian and Shin (2009) show, the real effects of intermediaries’ behavior are not confined to declines in lending. Because intermediaries play central roles in asset markets, their shrinkage can have dramatic effects on the prices of risky assets. For example, when hedge funds specializing in emerging market securities

⁸ For an early review of the literature on financial factors during the Depression, see Calomiris (1993). Bernanke’s (1983) time series study of the links between bank distress and economic activity has been criticized, but subsequent work, using panel data at the level of states or counties, confirms the importance of banking distress as a propagator of shocks during the Depression and also confirms the positive role that assistance to banks via the Reconstruction Finance Corporation played in mitigating the consequences of bank distress (Calomiris and Mason 2003; Calomiris, Mason, Weidenmier, and Bobroff 2013). In addition to the effects of bank condition on lending and securities pricing, Anari, Kolari, and Mason (2005) point to another channel through which bank distress magnified the economic downturn during the 1930s: the protracted process of liquidating the assets of banks that were placed into receivership. Liquidating assets depresses asset values in local markets. Those asset-pricing consequences created an incentive for postponing liquidation, which resulted in protracted delays in depositors’ ability to receive repayment of their deposits in failed banks.

lost money during the Russian crisis of 1998, Brazilian international bonds held by these funds were sold off massively. Because other investors not specializing in emerging markets had limited knowledge and consequently limited capacity for bearing emerging market risks, Brazilian sovereign debt prices fell dramatically. These connections between “funding liquidity” of intermediaries and “market liquidity” of securities have been formalized in Brunnermeier and Pedersen (2009).

Many of the debt instruments that banks rely upon for funding require them to maintain near-zero default risk. Because financial intermediaries depend upon risk-intolerant debt instruments (such as interbank deposits, repo, and commercial paper), they are especially vulnerable to adverse shocks to their asset values, which makes shocks to the value of banks’ assets (as in the case of subprime mortgages) especially likely to produce sudden declines in credit and in risky asset prices. These channels of transmission were visible in the recent crisis (Gorton 2009; Schwarz 2015; Calomiris 2009a; Heider, Hoerova, and Holthausen forthcoming; Ivashina and Scharfstein 2010; Gorton and Metrick 2012; Covitz, Liang, and Suarez 2013).

If the condition of financial intermediaries is an important propagator of shocks, then it may be useful to shore up the condition of intermediaries as part of a program of combating a recession caused by a major shock to the banking system. There is empirical evidence identifying favorable consequences for lending, asset pricing, and economic activity from assistance to financial intermediaries, policies that seek to improve the financial condition of intermediaries indirectly (for example, through debt re-denominations), or interventions to improve the liquidity of markets in the wake of bank failures (for example, government-sponsored asset management companies).⁹ Of course, this argument was used by Paulson and Bernanke in support of Congressional approval of TARP.

The debates over TARP, however, did not *only* reflect economic concerns and arguments, but also other considerations, which affected the process of approving TARP. Deep resentment toward banks—precisely because of their central role in precipitating the crisis—constrained public willingness to assist them. Deep suspicion of government policies to assist banks, which reflected legitimate concerns that government policies may serve special interests rather than the public interest,¹⁰ complicated any attempt by the government to assist banks. Nor was it obvious that government assistance to banks would actually be implemented wisely. For example, it is hard to make sense of the government’s decisions to bail out

⁹ For a general review, see Calomiris, Klingebiel, and Laeven (2005), who discuss the relative advantages of different policy approaches in different economic environments. See also the aforementioned studies of the operation of the Reconstruction Finance Corporation as a particular example of the effects of preferred stock assistance to banks, and Kroszner (1999) and Calomiris (2007) on the positive macroeconomic consequences of redenomination. Bayazitova and Shivdasani (2012) show that capital injections into banks can be useful as a signal of favorable private information, which can reduce asymmetry of information in public markets.

¹⁰ History confirms that government regulations and government assistance should be understood as political outcomes reflecting the creation of coalitions sufficiently powerful to enact programs, not as the politically neutral application of economic ideas (Calomiris and Haber 2014, chap. 6–8).

Bear Stearns, AIG, and Citigroup, but to refuse to bail out Lehman. Furthermore, it is far from obvious that “too-big-to-fail” bailouts always make sense, especially when one considers the hard-to-measure moral-hazard costs in the future that come from such bailouts today.

