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Measuring the Cost of Bailouts

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Abstract

This review develops a theoretical framework that highlights the principles governing economically meaningful estimates of the cost of bailouts. Drawing selectively on existing cost estimates and augmenting them with new calculations consistent with this framework, I conclude that the total direct cost of the 2008 crisis-related bailouts in the United States was on the order of $500 billion, or 3.5% of GDP in 2009. The largest direct beneficiaries of the bailouts were the unsecured creditors of financial institutions. The estimated cost stands in sharp contrast to popular accounts that claim there was no cost because the money was repaid, and with claims of costs in the trillions of dollars. The cost is large enough to suggest the importance of revisiting whether there might have been less expensive ways to intervene to stabilize markets. At the same time, it is small enough to call into question whether the benefits of ending bailouts permanently exceed the regulatory burden of policies aimed at achieving that goal.

1. INTRODUCTION

Following the wave of emergency policy actions taken in response to the financial crisis of 2008, there has been a resurgence of interest in bailouts and their consequences. Perhaps the dominant view among academic economists is that, given the available alternatives at that time, the bailouts of critical financial institutions were necessary to avert even greater economic harm (e.g., Bernanke 2015). However, consensus remains elusive.[1] Some (e.g., Ball 2018) have argued that more aggressive rescue policies (e.g., of Lehman Brothers or of underwater homeowners) were clearly called for. Others (e.g., Miron 2009) believe that more institutions should have been allowed to fail, at least temporarily, so as to shift more costs to unsecured creditors. Popular perceptions about bailouts also are mixed. One commonly heard narrative is that ordinary taxpayers were forced to pay huge sums to rescue rich bankers. Others point to tallies showing that net costs to taxpayers were modest or even negative. Certainly, political distaste for bailouts influenced key provisions of the Dodd–Frank Act of 2011, which made sweeping changes to the regulatory landscape with the stated intent of forever ending bailouts.[2]

A decade after the crisis, it is worthwhile to review what economists know about bailouts and the open questions that remain. The goal of this article is to inventory, on a consistent and economically meaningful basis, the direct costs and beneficiaries of the major post-2007 US bailouts. It also provides a brief discussion of the ideas in the literature on the broader costs and benefits of bailouts.

Perhaps the most fundamental questions about bailouts are whether and when their benefits justify their costs. Bailouts have both direct and indirect costs and benefits. I use the term direct to refer to the value transfers associated with bailouts arising from government subsidies, implicit guarantees, and administrative rulemakings. Direct costs are generally borne by taxpayers, while direct benefits accrue, in varying proportions in different circumstances and at different times, to the shareholders, debtholders, customers, and employees of the rescued institutions. Indirect costs include ex ante distortions to managerial incentives for risk-taking; the lasting economic distortions from bailing out some institutions and not others; distortions from the consequences of some regulatory responses; and the public's aversion to subsidizing private financial institutions and wealthy investors. Indirect benefits include staving off financial panics and damage to the real economy and preserving jobs and organizational capital in institutions with positive externalities.

A major focus of this review is on meaningful measurement of the direct costs of bailouts, and the incidence of the corresponding direct benefits. Accurate assessment of the direct cost of bailouts is important for several reasons. It is an essential input into any cost–benefit analysis of bailout-related policies, and necessary to answer questions such as: Did the likely benefits of the policy justify the costs? Or, could the benefits have been achieved at a lower cost? More broadly, credible cost assessments may reduce political and policy discord by helping to reconcile widely divergent perceptions about fairness and about the size and incidence of costs and benefits. Importantly, too, it is much more feasible to put dollar values on direct costs and benefits than on indirect effects, where disagreements are less likely to be resolvable.

The analysis here of direct costs draws selectively on existing cost estimates and augments them with additional calculations. The largest costs arose from Fannie Mae, Freddie Mac, the Troubled

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[1]Emblematic of the disagreements is the 2011 report by the Financial Crisis Inquiry Commission (FCIC 2011), which had been tasked with reaching consensus but in the end published a report that included two dissenting opinions along with the majority view.

[2]"An Act to promote the financial stability of the United States by improving accountability and transparency in the financial system, to end 'too big to fail', to protect the American taxpayer by ending bailouts, to protect consumers from abusive financial services practices, and for other purposes" (Dodd–Frank Wall Street Reform and Consumer Protection Act 2010).

Asset Relief Program (TARP), and the Federal Housing Administration (FHA). The contingent liabilities of the Federal Reserve and the Federal Deposit Insurance Corporation (FDIC) were greatly elevated, but taxpayers were largely shielded from those exposures by banks or covered by TARP. I conclude that the total direct cost of crisis-related bailouts in the United States was on the order of $500 billion, or 3.5% of GDP in 2009. That conclusion stands in sharp contrast to popular accounts that claim there was no cost because the money has been repaid, as well as to claims of costs in the multiple trillions of dollars. The estimated cost is large enough to suggest the importance of revisiting whether there might have been a more cost-effective way to achieve similar results. At the same time, it is small enough to call into question whether the benefits of ending bailouts permanently exceed the regulatory costs of policies aimed at achieving that goal.

The rest of this article is organized as follows. Section 2 provides a working definition of what is and is not a bailout, and lays out the theoretical principles that govern how direct bailout costs can be meaningfully measured. Those principles are contrasted with typical measurement practice. Section 3 inventories the bailouts associated with US policy actions precipitated by the 2008 financial crisis. It reports estimates of the direct costs and identifies the direct beneficiaries and payors. Section 4 briefly reviews the ideas in the literature on the broader costs and benefits of bailouts. Section 5 concludes and offers suggestions for further research.

2. WHAT IS A BAILOUT, AND WHAT DOES IT COST?

Although most economists seem to recognize a bailout when they see one, the term bailout is not a well-defined economic concept. Wikipedia provides a sensible starting point, defining a bailout as "a colloquial term for the provision of financial help to a corporation or country which otherwise would be on the brink of failure or bankruptcy" (see **https://en.wikipedia.org/wiki/Bailout**). However, not all financial help constitutes a bailout. The working definition of what is and is not a bailout that is used in this review is as follows:

- A bailout involves a value transfer arising from a government subsidy or an implicit guaranty that is triggered by financial distress, or a value transfer arising from new legislation passed in response to financial distress.
- A value transfer from the government is not a bailout if a fair or market value insurance premium was assessed and collected ex ante, or if there is a credible structure for recovering the full value of the assistance from the industry ex post (with some caveats).

This definition distinguishes between rescues arising from insurance that is paid for either ex ante or ex post and episodes where the costs fall on taxpayers—the former are not bailouts, while the latter are. However, the distinction is not always clear. An example of the gray area is when borrowers pay a subsidized insurance premium to the government, as for FHA mortgage guarantees. The losses incurred by that program are a payout on an insurance policy that was partially paid for by mortgage borrowers. However, because the premiums were subsidized, a portion of the costs incurred represents a bailout.

For certain types of government assistance, such as support provided by the FDIC or under the Terrorism Risk Insurance Act, the law provides for cost recovery from the insured entities ex post. Such ex post collection mechanisms can be optimal when there is significant uncertainty about the probability and size of losses, when governments are unable to prevent premiums from being diverted to other uses, and when moral hazard is not an important consideration. Optimality aside, such mechanisms greatly reduce the likelihood and cost of taxpayer-funded bailouts. (However, they do not eliminate them when there is the possibility that the industry will be unable to fully meet its obligations.) A subtler issue is whether this sort of provision is effectively also a tax, because

firms operating in the insured industry have no control over how much money the program will spend and they cannot opt out of it. This is essentially the situation for FDIC-insured financial institutions, as discussed in Section 3.

2.1. Measuring Bailout Costs: Theory Versus Practice

The conceptually best way to think about the direct costs (and benefits) of bailouts is subtler than is generally appreciated, and as a consequence popular accounts of bailout costs tend to severely overstate or understate their true economic value. Three possible approaches to cost measurement are evaluated here through the lens of a simplified Arrow–Debreu state pricing framework. The Arrow–Debreu approach clearly shows why some approaches make sense and others do not, and why different approaches lead to widely divergent cost estimates. The preferred approaches can be operationalized using standard valuation techniques to produce fair value cost estimates. In Section 3, these techniques are applied to the major bailouts arising from the 2008 financial crisis and its aftermath.