The Economic Consequences of TARP

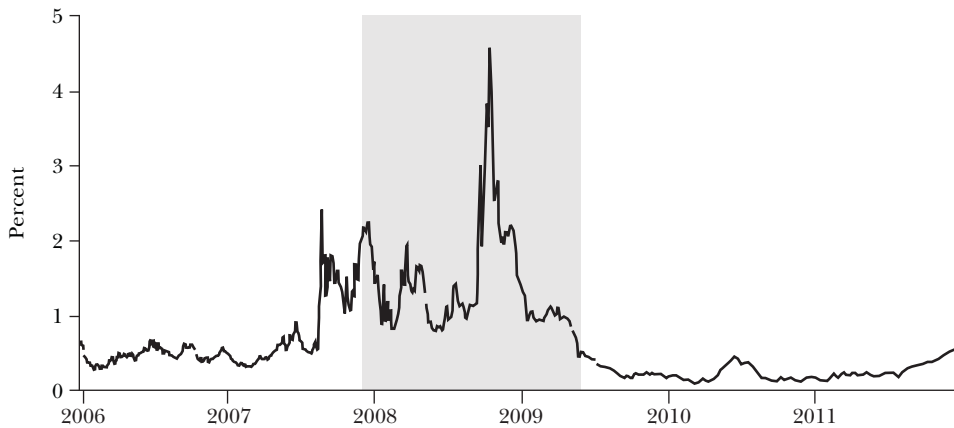
To fulfill TARP’s statutory requirements, the Office of Management and Budget and the Congressional Budget Office estimated the costs of TARP’s asset purchases and guarantees using procedures similar to those specified in the Federal Credit Reform Act of 1990 with an adjustment for “market risk,” as required by the authorizing legislation. The agencies interpreted market risk to be the premium that a private investor would require as compensation for the risk of the cash flows of the underlying transaction. Nominally, there were profits. As of March 12, 2014, the CBO estimated the net cost of TARP to the federal government, measured on the basis of nominal outlays and receipts, to be \$27 billion.¹¹ For the most part, the transactions with the banks, the focus of this paper, yielded a net cash flow gain. The net cash flow costs were largely from the assistance provided to AIG, the automotive industry, and the programs aimed at avoiding home mortgage foreclosures. The net cash flow gain estimated for the Cash Purchase Program was \$16 billion with only \$2 billion of preferred stock remaining outstanding. The CBO estimated a net cost of \$15 billion to the Treasury for the assistance provided to AIG under the Systemically Significant Failing Institutions program. All of the supplementary support provided to Citigroup and Bank of America through the Targeted Investment Program had been paid back and resulted in a net gain of roughly \$4 billion dollars to the federal government. Finally, the loss-sharing agreement with Citigroup through the Asset Guarantee Program yielded a net gain of \$3.9 billion.

But in evaluating the costs and benefits of TARP, as the authorizing legislation recognized, it is important both to adjust cash flows for the risk borne by taxpayers and to look beyond the net risk-adjusted cash flows received by taxpayers to examine the impact of TARP on the broader economy. After all, the first stated purpose of the program was “to restore liquidity and stability to the financial system of the United States.” But measuring risk adjustment on TARP funds (and the implied subsidy received by TARP recipients) and gauging the benefits to the economy from TARP are challenging, to say the least.

The most relevant measure of the subsidy received by TARP recipients is the estimate made at the time the funds were disbursed. The Congressional Budget Office used the market yields on actively traded preferred stock to gauge the size of the subsidy received by preferred stock issuers, and used the Black–Scholes option

¹¹ The White House Office of Management and Budget estimated the cost of TARP to be \$39 billion. The additional estimate of \$12 billion from the Congressional Budget Office largely related to CBO’s higher projection of costs for the mortgage programs under TARP.

Figure 1
TED Spread



Source: Federal Reserve Bank of St. Louis.

Notes: The TED spread is defined as the difference between the three-month LIBOR and the three-month Treasury bill yield. The shaded area marks the 2007–2009 financial crisis..

pricing model to value warrants. When no preferred stock was available for the issuer, it used a market index. On the first \$247 billion of TARP disbursements to banks, the implied subsidy received by program participants, estimated as of the end of 2008, was \$64 billion (Congressional Budget Office 2009, p. 1). The Office of Management and Budget's methods for calculating the implied subsidy arrive at comparable numbers. Veronesi and Zingales (2010) calculate a subsidy of between \$21 billion and \$44 billion on the first \$130 billion of TARP disbursements, which implies a comparable proportional value of the subsidy.

One would arrive at a higher subsidy cost estimate if one appropriately recognizes that TARP investments in the largest banks never were just preferred stock. As the experience of Citigroup and AIG show, taxpayers were effectively forced to convert preferred stock to junior equity positions in those institutions because their prospects were slow to improve. In that sense, taxpayers were effectively receiving a fixed income instrument but bearing the risk of losing their senior status on an as-needed basis.

Did the passage of TARP have positive effects on the financial system? Leading up to its passage, market credit spreads had increased to unprecedented levels as investors became increasingly risk-averse due to worries about the health of the banking system and the economy in general. Figure 1 shows the TED spread: that is, the difference between the bank-to-bank overnight lending rate embodied in the London Interbank Offered Rate (LIBOR) and the Treasury bill rate, which captures the extent to which the banking system experienced a crisis of confidence and a reduction in liquidity. The spread increased to 450 basis points, at its highest, in the aftermath of the bankruptcy of Lehman Brothers. Following the announcement

of the Capital Purchase Program on October 14, 2008, the first program of TARP announced in the pre-election phase, there were broad improvements in the credit markets. Between Friday, October 10 and Tuesday, October 14, the Standard and Poor's 500 rose by 11 percent and the common stock prices of the nine large financial institutions that were the very first participants of TARP increased by 34 percent (Veronesi and Zingales 2010). From October 13, 2008 (before the announcement of the CPP) to September 30, 2009, the LIBOR rate fell by 446 basis points and TED spread fell by 434 basis points. Costs of credit and perceptions of risk declined significantly in corporate debt markets as well. By the end of September 2009, the Baa bond rate and spread had fallen by 263 and 205 basis points, respectively (US GAO 2009, p. 37).

A specific goal of the Capital Purchase Program was to improve the banks' balance sheets by infusing banks with capital and thereby enhance the ability of banks to borrow and lend. The US Government Accountability Office (2009) reports that capital ratios at institutions that received CPP investments rose more than the ratios at nonparticipating institutions. Between December 31, 2008, and March 31, 2009, the Tier 1 risk-based capital ratio increased by, on average, 300 basis points in bank holding companies receiving CPP assistance relative to an increase of only 40 basis points in nonparticipating bank holding companies. The evidence also suggests that participating banks were more willing and able to increase lending than nonparticipating banks (US GAO 2009; Taliaferro 2009; Ng, Vasvari, and Wittenberg-Moerman forthcoming; Berger and Roman forthcoming; Li 2013). The 21 largest CPP recipients reported extending almost \$2.3 trillion in new loans as of July 31, 2009, since receiving CPP investments of \$160 billion.

How can one weigh and compare the costs and benefits associated with TARP to arrive at a net benefit estimate? Using an event study analysis of bank enterprise values, Veronesi and Zingales (2010) analyze the effect of the initial announcement of TARP assistance to the financial sector. They estimate that the October 13, 2008, announcement resulted in a net social benefit to financial intermediaries, after subtracting the cost to taxpayers, of between \$86 billion to \$109 billion, perhaps capturing the benefit of avoiding costly liquidation of financial intermediaries, among other things. This is a lower bound estimate of the social gains from TARP. The authors include in their measure of costs the \$125 billion preferred equity infusion in the nine largest US commercial banks via the Capital Purchase Program and a three-year government guarantee on new unsecured bank debt issues provided by the Federal Deposit Insurance Corporation. They find that banks that were more at risk of experiencing a sudden outflow of funding benefited the most from the government's intervention. More specifically, enterprise bank value increased the most for the three former investment banks (Goldman Sachs, Morgan Stanley, and Merrill Lynch) and Citigroup following the October 13 announcements, while the relatively healthy JP Morgan—which stood to gain from the continuing weakening of its troubled rivals—experienced the largest decrease.