2.1.1. Three approaches to direct cost measurement and benefit attribution. The direct cost of a bailout is the difference between the value of resources committed to the rescued entity by the government and the value of potential recoveries and fees. For example, under TARP the government provided banks with capital in exchange for preferred stocks and warrants, and the bailout cost for a given institution was the excess of the payments made over the value of the stocks and warrants the government received.

For a bailout cost measure to be economically meaningful, it has to be evaluated as of a fixed point in time on a market or fair value basis. In most cases, the natural choice is the year the bailout is initiated, for instance, when new legislation is passed or administrative policy changes are announced or implemented, or shortly thereafter. The cost is then the net present value of associated stochastic future cash flows, evaluated using a market or fair value methodology. This is the preferred approach when it is feasible to apply it. It takes into account the full distribution of possible future cash flows to and from the government, time value, and the cost of the associated risks.

Other events that satisfy the working definition of a bailout do not have a well-defined starting point. Ongoing subsidized government loan guarantee and direct loan programs, such as for mortgages and student loans, gave rise to enormous government losses in the years following the financial crisis. In such cases, a measure of bailout costs is the net present value (NPV) of the subsidies delivered or expected to be delivered on new credit support extended during the crisis period, plus the subsidy element of outstanding credit support just before the start of the crisis. Estimates using this second approach are referred to as ex ante bailout costs. Similarly to the preferred measure, it takes into account the full distribution of future outcomes, time value, and the cost of priced risks.

The third approach simply adds together all realized cash flows between the government and the bailed out entity, positive and negative. This is referred to as ex post cash accounting.[3] This approach is not theoretically justifiable for several reasons. It neglects time value and risk adjustment, and ignores the possibility that the outcome could have been different from what transpires. Nevertheless, it is most frequently how costs are calculated in popular accounts and government reports, as well as in some academic analyses.

2.1.2. State pricing. A simplified application of state pricing, based on the insights of Arrow & Debreu (1954), recognizes that implicit in market prices are a set of pure exchange rates between

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[3]In the venture capital context, this is referred to as cash-in cash-out.

different states of the world and at different points in time.[4] For simplicity, assume that there are only three possible states of the world at every point in time, t, recession, normal, and boom, denoted x_j, where $j = 1$, 2, and 3, respectively, and that the transition probabilities from x_i at $t -$ 1 to x_j at t, $\pi_{i,j}$ are constant for all i, j, and t. Let $V_{i,j}$ denote the amount of $t - 1$ consumption in x_i that has equal value to 1 certain unit of consumption in x_j at t. Then the state price at $t - 1$ in x_i for one unit of consumption in x_j at t can be written as $P_{i,j} = \pi_{i,j} V_{i,j}$.

A numerical example illustrates the alternative cost concepts and why they lead to very different conclusions. The annual transition probability matrix with elements $\pi_{i,j}$ is

$$\begin{vmatrix} .3 & .68 & .02 \\ .1 & .75 & .15 \\ .05 & .8 & .15 \end{vmatrix}.$$

For example, the first row represents the probability of being in a recession, a normal period, or a boom in the following year, starting from a recession in the current year. The values were chosen so that normal times are the most likely to follow any economic condition, and recessions are somewhat persistent. Going directly from a recession to a boom is unlikely, and vice versa. The implied steady state is a recession 12% of the time, normal conditions 75% of the time, and a boom 13% of the time.

The value matrix with elements $V_{i,j}$ is

$$\begin{vmatrix} 1.15 & .9 & .85 \\ 1.2 & .94 & .92 \\ 1.25 & .93 & .91 \end{vmatrix}.$$

The value matrix reflects the idea that people want to move resources into recession states, for instance, paying 1.2 consumption units during normal times to get just 1 consumption unit in a subsequent recession. The value less than one of moving resources into normal times or a boom reflects a positive rate of time preference in equilibrium in those instances.

Combining the transition probability matrix with the value matrix gives the state price matrix with elements $P_{i,j}$:

$$\begin{vmatrix} .345 & .612 & .017 \\ .120 & .705 & .138 \\ .0625 & .744 & .137 \end{vmatrix}.$$

The state price matrix can be used to price any future state contingent claim. For example, the one-period risk-free rate during a recession is the inverse of the price of a certain claim to one unit of consumption next year: $1/(.345 + .612 + .017) - 1 = .027$. The risk-free rate computed similarly in normal times is 3.8%, and 6.0% in a boom. In a complete set of markets, state prices can be extracted from market prices, but the transition probability and value matrices cannot be inferred without making additional identifying assumptions. Nevertheless, I started with those objects as a reminder of the intuitive links among state prices, preferences, and probabilities.

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[4]The theoretical result requires complete markets. I assume throughout the analysis that markets are complete enough for fair value estimates to reflect underlying preferences and beliefs or, in any case, to be the best available aggregators of information about value.
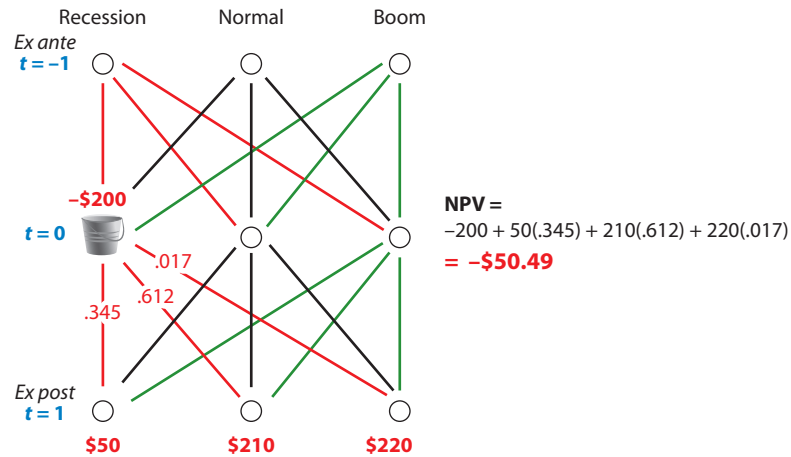
Figure 1

Cost computed as net present value (NPV) as of the time of bailout.

2.1.3. Comparing approaches with state price example.
Consider three consecutive years, $t = -1$, 0, and 1: the year prior to a bailout event, the year a bailout event occurs, and the year after the bailout event. Assume bailouts occur only in the recession state, and that the state price matrix is constant across all states and times. If a bailout occurs, the government recovers a state-dependent amount from the bailed-out entity in the following year. For example, assume the government spends $200 million on the bailout at $t = 0$. If at $t = 1$ the economy continues to be in recession it recovers $50 million, whereas if it is back to normal the recovery is $210 million, and in a boom it recovers $220 million.

The first approach, referred to as the NPV as of the time of bailout, defines the cost of the bailout as the (negative) NPV at the time of the bailout of current and future expected cash flows to the government, evaluated at state (market) prices. Using assumed state prices and payoffs, the cost is $-200 + 50(0.345) + 210(0.612) + 220(0.017) = -\$50.49$ million. **Figure 1** graphically illustrates the calculation.

The second approach, referred to as the ex ante NPV, looks at the cost of a bailout at a point in time and state of the world before a bailout has taken place, but when it is understood that there is a possibility of a future bailout action. For this example, the calculation is as of $t - 1$ and the economy is assumed to be in a normal state at that time. The calculation differs from the previous approach because ex ante there is a fairly small probability that a bailout will occur. The cost is $0.120[-200 + 50(0.345) + 210(0.612) + 220(0.017)] = 0.120(-\$50.49) = -\$6.06$, an order of magnitude smaller than at the time of the bailout. **Figure 2** illustrates the calculation. Note that if the $t - 1$ state had been a recession or a boom, then the ex ante NPV would have been higher in the former and lower in the latter because the relevant state prices would have been different.

The third approach, referred to as ex post cash accounting, equates the raw sum of cash inflows and outflows from the government with cost. For example, assume that in the year following the bailout the economy returns to normal, in which case the government recovers $210 million. The government earns a "profit" from the bailout of $-\$200 + \$210 = \$10$ million. **Figure 3** illustrates the situation and makes clear its conceptual shortcoming.

Ex post cash accounting fails to recognize that at the point in time when assistance is committed there is no assurance about how much will be recovered. In fact, because it is most likely that a recession will be followed by a recovery, it is probable that the government will show a "profit."
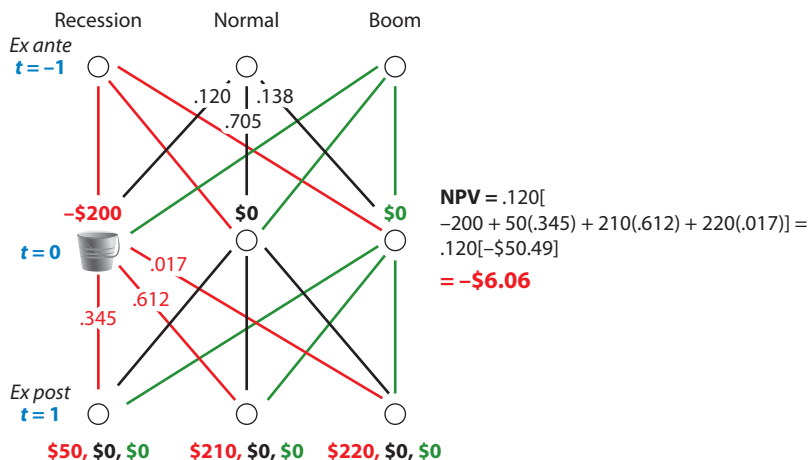
Figure 2

Cost computed as ex ante net present value (NPV). The dollar values at the bottom (in the middle) correspond to the $t = 1$ ($t = 0$) cash flows contingent on the realized state of the economy at $t = 1$ ($t = 0$). Red denotes a transition from a recession, black from normal times, and green from a boom.

However, bailouts are costly because of the possibility of relatively unlikely but very costly states of the world where recessions persist and recoveries are low. Notice also that ex post cash accounting is like adding apples to oranges, or dollars to euros—the value of resources in bailout states is higher than in normal states (as reflected in the risk premiums implied by market prices), but no adjustment is made for those value differentials. Put more technically, ex post cash accounting uses an inconsistent numeraire across time and states of the world.

The numerical example suggests several conclusions that are true in general: The NPV at the time of a bailout is larger in absolute value than the ex ante NPV. That is because the latter equals the former multiplied by the probability of a future bailout, which is less than one. The ex post
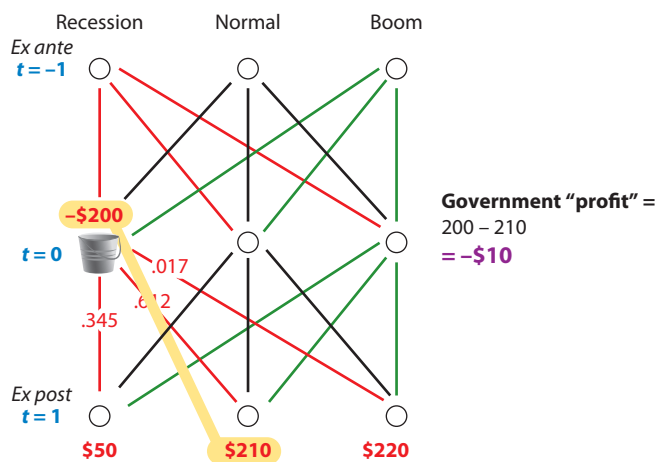

Figure 3

Cost computed under ex post cash accounting.

cash cost on average is smaller in absolute value than the NPV at the time of the bailout because there is no risk adjustment or discounting applied to future recoveries.

The main measure used in the cost calculations in this review is the NPV at the time of the bailout, constructed using a market or fair value approach. When it is applicable, it is the preferred approach because it is forward looking, accounts for all possible future outcomes, uses a consistent numeraire for pricing, and incorporates the information about aggregate beliefs and preferences embedded in market prices.

Before leaving the state price approach, it is useful to explore its implications for how the risk premium on an asset changes over states and time, when preferences and beliefs are stable but state dependent. As can be shown using the running example above, the risk premium implicit in market prices can be considerably higher in a recession than if the same cash flows were viewed from the perspective of a normal or boom period. Recall that if the government provides $200 at the time of a bailout, and if the recovered amount will be $50, $210, or $220 the following year in a recession, normal, or boom period, respectively, then the above state prices imply a bailout cost of $50.49. This can be translated into a risk premium with a little algebra. Applying the physical probabilities to the payoffs yields an expected dollar payment of $162.20. The present value of the expected payoff is $200 − $50.49 = $149.51. The implied return is $162.20/149.51 − 1 = 8.49\%$. Subtracting the risk-free rate in a recession yields a risk premium of 5.8%. That same exercise undertaken in normal times yields a risk premium of 2.2%; in a boom the implied premium is 1.4%. There are two reasons the risk premiums differ across states: (*a*) The probabilities of different states next period depend on the current state of the economy, and (*b*) the value of current consumption relative to future consumption depends on the current state of the economy. Thus, the observation of a higher risk premium in market prices does not automatically signal panic or mispricing. Rather, it can be a rational response to changing circumstances.

2.2. Operationalizing Cost Estimation with Fair Values

Valuation methods that rely on market prices, or on fair value approximations to market prices, are the natural way to operationalize the first two approaches to cost measurement described above. Specifically, fair value costs at a point in time can be estimated by projecting expected future net cash flows and discounting them at risk-adjusted rates, either explicitly or by using an option pricing approach. Because of the contingent nature of much of the assistance provided, an options pricing approach often can be expected to yield more accurate results than simple discounting.[5]

Fair value estimates proxy for market values when market prices are unavailable or unreliable. This can be particularly important during a financial crisis, when security prices may be depressed for reasons unrelated to the value of the asset being assessed. For instance, concerns about counterparty risk can lower the transactions price even for a safe asset. Market prices may also be unobservable, such as when trading dries up or when the government administratively sets certain prices or offers a contract without an exact market analogue. In such cases, a properly implemented fair value approach interpolates using liquid market prices of similar securities, or it uses financial models to approximate market prices. While the accuracy of fair value estimates is sometimes questioned, there is no obviously better alternative for generating unbiased cost estimates when markets are missing or malfunctioning.

The basic presumption that the costs incurred by governments should be evaluated using market prices rests on the logic that losses incurred by governments are ultimately borne by taxpayers and other government stakeholders, for whom prices are the best available measure of opportunity

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[5] The seminal papers that introduce this idea are those by Merton (1974, 1977).

cost. When a government assumes risk, such as when it guarantees the debt of a financially distressed institution, any losses incurred eventually must be covered by increases to future taxes or cuts to other spending.[6] Importantly, risky government investments cannot be funded entirely with risk-free government debt; taxpayers are effectively equity holders in such transactions. Therefore, a weighted average cost of capital that recognizes the cost to taxpayers as risk-bearing equity holders should be the same as the private sector weighted average cost of capital, at least as a first approximation. Despite that logic, governments often take their borrowing cost to be their cost of capital, and use it to discount risky cash flows. In such cases, officially reports on guarantee costs are biased downward (for a detailed discussion of these issues, see Lucas 2014 and references therein).

Consistent with these observations, the costs reported below all use a fair value approach. They were prepared by a number of different analysts, and the information available to them differed across programs and time. In all cases, efforts were made to apply risk premiums that reflected the cost of risk for the underlying assets being valued, and hence that were adjusted to omit counterparty or liquidity risk. However, as the state pricing example shows, the risk premiums implicit in market valuations are expected to be higher in periods of financial distress, and a proper analysis of cost should reflect the elevated price of risk.

2.3. Incidence of Direct Benefits

The beneficiaries of bailouts are generally quite different depending on whether one looks at the time of the bailout or ex ante. The incidence of benefits also depends on whether the bailout is of a private entity or a government program.

At the time a bailout of a private financial institution is announced, the largest beneficiaries will be the unsecured and uninsured creditors of the rescued institution, not its equity holders. At that point, equity is typically close to being wiped out and the prices of debt-related claims are depressed by the expectation of losses. The terms of a bailout often leave existing equity holders with little or no value, for instance, because their ownership stake is subordinated to new claims that are issued to the government in exchange for assistance. Creditors benefit from the price increases that accompany the announcement of government backing.

By contrast, direct benefits measured on an ex ante basis accrue primarily to stockholders or to customers and other stakeholders such as employees, depending on the competitiveness of the market in which the firm operates and its management practices. The possibility of a future bailout lowers the cost of borrowing to a guaranteed entity as long as it remains solvent. When credit markets are competitive, the added safety for creditors is reflected in commensurately lower interest rates, and the rents from those lower rates accrue to the borrowing firms. When product market competition is limited, equity holders or other stakeholders such as employees can capture the rents. In competitive product markets the rents should go to customers, for instance, through lower prices. More precisely, to the extent that market participants believe that equity holders will capture future rents, their value should be capitalized into the price of equity. Actions that alter those perceptions by strengthening or weakening guarantees will precipitate stock price changes.