The most important limitation of the Veronesi and Zingales (2010) calculation of the net gains from TARP is the authors' assumption that the only anticipated

costs to taxpayers under TARP as of October 14, 2008, were the outlays announced under the Capital Purchase Program (and the Federal Deposit Insurance Corporation debt-guarantee). In the event, as initial assistance proved inadequate for Citigroup, AIG, and Bank of America, several more assistance programs were announced by the federal government. To the extent that the potential weakness of these banks was known, and to the extent that the potential additional expenditures in response to that weakness were also forecastable, Veronesi and Zingales (2010) underestimate the expected costs of TARP as of October 13, 2008. The first round of assistance provided to the big banks effectively committed the government to a “whatever it takes” approach to keep AIG, Citigroup, and Bank of America alive, and therefore, the continuing cost to taxpayers actually experienced in 2008–2012 was predictable, at least to some degree. In other words, if TARP assistance would be forthcoming (and more junior in form over time) in response to worsening bank condition, the recipients effectively possessed a put option from the government to issue equity in addition to the explicitly recognized preferred stock investments made by the government. Veronesi and Zingales (2010) do not include the value of this put option in their measure of cost (Kane 2014).

With regard to TARP’s gross benefits, a credible evaluation of the impact of TARP assistance to financial institutions remains elusive. First, it is difficult, if not impossible, to isolate the effects of TARP from other initiatives of the Federal Reserve, Federal Deposit Insurance Corporation, and other financial regulators, or from other influences on the economy unrelated to government programs. For example, on October 14, 2008, the Capital Purchase Program was announced jointly with the Fed’s Commercial Paper Funding Facility Program and FDIC’s Temporary Liquidity Guarantee Program. Furthermore, it is hard to know to what extent the financial markets would have stabilized and the economy would have recovered in the absence of an activist government response. Some have argued that government support for financial institutions during the crisis confused and frightened market participants and was itself possibly a net negative for the economy. For example, Taylor (2010 p. 170; see also 2009) argues that the initial proposed structure of TARP was a further source of shock to markets as many people “were skeptical about how [the buying up of toxic assets] would work and government officials had difficulty explaining how it would work” (p. 171), but he concludes by conceding that after it became clear that TARP would take the form of capital injections, “conditions began to improve” (p. 172). Others point out that the failure of Lehman affected markets primarily by changing perceptions of the scale of loss associated with exposures to subprime and Alt-A mortgages. Lehman’s derivatives were liquidated in an orderly fashion, and no major intermediary actually failed as the result of interconnections with Lehman. From that perspective, Secretary Paulson’s view that the economy was teetering at the edge of Armageddon may have been a gross exaggeration.

Finally, it is possible to argue that there were additional social costs associated with the way TARP was administered and that alternative policies might have produced greater gross benefits. These questions are the topics of the next two sections.

Was TARP Administered Properly?

Corruption is a social cost, as it entails both a misallocation of resources and a diminution of justice. Did TARP adhere to objective eligibility requirements and a credibly fair and impartial process of allocation funds, or did it also reflect political influences that were unrelated to objective criteria?

The Capital Purchase Program was the first and primary initiative under TARP through which the Treasury made preferred stock purchases in qualified financial institutions. The final decision to make CPP investments rested with the Treasury, but federal banking regulators also played an important and influential role in the CPP application and approval process. The approval process began with the interested financial institution consulting with its primary federal bank regulator about being included in the CPP. The regulator assessed the applicant's strength and viability based on bank examination ratings, financial performance ratios, and other factors.¹² Institutions that were deemed to be the strongest, received presumptive approval and their application was forwarded to the Treasury's Investment Committee. Institutions deemed to be less strong required further review and were referred to the CPP council, which was comprised of representatives from the four primary banking regulators with Treasury officials as observers. Following the CPP council's evaluation, institutions that were approved by a majority of the council members were recommended to the Treasury's Investment Committee.¹³ The institutions with the lowest banking ratings and poor financial ratios were deemed ineligible for participation in the CPP, received a presumptive denial recommendation, and were not forwarded to the Investment Committee.

The Office of Financial Stability reviewed documentation of applications recommended by the regulators or the CPP Council and at times collected additional information about the applicants before submitting the applications to the Investment Committee. The Investment Committee made recommendations to the Assistant Secretary for Financial Stability for final approval after completing its review (US GAO 2010). Clearly, discretionary judgments played a significant role in the approval process.¹⁴

¹² Six performance ratios were identified to evaluate applicants. Three related to regulatory capital levels: the Tier 1 risk-based capital ratio, total risk-based capital ratio, and Tier 1 leverage ratio. The quality of assets was assessed using the ratio of classified assets, nonperforming loans, and construction and development loans to capital and reserves.

¹³ The Treasury provided guidance to the Capital Purchase Program council to use in assessing applicants that allowed consideration of additional factors (such as signed merger agreements, confirmed investments of private capital beyond, and others) beyond examination ratings and financial ratios (US GAO 2010, pp. 11–147).