To the extent that bankers are affected by bailouts primarily as equity holders and stakeholders of the affected institutions but not as debt holders, this line of reasoning suggests that by the time bailouts materialize, the main beneficiaries of those actions are not the bankers (although

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[6]Although the government can postpone passing costs through to taxpayers by issuing debt, ultimately the debt plus accrued interest has to be repaid by the public. Thus, debt is a means of financing an obligation, but it does not affect its cost.

the indirect benefit of being more likely to keep their jobs certainly has significant value). As we have seen, the unsecured or uninsured creditors of banking institutions stand to gain the most. It would therefore be interesting to know the financial and demographic makeup of that group of creditors, but to my knowledge that information is not readily available.

For bailouts involving government credit programs, the beneficiaries are primarily the program participants, who are able to borrow on subsidized terms. The industry supporting those loans (e.g., servicers) also benefits from increased business.

2.4. Cost Estimates in Practice

The press typically reports bailout costs on an ex post cash basis despite the problems with that approach. For example, ProPublica, a highly regarded nonpartisan news organization, created a Bailout Tracker (see **https://projects.propublica.org/bailout/**) that has been keeping a running tally of government asset purchases and cash receipts under TARP and from the bailout of Fannie Mae and Freddie Mac. In its September 27, 2018, update, ProPublica reported a total net government "profit" of $97 billion. Policy makers also tend to cite ex post cash results. For example, in 2012 former president Barack Obama claimed that "[w]e got back every dime used to rescue the banks." Other media outlets report skepticism about such claims,[7] but news organizations generally lack the financial acumen or resources to produce credible cost estimates of their own.

Another clearly flawed approach that has contributed to the confusion is to claim all at-risk government funds as the cost of bailouts. For example, a 2015 guest article in *Forbes* (Collins 2015) stated that the "total commitment of government is $16.8 trillion dollars with the $4.6 trillion already paid out." This shares with ex post cash accounting the problems of ignoring risk adjustment and time value. Moreover, it fails to recognize the high probability that not all available monies will be drawn upon, and that substantial recoveries are likely on funds that are extended.

Budget estimates are particularly important for informing policy makers about the prospective cost of authorizing financial assistance. However, budget estimates of the cost of financial policies also typically deviate from economic principles in their construction. In the United States, the law governing federal budgetary accounting for credit, known as the Federal Credit Reform Act of 1990 (FCRA), requires capitalizing expected future cash flows associated with federal credit or loan guarantees at Treasury rates. That rule captures time value and expected losses, but neglects the cost of market risk. The FDIC is treated in the budget as an insurance program rather than a credit guarantee, and as such is accounted for on a cash basis. Many other countries report no upfront cost for the sorts of contingent liabilities that arise from bailouts (Lucas 2014).

Why are incorrect approaches to cost measurement so prevalent? Probably one reason is that they are much easier to implement than fair value estimates, and also superficially more intuitive and easier to explain. Perhaps another is that economists have not drawn sufficient attention to the issue of cost mismeasurement in this area. A casual perusal of the sources of the conflicting estimates suggests that metrics often are adopted because they provide answers that comport with prior beliefs about whether government intervention is a good thing.

Fortunately, there are several credible sources that have estimated fair value costs for some of the major bailouts associated with the 2008 financial crisis. The analysis that follows draws heavily on those analyses, but some new calculations are also presented. Many of the estimates that conceptually conform most closely to the cost concept used here come from the nonpartisan US Congressional Budget Office (CBO). The fair value treatment of TARP was called for as part of

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[7]For example, a *National Review* article (Palumbo 2015) casts doubt on cash basis accounting.

the legislation, and for consistency CBO analyzed the assistance to Fannie and Freddie on the same basis. CBO has continued to provide fair value estimates for all major credit support activities of the US Government, including an analysis of emergency actions by the Federal Reserve, and of the Small Business Lending Fund (SBLF). The Congressional Oversight Panel (COP), a bipartisan organization that was created by Congress in 2008 to oversee TARP, as part of its investigation commissioned Duff & Phelps (2009) to undertake a fair value analysis of TARP assistance provided to large financial institutions. Several estimates by academics and policy analysts also provide useful information on fair value costs for certain bailout actions.

3. POST-2007 BAILOUTS IN THE UNITED STATES

I now turn to evaluating the direct costs, beneficiaries, and payors for the major post-2007 legislative and administrative actions in the United States that satisfy the above definition of a bailout. Those actions include capital injections into Fannie Mae and Freddie Mac; capital infusions to banks, other private firms, and mortgage borrowers provided by TARP and the SBLF; the government losses arising from subsidized FHA mortgage guarantees; the subsidized support provided to the capital markets by some of the Federal Reserve's emergency facilities; the partial forgiveness of student loans arising from the expansion of income-driven repayment; and the FDIC's expanded coverage of previously uninsured depositors. The assistance to Fannie, Freddie, and other financial institutions under TARP accounts for approximately 85% of the total costs identified.

3.1. Fannie Mae and Freddie Mac

Prior to the crisis, the government sponsored enterprises (GSEs) Fannie and Freddie[8] together bore the credit risk on more than $5 trillion of US mortgages and a substantial share of the associated interest and prepayment risk.[9] Their bailout was made possible by the passage of the Housing and Economic Recovery Act of 2008 (HERA). Congress passed HERA in response to increasing investor concerns about the GSEs' solvency, and the prospect of a collapse in supply of mortgage credit if those institutions were allowed to fail. Under that authority, the GSEs were soon placed into federal conservatorship, where they remain to this day. Those actions effectively transferred ownership and control of those too-big-to-fail entities to the government (for an analysis of the bailout and its economic impacts, see Frame et al. 2015 and references therein).

Senior Preferred Stock Purchase Agreements (PS) were the mechanism established to ensure the GSEs' solvency. That arrangement called for the Treasury to pay cash to the GSEs in exchange for shares of preferred stock, with a combined cap of $445 billion. The Treasury is obligated to make purchases in amounts that would prevent the GSEs' net worth from turning negative for as long as cumulative purchases remain under the cap.

The PS agreements also called for dividends to be paid to the Treasury. The rules determining the dividends were administratively modified over time. Initially, the Treasury received a 10% dividend on its PS holdings regardless of profitability. Because the GSEs' free cash flows were often insufficient to cover a 10% dividend payment, the dividends were partly or fully paid for by further draws on the PS lines. In effect, the Treasury was paying dividends to itself and the lines were being depleted, a situation that diminished the remaining size of the federal backstop, and that has contributed to the confusion about whether Treasury was making or losing money on the GSEs. In

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[8]This section draws heavily on my 2017 essay (Lucas 2017), where I suggest that the different cost measures are also telling for the debate over whether the government would make or lose money by privatizing the GSEs.

[9]In 2007, total US residential mortgage debt stood at approximately $12 trillion, as reported by the Federal Reserve.

2012, the third amendment to HERA ended those circular payments by replacing the requirement to pay a 10% dividend with a sweep of all GSE profits to the Treasury. That decision sparked lawsuits from private shareholders, but to date the courts have upheld the legality of those actions.

The three approaches to cost measurement described in Section 2 are applied here to the bailout of Fannie and Freddie. As theory suggests, the results differ dramatically between them. Results range from a cost of $311 billion on the methodologically preferred fair value basis at the time of the bailout to a profit of $58 billion on an ex post cash basis.

3.1.1. Fair value cost of Fannie Mae and Freddie Mac bailout at time of crisis.

The cost under the preferred approach—the fair value around the time of the bailout—is based on the CBO's cost estimates (reported in CBO 2009a and explained in CBO 2010b). CBO used models of defaults, recoveries, fees, and prepayments to infer cash flows to and from the government over the life of the mortgages, and then discounted at rates inferred from the jumbo mortgage market.[10]

CBO (2009a) reports a fair value cost for the existing book of business through the end of 2009 at $291 billion. In addition, it shows subsidies on mortgages guaranteed in 2010 of $20 billion. The total implied bailout cost is $311 billion. The high price tag reflects the elevated rate of expected defaults and reduced recovery rates, uncertainty about whether and how much more house prices would fall and the speed of recovery, and the assumption that the GSEs would continue to underprice risk after 2009.