¹⁴ The nine largest financial institutions that were included in the Capital Purchase Program at the time of its establishment did not follow the application process described above. These were Bank of America, Bank of New York Mellon, Citigroup, Goldman Sachs, JP Morgan Chase, Merrill Lynch, Morgan Stanley, State Street, and Wells Fargo. They were offered assistance by virtue of their systemic importance and were asked to participate in the program even if they did not want to do so.

The US Government Accountability Office's (2010) review of the approval process for participation in the Capital Purchase Program revealed that almost all of the reviewed institutions had satisfactory or better overall ratings. However, a quarter of the examination ratings used for making approvals were more than one year old, 5 percent were more than 16 months old, and 104 of 567 reviewed applications lacked a date of the most recent bank examination. Several approved institutions also exhibited weaker characteristics that made their viability doubtful. The Government Accountability Office discovered that 12 percent of the approved cases reviewed (66 institutions) either: 1) did not meet the performance ratio guidelines; 2) had an unsatisfactory bank examination rating; or 3) had a formal regulatory enforcement action involving safety and soundness concerns. This could partly be a result of limited communication and guidance from the Treasury to the CPP council regarding how to assess viability during the early stages of the CPP. A 2009 audit of the CPP review and approval process by the Federal Reserve's Inspector General found that applicants would have been analyzed consistently and completely if the Treasury had provided formal and detailed procedures to evaluate applicants (Board of Governors 2009).

Marginal cases that were approved for the Capital Purchase Program displayed more financial weaknesses than others. The US Government Accountability Office (2010) reports that 39 percent of the 66 approved institutions with marginal characteristics missed at least one CPP dividend payment. In comparison, only 20 percent of all CPP participants had missed at least one dividend payment. By August 2010, several marginal cases also had received formal enforcement actions.

Not all of the administrative shortcomings of TARP can be attributed to innocent oversights or incompetence, and political connections seem to have played a part in the approval and allocation of TARP funds.¹⁵ Congressional campaign contributions from the financial services industry were associated with a higher likelihood of voting in favor of the Emergency Economic Stabilization Act of 2008 (Mian, Sufi, and Trebbi 2010). Institutions that employed ex-regulators or federal government employees, or were headquartered in the election districts of House members on key finance committees were more likely to be approved for participation in the Capital Purchase Program (Duchin and Sosyura 2012; Blau, Brough, and Thomas 2013). For example, Duchin and Sosyura (2012) report that banks employing a director who worked at the Treasury or one of the banking regulators were 9.1 percentage points more likely to be approved for participation in CPP. Campaign contributions and lobbying expenditures by institutions increased the likelihood of receiving CPP investments. Political connections also influenced the amount and timing of investments under TARP. Politically connected institutions received a greater amount

¹⁵ Some readers will remember the infamous Keating Five, a previous example where it appeared that there had been political interference in financial regulation. Five US Senators were accused of improperly intervening in 1987 on behalf of Charles H. Keating, Jr., Chairman of the Lincoln Savings and Loan Association. Lincoln was a target of regulatory investigation by the Federal Home Loan Bank Board (FHLBB). Following the intervention of the Senators, FHLBB backed off from taking action against Lincoln and subsequently it failed in 1989 at a cost of \$3 billion to the taxpayers.

of TARP support, and it was provided earlier, relative to firms that lacked political connections. Politically connected recipients subsequently underperformed unconnected firms based on both stock returns and on accounting-based performance measures (Duchin and Sosyura 2012).

Alternative Policies, Inefficiencies, and Political Constraints

TARP was crafted in a volatile political and economic environment, in the middle of a financial crisis, and just prior to a major election (Swagel 2009). Its architects were in a hurry to enact TARP and knew that it was not going to be easy to get agreement on a blank check for hundreds of billions of dollars to assist “fat cats” on Wall Street. TARP’s main design challenge was to balance the often conflicting objectives of shoring up banks while ensuring “social justice” by limiting how much banks’ owners, creditors, and employees would benefit personally at taxpayers’ expense. Here we consider several of the alleged shortcomings of TARP’s design that gave rise to inefficiencies relative to alternatives, and also consider the extent to which those shortcomings were the product of political compromise.¹⁶

Should the Structure of TARP Have Been Debated More Broadly?

One of us suggested to a senior Congressional staff member in September 2008 that Congress should invite economists to offer views on how TARP might be structured. This could have been accomplished very quickly, as many knowledgeable people were interested in participating. The staffer explained that an election was coming. Democrats anticipated control of both houses of Congress and the White House. They had little to gain, and much to lose, from becoming vocal proponents of a new plan or vocal opponents of Secretary Paulson’s plan. Although the Democratic leadership had serious doubts about the asset purchase plan, they did not want independent testimony to put them “on the spot.” They did not want to have to create or politically “own” new ideas about assisting banks. The path of least political resistance was to let Secretary Paulson take the lead and the responsibility. This explains why no independent testimony or substantive public policy debate over the structure of TARP occurred during the crucial days from mid-September until early October 2008. It may also explain the Treasury’s ill-fated advocacy of the asset purchase approach—an idea that was untested and viewed by many as unworkable. In contrast, capital injections had been used successfully in the United States in the 1930s and in Scandinavia in the 1990s. Problems in Japan’s implementation

¹⁶ We consider broad design features below. There are also several narrower design issues that have been considered in the literature. For example, Wilson (2013) finds that permitting some banks to issue noncumulative preferred stock was associated with a greater probability of missing a dividend payment.

of capital injections were also well known (Calomiris 1998; Calomiris and Mason 2004; Hoshi and Kashyap 2010).¹⁷

Those experiences provide evidence in favor of the efficacy of capital injections, and identify some design errors in TARP's capital injection program that might have been corrected. Specifically, we consider: 1) the requirement that warrants be issued alongside preferred stock, 2) permitting common dividends to be maintained by recipients of TARP assistance, 3) debt overhang problems (which ultimately led to the government's common stock holdings in Citigroup and AIG), and 4) compensation limits for recipients of assistance.

Should Warrants Have Been Required?

Requiring recipients of TARP assistance to issue warrants alongside preferred stock had political appeal as it allowed taxpayers to participate in the upside once the crisis ended. But did the use of warrants make economic sense as part of TARP assistance? The purpose of TARP was not to create profit opportunities for taxpayers, but to stabilize the banking system and the economy. From that perspective, requiring warrants was not helpful because the inclusion of warrants discouraged private stock issuance by taking away some of the upside available to stockholders (Calomiris 1998, 2009a, b; Calomiris and Mason 2004). A much better approach would have been to reward banks that received preferred stock assistance for raising new common stock in the market (for example, by making coupons on preferred stock fall with new common stock issues). That approach would have magnified the effects of TARP preferred stock through higher common stock offerings, resulting in greater bank stability and more protection against loss to taxpayers. It would have meant an even larger subsidy on the preferred stock coupon, but subsidy is the essence of government assistance—that subsidy would have been directly linked to the economic improvements that were the goal of TARP. Warrants were a popular tool for politicians who wanted to make speeches about how bankers' profiteering would be limited, but they also were an impediment to encouraging the more rapid private recapitalization of banks, which would have reduced taxpayers' risks and increased banks' stability and lending capacity.

Should Common Stock Dividends of TARP Recipients Have Been Reduced?

Participants in the Capital Purchase Program should not have been permitted to pay common stock dividends. If banks are undercapitalized enough to warrant taxpayer-funded recapitalization, then they should be forced to accumulate capital through retained earnings. Also, the protection taxpayers enjoy through the seniority of preferred shares is lessened, and debt overhang problems are exacerbated, by paying dividends.

This feature of TARP is generally explained as the result of a political deal between the Treasury and the healthy large banks (such as JP Morgan Chase) which

¹⁷ For a summary of some of the literature on crisis-management policies, see Calomiris, Klingebiel, and Laeven (2005).

otherwise would not have bent to Treasury's pressure to participate in TARP. But that explanation raises a deeper question: what was the presumed advantage from getting healthy banks to participate in TARP? One explanation is the desire to mask differences among banks so that weak banks are not identified by virtue of their participation. But the market was well aware of the differences in the relative strength of various financial institutions. The 90-day moving average of Citigroup's market equity-to-asset ratio fell to about 2 percent in late 2008 and reached 1 percent in early 2009, while JP Morgan Chase's market equity-to-asset ratio consistently remained several times as high (Calomiris and Herring 2013). Having JP Morgan Chase sign up for assistance did nothing to make Citigroup seem stronger.

Should Compensation Limits Have Been Less Onerous?