The direct beneficiaries of the $291 billion bailout of the existing book of business were primarily the debt holders of Fannie and Freddie. Prior to the passage of HERA, yields spreads on GSE debt had widened, depressing its value. In 2006 and 2007, the interest expense reported by Fannie Mae on its long-term debt was less than 10 basis points more than the corresponding year-end 10-year constant maturity Treasury rate. In 2008, the difference widened to 200 basis points. The capital infusions caused debt prices to recover, and liquidity was restored to the market. By contrast, common stock holders were essentially wiped out. The value of the stock had already fallen to very low levels, and the dilution from the preferred shares issued to the government further reduced the value of existing claims. The identity of the debt holders that reaped those benefits does not appear to be publicly available information. However, it was well-known that the debt was widely held, and that foreign governments numbered among the significant investors. For example, the *Wall Street Journal* reported that China held $454 billion of long-term US agency debt as of June 30, 2009 (**https://blogs.wsj.com/chinarealtime/2011/02/12/much-ado-in-china-about-fannie-and-freddie/**).

The $20 billion of costs incurred for new Fannie and Freddie originations in 2010 accrued to mortgage borrowers, who were able to obtain funds at a lower cost because of the government guarantee. There was no additional benefit to debt holders in those years.

Only new costs arising from HERA through 2010 are included in the totals here to limit the calculation to assistance that is clearly associated with the financial distress arising from the crisis. However, the legislation created protections for the GSEs that continued indefinitely. Including the present value of those future subsidies to GSE borrowers would increase the estimated cost further.

3.1.2. Fair value cost of Fannie Mae and Freddie Mac bailout ex ante.

Concerns about an implicit federal guarantee of the GSEs, its potential costs, and its effects on incentives and

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[10]Perhaps ideally, the exercise would have occurred at the time of passage rather than with an additional year of information, but this is the earliest available estimate on a fair value basis. An advantage of the delay is that it became much clearer over that year how the government would choose to use its expanded authorities.

the housing market, have a long history (e.g., Feldman 1999). Several studies, including those by Lucas & McDonald (2006, 2010), Passmore (2005), and Stiglitz, Orszag & Orszag (2002), aimed to estimate the value of the implicit guarantee to Fannie and Freddie prior to the crisis. All assumed that for these too-big-to-fail institutions, a bailout would occur in the event of significant financial distress. However, the methodologies and cost estimates varied widely. The number reported here is from Lucas & McDonald (2006), who introduced a contingent claims model with dynamic capital structure rebalancing, calibrated with market and accounting data, to generate an estimate of the ex ante NPV of future bailouts as of 2006. The estimated cost to the government over a 10-year horizon is estimated to be approximately $8 billion—much more than estimated by Stiglitz, Orszag & Orszag (2002), and much less than Passmore (2005).

That ex ante estimate is a small fraction of the $311 billion cost estimated around the time of the bailout. Part of the difference is explained by the small probability of a bailout given the benign market conditions of 2006. However, the realized severity of the bailout was an outlier relative to the model's predicted distribution of assistance conditional on a bailout occurring.

The beneficiaries of the implicit guarantee ex ante were certain shareholders of Fannie and Freddie and possibly their customers. The perception of an implicit guarantee allowed the GSEs to issue debt at lower yields than they otherwise could have. The debt holders bore less risk but receive a commensurately lower return, and hence did not benefit on an ex ante basis. To the extent that the GSEs acted as a duopoly, it is likely that their equity holders were able to capture a significant portion of the value of the expected rents created by the stream of interest rate savings. More precisely, at any point in time expected future rents are capitalized into stock prices. When the guarantee becomes more valuable, either because it becomes more credible or because the likelihood of distress increases, current shareholders benefit; and conversely when the guarantee loses value. Thus, not all stockholders benefited equally from the implicit guarantee.

3.1.3. Ex post cost of Fannie Mae and Freddie Mac bailout on a cash basis.

Data on annual cash flows between the government and the GSEs are available in their annual reports. Adding up the realized differences between Treasury purchases of preferred stocks and dividend payments received in the post-HERA period suggests a "profit" to the government of $58 billion as of 2014. Specifically, cash payments from the Treasury totaled $116 billion to Fannie and $71 billion to Freddie. The Treasury collected $147 billion from Fannie and $98 billion from Freddie. As explained above, interpreting this tally as a cost measure is conceptually flawed for several reasons. Wall (2014) also discusses the shortcomings of this approach, which has been used to argue that the government has been more than fully repaid and that value should be returned to the shareholders. He also notes that there is value to the continuing government backing from the PS agreements, which is not taken into account on a cash basis of accounting.

3.2. Federal Housing Administration Mortgage Guarantees

The purpose of FHA's guarantee program is to make mortgage credit available and affordable for low-income and first-time homebuyers. Prior to the crisis its market share had been on the decline, as subprime lenders attracted potential FHA borrowers with lower rates and more favorable terms. Postcrisis the FHA quickly became, and remains to this day, the country's largest subprime lender.

The cost of expanded FHA guarantee authority, along with the deep losses it experienced on its outstanding and newly originated mortgage guarantees during the crisis, have received much less attention than the bailout of the GSEs. Nevertheless, the FHA bailout is notable in that the costs were among the largest associated with the crisis. More broadly, evaluating the bailout costs associated with an ongoing federal guarantee program involves conceptual challenges that have

applicability to other situations (such as student loans and flood insurance), but that appear not to have been analyzed in the literature.

The FHA bailout arose from three sources:

1. HERA authorized the FHA to guarantee up to $300 billion in new 30-year fixed rate mortgages for subprime borrowers if the private lenders wrote down principal loan balances to 90% of current appraisal value. It also increased the cap on insured mortgages from $363,000 to $625,000.
2. The government absorbed large losses on outstanding FHA-backed mortgages that had been insured at below-market rates before the start of the crisis.
3. The FHA guaranteed large volumes of newly issued risky mortgages at highly subsidized rates during the crisis period.[11]

Evaluating the cost of the additional FHA guarantee authority under HERA requires an estimate of program uptake, and of the fair value subsidy rate on those guarantees (dollar subsidy cost per dollar of principal insured). To my knowledge, no estimate of this cost is available in the academic literature or from government or other sources. The ballpark estimate offered here suggests the magnitude of the associated cost.

A forecast of the take-up of additional guarantee authority as of late 2008 is based on the following assumptions: (*a*) The size of the residential mortgage market is approximately $10 trillion; (*b*) subprime mortgages make up 12% of the total;[12] (*c*) 20% of subprime mortgages are distressed; (*d*) lenders will want to write down only 10% of the distressed mortgages that qualify for the program; and (*e*) 70% of subprime mortgages are eligible (e.g., are below the principal limit). Multiplying together those percentages, the principal amount of subprime mortgages expected to be refinanced would be $16.8 billion, an order of magnitude less than the additional guarantee authority.

The other input to the subsidy calculation is the fair value subsidy rate, which when multiplied by loan principal gives the present value of the newly granted loan subsidies on a fair value basis. CBO (2006, 2011) provides estimates of fair value subsidies for FHA loans in various years by extrapolating from pricing data from private mortgage insurance and adjusting for other differences from FHA loans. CBO's subsidy rate range for 2006 is 2% to 5%. Its central estimate for 2012 is 1.5%, a drop that reflects program changes to reduce cost and a recovering housing and job market, as well as methodological differences in the calculation. A further reference point is that the official FCRA subsidies were on the order of −2% during the precrisis period (that is, when discounting projected cash flows at Treasury rates, the program showed a budgetary profit). By 2007, the FCRA estimate had risen to close to zero, and it remained there through 2010. CBO did not publish fair value subsidy rates for 2008 through 2010. Extrapolating from the 3.5% midpoint of the CBO (2006) range and assuming the same 2% upward shift as reported for FCRA rates going from the precrisis to crisis period, I assume that a 5.5% subsidy rate applies to all FHA guarantees mortgages extended during the 2008–2010 period.

Applying that 5.5% subsidy rate to the projected $16.8 billion in new guarantees arising from the expanded HERA authority yields a cost of approximately $900 million. The direct beneficiaries were the existing subprime borrowers who were able to lower their principal balance and possibly their interest rate. Lenders that chose to participate also directly benefited from

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[11] The federal government also guarantees a substantial volume of mortgages through the Veterans Administration and the Rural Housing Service. A similar analysis of points 2 and 3 would apply to those loans, but I do not undertake the calculations here.