Limits on participating banks' compensation rules were part of TARP from the beginning and the limits became more binding with the passage of ARRA in February 2009. Like the use of warrants, compensation limits served the political purpose of building support for TARP assistance programs, but increasingly binding limits encouraged strong banks to avoid TARP. That policy generated the early exodus from TARP by many big banks in mid-2009 and reduced other relatively strong banks' willingness to apply for assistance in the program (Bayazitova and Shivdasani 2012; Cadman, Carter, and Lynch 2012), which lessened the impact of TARP in increasing the supply of lending. Cadman, Carter, and Lynch (2012) find that increasing compensation from the 25th to the 75th percentile of banks was associated with a doubling of a bank's unwillingness to accept TARP funds. They also find that TARP recipients tended to suffer larger managerial turnover and the presence of severance agreements made banks hesitant to participate in TARP, consistent with concerns about a talent drain related to compensation limits.¹⁸ Bayazitova and Shivdasani (2012, p. 390) find that the presence of highly compensated CEOs reduced the chance of being approved for TARP: "A one-standard-deviation increase in the log of CEO compensation in excess of \$500,000 is associated with an 11.4-percentage point reduction in Treasury approval, or roughly one-sixth of the size of the unconditional approval probability."

Better Ways of Addressing Debt Overhang?

The debt overhang problem arises when debts are so large that any gains to banks are likely to benefit only debtholders rather than shareholders. In the cases of AIG and Citigroup, the debt overhang problem ultimately led to the transformation of government assistance into common stock ownership. Might better alternative solutions have avoided such a high degree of taxpayer exposure to potential loss? At least three viable alternatives were known and discussed. The problem with each of

¹⁸ Cadman, Carter, and Lynch (2012) do not find any difference in lending between TARP recipients and other banks, but as they recognize, this likely reflects selectivity bias; TARP recipients likely would have cut lending if they had not received TARP. Li (2013) finds that TARP funding did in fact increase the supply of lending.

them is that they would have required an explicit payment of a subsidy rather than the implicit payment associated with TARP's more politically palatable willingness to bear downside risk.

One approach would have used out-of-the-money guarantees to boost the value of distressed assets, thereby raising the value of banks' assets and overcoming the debt overhang. One of us proposed such an approach for especially weak banks in late 2008 and early 2009 (Calomiris 2009b), and argued that such subsidies could be combined with requirements that banks receiving such guarantees raise common stock to bolster their resiliency and enable them to expand their lending. To be concrete, in late 2008, as the result of the collapse of market liquidity, many portfolios of subprime and Alt-A mortgages were being priced very low (in rarely observed market transactions) compared to their expected recovery values. If the government had offered a free put option on, say, Citigroup's entire portfolio of subprime and Alt-A mortgages and mortgage-backed securities (to prevent cherry picking) at 50 percent of face value, that would have substantially raised the market value of Citigroup's shares. Even if 50 percent of the mortgages underlying that portfolio had gone to foreclosure with a loss, given default, of 50 percent, the recovery value of the portfolio would have been 75 percent, implying no cash flow cost to taxpayers from providing a put option at 50 percent of face value. Of course, if this guarantee had been priced on market terms, there would have been no subsidy, and also no effect on Citigroup's stock price.

A second approach would be to attach put options to new stock offerings. The government could offer buyers of new shares a put option at, say, 30 percent below the price paid for those shares in the market. This step would raise the price of new offerings, substantially improving the ability of banks to raise common stock, and would limit taxpayers' exposure to extremely unlikely states of the world (where cumulative losses on shares exceeded 30 percent).

A third approach would be to copy Mexico's "Punto Final" program of 1999, which helped to end the Mexican banking system's financial gridlock (Calomiris, Klingebiel, and Laeven 2005; Calomiris 2009b). The Mexican government matched loan write-downs that were agreed between creditors and debtors so long as they were agreed quickly (within six months). For example, the US government could have agreed to pay 30 cents to a creditor for every dollar that the creditor decided to forgive in troubled mortgages, leaving it to the creditor to decide which mortgages to include in the subsidized write-down program. Value-maximizing creditors would have used this subsidy to write down mortgages that were close calls—those for which (absent the subsidy) foreclosure was the best strategy for the creditor, but for which a subsidy would make it worthwhile for the creditor to agree to a moderate write-down. A Punto Final approach not only would have raised bank asset and equity values, it would have improved the wealth of many mortgage holders and eliminated some of the uncertainty that plagued the housing and mortgage markets.