[12] Reported by the Federal Reserve Bank of San Francisco.

reductions in expected losses. However, program participation turned out to be considerably lower than projected here.[13]

The much larger part of the FHA bailout cost arose from subsidies on existing and newly extended guarantees around the time of the crisis. Before I turn to those calculations, I address several critical conceptual issues. The FHA is an agency within the federal government, not a shareholder-owned financial institution. One might question whether it makes sense to describe a government bailout as involving one of its own programs. The logic that FHA generated bailout costs rests on several observations: First, rescues of governments by other governments or by governmental entities are routinely characterized as bailouts (e.g., Greece by the International Monetary Fund, subnational governments by national governments). Second, and most importantly, the FHA's mortgage guarantee business was very similar to that of Fannie and Freddie, including the exposure of taxpayers to uncompensated losses from mortgage defaults.

Timing is also an issue. FHA guarantees had been subsidized for decades, with the size of subsidies varying over time with changes in program rules and market conditions. There is no well-defined event date to assign to the bailout of mortgages already on their books when the crisis hit. Nevertheless, the idea of ex ante cost described in Section 2 can be applied. FHA's book of outstanding mortgage guarantees just prior to the crisis in 2007 stood at $332 billion. Multiplying by the midpoint of the CBO (2006) subsidy rate range of 3.5% gives an ex ante bailout cost for existing guarantees of $11.3 billion. The $11.3 billion represents the fair value of the uncompensated subsidy to existing FHA borrowers shortly before the crisis started. It is a conservative estimate in that it treats the occurrence of the crisis as an unlikely event.[14]

For the FHA guarantees extended during the crisis and its immediate aftermath, the decision to offer guarantees on highly favorable terms amounts to a windfall to those borrowers who otherwise would have faced much less favorable lending terms in the market, or would have been unable to borrow at all. Those administrative decisions had the equivalent effect of HERA for Fannie and Freddie, of allowing large numbers of significantly subsidized new mortgages to be originated. Applying the 5.5% fair value subsidy rate to the $868 billion of new FHA guarantees made from 2008 to 2010 implies an additional bailout cost of $47.7 billion for mortgages insured during the crisis.

In total, then, the FHA bailout cost around the time of the crisis is estimated to be approximately $60 billion. The direct beneficiaries were primarily the mortgage borrowers who were able to obtain funds on below-market terms. Benefits also accrued to the purveyors of FHA mortgage–related services such as origination and servicing, whose incomes were bolstered by increased lending volumes.

Evaluating FHA costs on an ex post cash basis is complicated by the ways in which the program is accounted for. The government uses a mix of cash and accrual accounting for the program, with accruals calculated using Treasury rates for discounting. The Mutual Mortgage Insurance Fund is a mechanism peculiar to the FHA that accounts for flows to and from the Treasury to the program cumulatively over time. For all federal credit programs, including FHA, budget reestimates track the difference between (*a*) the original accrual cost estimate that appears in the budget in the year a loan is originated and (*b*) revisions to that estimate over time that incorporate realized cash flows and updated accrual assumptions.

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[13]Lenders wrote down relatively few mortgages under this or other programs, a fact that has been attributed to various institutional constraints and economic incentives.
[14]Although this asymmetry between the treatment of the GSEs and FHA is problematic, it seems unavoidable. It arises because for the GSEs there is a well-defined bailout event with the passage of HERA, whereas FHA subsidies were delivered through mostly preexisting budget authority.

An ex post cash estimate of the bailout cost can be approximated by adding together the reestimates for FHA mortgage guarantees whose performance was likely to be affected by the crisis, as of a later point in time. The loans guaranteed between 2004 and 2010, viewed from the perspective of 2016, fit that description. Many had been repaid or defaulted upon by 2016, which implies that the reestimates reflect mostly realized cash flows. By this measure, FHA guarantees cost taxpayers $43 billion more than was originally budgeted for.

Perhaps the most important question with regard to the FHA is how a $60 billion bailout, one of the largest associated with the crisis, could have received so little popular or policy attention. Certainly a contributing factor is the opaque way in which the program is budgeted and accounted for. The FHA's Mutual Mortgage Insurance Fund is an accounting mechanism that suffers from the shortcomings of ex post cash accounting. During the crisis it never went negative, a fact touted by the FHA. With regard to the federal budget, credit programs under FCRA have unlimited budget authority to accommodate losses that turn out to be larger than initially predicted, which means that Congress does not have to actively acknowledge cost overruns. It may also be that because the FHA bailout benefited mortgage borrowers rather than private investors it was seen as more benign.

3.3. Troubled Asset Relief Program and Small Business Lending Fund

The Emergency Economic Stabilization Act of 2008, signed into law in October 2008, created TARP. That legislation gave the Treasury broad authority to purchase or insure up to $700 billion of troubled assets to bring stability to the financial system. Within two months, $248 billion had been disbursed and the Treasury had announced the intention to use most of the remaining funds if needed. Under the Capital Purchase Program, which accounted for $178 billion of the early disbursements, financial institutions received equity infusions in exchange for preferred stock and warrants. The largest disbursements were to JPMorgan Chase and Wells Fargo, at $25 billion each; Bank of America, at $15 billion; and Morgan Stanley and Goldman Sachs, at $10 billion each, but funds went to more than 100 smaller banks as well. Preferred stock purchases also propped up American International Group (AIG) and General Motors Acceptance Corporation (GMAC), and subsidized loans were made to Chrysler and General Motors. TARP was also used to absorb potential losses from some actions taken by the Federal Reserve and the FDIC, and later to fund grant programs aimed at preventing foreclosures on home mortgages.

For academic analyses of various aspects of TARP, see Calomiris & Khan (2015), McDonald & Paulson (2015), and references therein. The analysis by Veronesi & Zingales (2010) is most closely related to the analysis here. These authors consider the taxpayer cost of the assistance to large banks and compare it with the value increase in the securities of those firms. They estimate that "this intervention increased the value of banks' financial claims by $131 billion at a taxpayers' cost of $25–$47 billions with a net benefit between $84bn and $107bn" (Veronesi & Zingales, p. 339). They suggest that the direct benefits exceed the costs because of the reduction in the probability of costly bankruptcy.

More-detailed fair value analyses of the costs of TARP were undertaken by CBO, which was required by TARP to provide annual updates on cost, and by the COP, which hired Duff & Phelps to perform a fair value analysis of assistance to large financial institutions. The estimates here for the cost at the time of TARP-funded bailouts draw from Duff & Phelps (2009).

CBO's (2009b) TARP report put the fair value cost of TARP assistance disbursed through year-end 2008 at $64 billion. The cost is based on the difference between the value of cash paid and the estimated values of the preferred stocks and warrants received. A few months later, the COP independently estimated the fair value cost to be between $53 and $72 billion. Given

Table 1 TARP subsidies to large financial institutions

Institution	Capital infusion (billions)	Subsidy[a] (billions, fair value)
AIG	$40.0	$25.20
Bank of America	$15.0	$2.55
Citigroup	$25.0	$9.50
Citigroup	$20.0	$10.0
Goldman Sachs	$10.0	$2.50
JPMorgan Chase	$25.0	$4.38
Morgan Stanley	$10.0	$4.25
PNC	$7.6	$2.05
US Bancorp	$6.6	$0.30
Wells Fargo	$25.0	$1.75
	Total	$62.47

[a]Based on midpoint of COP estimates of preferred stock and warrant values.

Abbreviations: AIG, American International Group; COP, Congressional Oversight Panel; TARP, Troubled Asset Relief Program.

the volatility and uncertainty about valuations at the time, the two independent estimates are remarkably consistent. **Table 1** breaks down the subsidies by institution as reported by the COP.

At that time, further TARP disbursements were viewed as likely. The funds were available to use for a variety of purposes, and there was the risk of large losses from the use of TARP to back contingent liabilities of the Federal Reserve and FDIC arising from their emergency facilities had the crisis worsened. To roughly account for the cost of the remaining exposures, I assume an expected $100 billion of additional disbursements, and apply the average subsidy rate estimated by CBO on existing disbursements. That puts the total fair value cost at the time of the bailout at $90 billion.

In fact, more than an additional $100 billion of TARP funds were eventually paid out under a variety of programs. CBO (2018) reports that $439 billion of the $700 billion available had been disbursed. Nevertheless, the ex post cash cost of TARP was considerably lower than the fair value cost at the time of the bailouts, as most of the assistance was eventually repaid. Although the headline payouts to big banks and the GSEs were recovered, losses incurred from AIG, the auto loans, and the mortgage grant programs resulted in a net loss of approximately $30 billion.[15]

A TARP-like program that has received much less attention was the SBLF, created by the Small Business Jobs Act of 2010. It made government capital available to qualifying community banks and community development loan funds at a below-market price. Under that program, the Treasury purchased preferred stock with a dividend that was contingent on the amount of new small business lending by an institution. CBO (2010c) estimated the fair value cost of the SBLF to be $6.2 billion shortly before the Small Business Jobs Act was enacted.

The primary direct beneficiaries of TARP assistance were the uninsured debt holders of the financial institutions receiving the assistance. For the reasons explained above, equity holders benefited less because of the dilution in the value of their claims from the warrants and preferred stock granted to the government.

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[15]Although CBO was directed in the legislation to report costs on a fair value basis, it nevertheless reported realized losses on a cash basis and referred to them as the costs. For that reason, only the estimates in CBO's 2009b report, which are on a fair value basis, are used in the calculations of costs at the time of the bailouts.
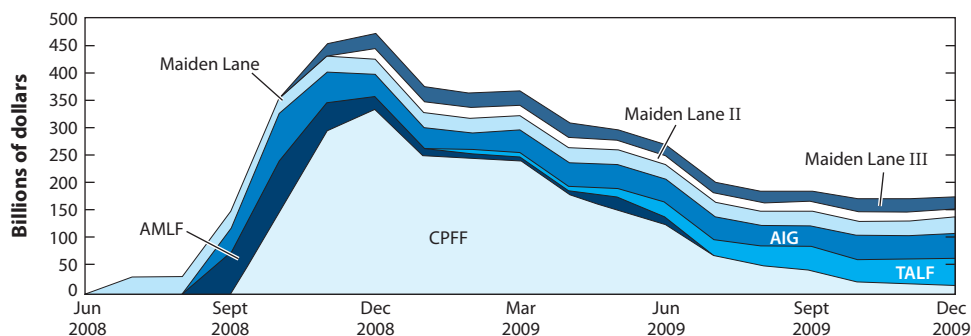
Figure 4

Funding provided through selected Federal Reserve programs. The Maiden Lane facilities involved purchases of mortgage-backed and collateralized debt obligation (CDO) securities from Bear Stearns and American International Group (AIG) at fair value. The Term Asset-Backed Securities Loan Facility (TALF), Commercial Paper Funding Facility (CPFF), Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), and Money Market Mutual Fund Liquidity Facility (MMLF) all provided loans that were backed by collateral assets. The data for the AIG constitute the outstanding balance on a line of credit and some other obligations. Data are from CBO (2010a) and are based on data from the Federal Reserve.

3.4. Federal Reserve Emergency Facilities

The Federal Reserve took a number of extraordinary measures during and after the worst of the financial crisis that exposed it to trillions of dollars of potential credit exposure. **Figure 4** shows the realized balances on the facilities over time. To what extent did those actions constitute a bailout?

CBO (2010a) undertook an analysis that effectively answers that question by assessing the present value of net payments from the government evaluated on a fair value basis over the expected life of the facilities. It also explains the budgetary impacts, which it reports on a cash basis. Its fair value estimate is conceptually consistent with the preferred measure of bailout costs here.

Despite the trillions of dollars of new exposures, CBO estimated the total fair value cost to be $21 billion. There are several reasons why the cost is modest. Some programs involved large amounts of collateral and short loan maturities that protected the Federal Reserve from losses. Others, like the Maiden Lane facilities, exposed the Federal Reserve to considerable credit risk. However, most of those transactions were carried out on a fair value basis or through an auction mechanism that suggested the subsidies conferred were negligible. Furthermore, some of the transactions shielded the Federal Reserve by putting TARP funds in a first-loss position. The programs judged to involve costs to the Federal Reserve, especially the Term Asset-Backed Securities Loan Facility (TALF), involved loans that were backed by risky collateral and had TARP protection capped at less than potential losses, had administratively set rather than market-based interest rates, and extended over horizons of months or years.

I do not evaluate outcomes for the Federal Reserve on a cash basis because detailed cash flow information does not appear to be readily available. However, the realized net cash flows to the government from the Federal Reserve's emergency actions were almost certainly positive.

3.5. Expanded Federal Deposit Insurance Corporation Coverage

The FDIC significantly expanded deposit insurance coverage to head off the possibility of runs by uninsured depositors. Two notable administrative policy actions were taken under its existing statutory authorities. The first, in October 2008, was to temporarily increase the cap on insured

deposits from $100,000 to $250,000.[16] The second, finalized a month later, was to create the Temporary Liquidity Guarantee Program (TLGP). The TLGP had two components, a Debt Guarantee Program for newly issued bank debt and a Transaction Account Guarantee Program that provided unlimited coverage of transaction accounts to banks that opted in, initially at no cost to the banks and then in exchange for fees.

Estimating the fair value cost of those actions at the time they were announced would involve assumptions about the distributions of the expansion of covered deposits, the likelihood and severity of losses paid by the FDIC, premiums collected, and appropriate discount rates, as well as inputting those values into a pricing model such as that presented by Marcus & Shaked (1984), which builds on the insights by Merton (1977). To my knowledge, such an estimate has not been published for these programs.

However, for the FDIC such a prospective cost estimate would significantly overstate the cost to taxpayers. That is because the FDIC is required by statute to recover losses with assessments on solvent financial institutions ex post when the Deposit Insurance Fund is depleted. The Treasury provides a backstop in the form of a credit line. Along with the expansion of FDIC coverage, the Treasury increased the FDIC credit line from its normal level of $100 billion to $500 billion.

Taxpayers would realize losses only if draws on the Treasury line were not fully repaid, for instance, because surviving banks could not afford to repay the losses without becoming insolvent themselves, or more likely because of below-market rates charged by the Treasury. Those possibilities suggest that the expanded FDIC coverage qualifies as a bailout, though it was not a large one.

To give a sense of the order of magnitude of the bailout cost, assume that at the time FDIC coverage was expanded, there was a 10% chance that the crisis would intensify and the entire line would be drawn, and in that event only 80% of the draw would be recovered in present value terms. In all other scenarios, the Treasury would be fully repaid for any borrowing. Under those admittedly arbitrary but not implausible assumptions, the bailout cost is $10 billion.

To the extent that this is a bailout, banks are clearly the direct beneficiaries. However, because FDIC participation is effectively mandatory for banks, the expanded programs have the incidence of a tax on banks that pay premiums (ex ante and, in expectation, ex post) in excess of the cost of risk they impose on the system, and conversely riskier banks receive a net subsidy.

On an ex post cash basis, changes in the Deposit Insurance Fund track the cash flows to and from the FDIC over time. The fund stood steady at approximately $52 billion from the fourth quarter of 2007 to the second quarter of 2008. By the fourth quarter of 2008 it had fallen to $34.6 billion, and by the fourth quarter of 2009 it had turned negative, to −$8.2 billion. The fund reached its most negative point in the first quarter of 2010, at −$20.9 billion, and slowly recovered from there. By the fourth quarter of 2012 it stood at $25 billion, and by June 2018 it had reached $97.6 billion. The FDIC had enough money on hand at the time to cover the realized negative fund balances without borrowing from the Treasury.

This analysis casts doubt on the common perception that underpriced deposit insurance provides a significant subsidy to banks. In fact, prospective costs to taxpayers are small, even during a severe financial crisis. The direct costs fall largely on strong banks, which through the system subsidize weaker ones. However, there may also be substantial indirect costs, for instance, through incentive effects.

3.6. Student Loans and Other Federal Credit Programs

Similarly to the FHA, other federal credit programs—for student loans, small business and farm credit, and so forth—provided significant subsidies that were magnified by the financial distress

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[16]The Dodd–Frank Act later made that temporary increase permanent.

and economic downturn following the crisis. The federal student loan program is particularly notable for its size and the large subsidies it provided. In fact, federal student loans represented the only major credit category that did not contract during the crisis period. Between 2008 and 2010, $319 billion in new loans were disbursed through the federal direct and guaranteed student loan programs.[17] As for the FHA, the decision to offer credit on highly favorable terms during the crisis period amounted to a bailout of those borrowers who otherwise would have faced much less favorable lending terms in the market, or would have been unable to borrow at all. Applying a subsidy rate of 14% to those 2008–2010 loans—based loosely on calculations explained by Lucas (2016, and references therein)—implies a cost of $44 billion. Although it is not estimated here, there was also an ex ante bailout cost associated with the government's outstanding student loans at the start of the crisis.