Despite discussions of all three approaches, including by Secretary Geithner in early 2009, political opposition to subsidizing the big banks blocked these subsidy

proposals. Ricardo Caballero, a vocal proponent of using subsidized out-of-the-money guarantees of bank assets or stock offerings, complained in frustration in an article published in February 2009: “Politics require that a ‘good deal for taxpayers’ is added to . . . [the] . . . principles [guiding TARP], but the truth is that the best deal for taxpayers, once one considers the endogenous response of the economy, is anything that works to stabilize the financial system . . .”

Should Assistance to Banks Have Been More Generous or More Selective?

Li (2013) shows that TARP recipients increased the supply of credit they provided to the economy. Local markets in which a higher proportion of banks received TARP funds experienced improved economic conditions (Berger and Roman 2015). Croci, Hertig, and Nowak (2015) argue that more forgiving standards for TARP assistance to voluntary participants would have reduced resolution costs for the Federal Deposit Insurance Corporation, and that on net, this would have been desirable.

These analyses tend to support the view that TARP should have been more generous. However, there are some counterbalancing considerations. Financial institutions that can reasonably expect to receive assistance if they take risks that could lead to insolvency, will have a moral hazard incentive to engage in riskier behavior, which means that the costs of providing such incentives are potentially large (Duchin and Sosyura 2014). Furthermore, the ability to survive the crisis after receiving assistance sets too low a standard because it neglects the long-term social gains that come from transferring poorly performing banks to relatively efficient management. Berger and Roman (forthcoming) find that TARP funds were a source of major competitive advantage in local markets, and as such they could be used inappropriately to offset the disadvantages that come from poor management. Cornett, Li, and Tehranian (2013) found that relatively weak banks that received TARP tended not to make as much high-quality loans in response to receiving funding, or to reduce expenses as much, and were less likely to repay their funding. Bayazitova and Shivdasani (2012) found no evidence of certification gains from receiving Capital Purchase Program infusions, indicating little belief among those out in the market that government selections conveyed useful positive private information about bank quality.

With respect to large banks, counterfactual resolution costs from allowing failure are hard to gauge. It is hard to find an acquirer for a global behemoth, and liquidation is particularly costly for complex organizations with cross-border reach (which substantially complicates regulatory jurisdictional challenges). On the other hand, moral-hazard costs from predictable too-big-to-fail protection may be especially great (Black and Hazelwood 2013).

Conclusion

Six years after the passage of TARP, it remains hard to measure the total social costs of the assistance to banks provided under TARP programs. While TARP’s

passage was associated with significant improvements in financial markets and the health of financial institutions, from an economic perspective TARP could have been better designed to achieve more benefits at lower costs. Several of the design choices made under TARP—the lack of strict limits on common dividend payments, the use of strict limits on executive compensation by participants, the contingent use of common stock investments to replace preferred stock investments in especially weak, too-big-to-fail banks instead of subsidized guarantees for troubled assets or new stock issues—all reflected fundamental political obstacles that constrained the mechanisms that were chosen.

Any evaluation of TARP must look beyond its effects on GDP and recognize that democracies also value justice, which further complicates any evaluation of TARP's design. Beyond its economic costs and benefits, TARP clearly entailed other social costs. Many found assistance to bankers unjust, or insisted on attaching conditions to that assistance that weakened its effectiveness. Evidence of corruption in choosing which banks received TARP funds also added to the noneconomic social cost.

The implementation of TARP was hasty and heavily influenced by the immediate political backlash produced by the financial crisis, especially in the crucial weeks between Lehman's failure and the election. From that perspective, perhaps the clearest lesson from TARP is that it would be useful to evaluate TARP and reach agreement within our democracy about the difficult tradeoffs involved in designing crisis assistance to banks *before* another crisis is upon us. That way, our discussion of the myriad economic and noneconomic costs and benefits can be more complete, informed, and thoughtful. This is particularly important in light of the new limits that the Dodd–Frank Act of 2010 has placed on Federal Reserve assistance to troubled financial institutions under Section 13(3) of the amended Federal Reserve Act. The Fed was actively involved throughout the financial crisis in taking on risk through guarantees, purchases, and loans. In the future, the ability of the Fed to do so will be substantially more constrained. Although it is reasonable and appropriate to limit Fed discretion on fiscal matters, having done so, it is all the more necessary to plan ahead transparently and wisely for the next crisis. The United States has suffered 17 major banking crises since 1792; it is unlikely that the subprime mortgage crisis will be our last.

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