Administrative actions taken by the Department of Education in 2011 significantly expanded its Income-Driven Repayment Program. Those changes could be viewed as a partial bailout of students that had accumulated large amounts of debt during the financial crisis. Specifically, borrowers who took out their first loans in 2008 or later and took out at least one loan in 2012 or later were able to qualify for an annual cap on payments of 10% of income (previously capped at 15%), with loan forgiveness after 20 years of payments (previously 25 years) (Delisle & Holt 2012). While the effects of the change would not be reflected in cash flows for a number of years, Delisle (2015) estimates that the cost of the program expansion on a fair value basis would rise to $11 billion annually by 2014.

Despite the significant costs of non-FHA federal credit programs during the crisis, they are excluded below from my preferred tally of total bailout costs. That can be justified by the business-as-usual aspect of most of their activities during that time (with some exceptions, such as the expansion of income-driven repayment for student loans). The FHA is included in bailout costs because its policies were part of a larger set of actions taken to prop up the mortgage market and because that role was explicitly recognized in the HERA legislation.

3.7. Summing It All Up

Table 2 summarizes the bailout costs using my preferred metric—a fair value basis around the time of the crisis. Those estimates total approximately $500 billion. Almost 75% of the cost is associated with Fannie, Freddie, and FHA, which perhaps is not surprising considering that the

Table 2   Summary of fair value bailout costs

Institution(s)	Cost (billions)
Fannie Mae and Freddie Mac	$311
FHA	$60
TARP	$90
Small Business Lending Fund	$6
Federal Reserve	$21
FDIC	$10
Total	$498

Abbreviations: FDIC, Federal Deposit Insurance Corporation; FHA, Federal Housing Administration; TARP, Troubled Asset Relief Program.

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[17]Federal lending volumes can be found in the Federal Credit Supplement to the US Budget, which is published annually by the US Government (e.g., **https://www.whitehouse.gov/wp-content/uploads/2018/02/cr_supp-fy2019.pdf**).

housing price meltdown was ground zero of the crisis. The next most costly intervention was TARP, with the bailouts of AIG and Citigroup making up approximately half of the total cost. Although the Federal Reserve and the FDIC took aggressive steps to maintain liquidity in the markets, for the most part they were able to do that without creating large exposures for taxpayers.

Another way to slice these fair value bailout costs is to include only the support that went to private investors. That figure can be calculated by subtracting from the **Table 2** total the amounts that directly benefited borrowers: $60 billion for FHA and the $20 billion for Fannie and Freddie incurred postconservatorship.[18] That implies a cost for the bailout of private investors of $418 billion. Going in the other direction, if one wants to include the subsidies provided through all federal credit programs, not only the FHA, a ballpark estimate is a cost increase between $60 and $120 billion.

Costs on an ex post cash basis were identified for only a subset of the above programs, but it is likely that on that basis the government came out ahead. Hopefully, the reader has been convinced that there is little meaningful information in this fact.

4. BROADER ECONOMIC EFFECTS OF BAILOUTS

The theoretical mechanisms by which bailouts can preserve liquidity in financial markets and help avert contagion are well understood (see, e.g., Gorton & Huang 2004 and references therein), and their effectiveness, at least in the short run, has been demonstrated in many historical episodes. However, much has also been written about potential adverse consequences of bailouts and what might be done about them (e.g., Stern & Feldman 2009).

An important issue is the ex ante effects on risk-taking incentives. The influential work of Merton (1974, 1977) showed the equivalence of financial guarantees with put options, whose value increases with the volatility of the underlying asset.[19] As applied to financial institutions, that logic suggests that underpriced government guarantees provide an incentive to make riskier investments because shareholders get the upside and the government gets the downside.

However, an offsetting effect that can flip incentives of bank managers and shareholders from risk-loving to risk-averse is that subsidized credit support creates charter value for solvent institutions. Merton's early work recognizes that effect, and Marcus (1984) develops the idea in an important paper showing that an insured institution in some circumstances would choose to take less risk than an otherwise similar institution in order to preserve the value of the borrowing cost advantage generated by the guarantee. Lucas & McDonald (2010) establish a related result in the context of the implicit precrisis guarantees to the GSEs. Panageas (2006) looks at related issues. This effect implies that insured institutions will gamble for salvation once they are distressed, but may take less than optimal amounts of risk when they are solvent.

The charter value created by underpriced government guarantees can also make it harder for uninsured institutions to compete. That observation has been used to explain the persistently large market share of Fannie and Freddie in the decades leading up to the crisis, and also for the relative growth of too-big-to-fail banks despite regulatory efforts to end that status. The anticompetitive effects can be expected to increase the cost of financial services and to exacerbate systemic risk by allowing too-big-to-fail institutions to become even bigger. Some studies have estimated the borrowing cost advantage of being too big to fail (e.g., Akram & Christophersen 2010), but to my knowledge the wider anticompetitive effects have not been quantified in the literature.

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[18]A small portion of TARP funds was also eventually used to help borrowers.
[19]Marcus & Shaked (1984) provide an early practical application of valuing deposit insurance.

Other important analyses of broader bailout effects include, but are not limited to, studies by the following authors (and references therein): Acharya, Dreschler & Schnabl (2014), who observe that bailouts convert bank risk into sovereign risk; Diamond & Rajan (2002), who show that poorly structured bailouts can increase systemic risk; Farhi & Tirole (2012), who model the collective moral hazard that arises from imperfectly designed government support of financial institutions; and Berger et al. (2018), who develop a model that they use to quantify and compare the economic effects of bailouts, bail-ins, and doing nothing.

Economists have explored a range of alternatives to bailouts that might have fewer adverse consequences. Those include requiring higher capital, creating orderly liquidation facilities and living wills, and requiring bail-ins. A survey of that important literature is beyond the scope of this review.

5. CONCLUSIONS

Properly measured, the direct costs of bailouts arising from the 2008 US financial crisis totaled approximately $500 billion. That conclusion rests on many uncertain assumptions, and the estimates presented here, individually and collectively, should be viewed as having wide error bands. Nevertheless, the total is large enough to conclude that the bailouts were not a free lunch for policy makers, as some have claimed. At 3.5% of 2009 GDP, the cost is big enough to raise serious questions about whether taxpayers could have been better protected. Another point of comparison consists of the concerns that were raised at the time about the affordability of the $392 billion cost of the American Recovery and Reinvestment Act, the major stimulus package enacted in 2009 to combat the recession.

At the same time, the analysis here establishes that assertions of costs to taxpayers in the multiple trillions of dollars are not true. The estimated cost of $500 billion is small enough to raise questions about the wisdom of trying to end bailouts without seriously weighing the costs of doing so. The magnitude suggests the possibility that the costs of financial suppression and regulatory compliance could exceed those of allowing a small probability of future bailouts. It also suggests that it would be worthwhile to seriously try to assess the costs and benefits of the regulations put into place after the crisis, including their more difficult to measure indirect effects.

A novel finding in this analysis is the large size of borrower bailouts involving federal credit programs, most notably those offered by the FHA, the GSEs after they were taken into conservatorship, and the federal student loan programs. Also notable are the modest costs found to be associated with the major actions taken by the Federal Reserve and the FDIC, both of which assumed large risk exposures, but with protections in place that shielded ordinary taxpayers from directly bearing most losses.

The unsecured creditors of large financial institutions—most significantly, of Fannie and Freddie, Citigroup, and AIG—were the largest direct beneficiaries at the time of the bailouts. The equity holders of those institutions benefited less than the popular perception, as many were effectively wiped out. However, prior to the bailouts equity prices may have been boosted by the perceived value to shareholders of being a too-big-to-fail institution. For the bailouts arising from federal credit programs, the direct beneficiaries were the borrowers who otherwise would have been unable to obtain funds or would have paid more.

A similar approach to the one here could be used to estimate bailout costs and to identify the direct beneficiaries for other countries and other historical episodes. For example, it would be useful to study the European bailouts that occurred around the same time but under quite different regulatory and political frameworks than those in the United States. The approach could also be applied to the earlier bailouts in Japan and the wave of bailouts in emerging markets in the 1990s. A challenging but valuable contribution would be the development and calibration of models that

could begin to quantify the competitive and broader economic effects of bailouts, and that could be used to evaluate the counterfactual effects of alternative policy actions. Developing credible frameworks for quantifying benefits is a challenging but important direction for future research as well.

DISCLOSURE STATEMENT

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