Credit Policy as Fiscal Policy

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1. Introduction

The effects of federal credit policies are rarely prominent in discussions of fiscal policy, perhaps because official estimates of the cost of federal credit assistance tend to be small. Nevertheless, there are several reasons why federal credit programs can have significant effects on the economy and therefore can be viewed as a potentially important channel of fiscal policy: Federal credit policies affect pricing and allocations in most U.S. credit markets, and the economic subsidies associated with federal credit programs are significantly larger than what official subsidy cost estimates suggest. Those subsidies represent transfers from taxpayers to program participants; the amount of the subsidies can be viewed as a measure of the direct fiscal effects of credit policies. Furthermore, federal credit programs may significantly increase the availability of credit for some borrowers through indirect channels, for instance by circumventing the asymmetric information problems that give rise to credit rationing by private financial institutions. When incremental borrowing results in expenditures that would not otherwise have been made, the stimulus effects of credit programs can be large relative to their direct cost to taxpayers and to other types of stimulus spending. To the extent that government credit expansion is countercyclical, its stimulus effects can act as an automatic stabilizer.

Federal credit programs also can have adverse effects on the economy. For instance, credit subsidies can distort the allocation of capital and crowd out more productive private investment, encourage overly high levels of household debt, and create incentives for excessive risk-taking that can have systemic consequences.[1] Evaluating the effect of federal credit policies on social welfare is beyond the scope of this analysis. A further caveat is that although credit policy also includes a host of regulatory policies, the effects of credit market regulations are not considered in this analysis.

The paper begins by documenting the size and scope of the programs through which the government executes its credit policies, and puts those figures into perspective by comparing them with other credit market, macroeconomic and fiscal aggregates. It also presents an estimate of aggregate government expenditures related to those programs in 2010. That estimate of the

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[1] For a related discussion of the systemic risks associated with federal credit activities see Lucas (2011).

aggregate cost of the federal government's credit programs is new and a similar estimate does not appear in the recent literature. The calculation relies on the pricing models and results that my colleagues at the Congressional Budget Office (CBO) and I have developed over a number of years to produce fair value estimates for federal credit programs. In most cases those fair value estimates significantly exceed the programs' budgetary costs because they take into account the cost of the market risk borne by taxpayers.

I also calculate for 2010 a rough estimate of how much the major credit programs are likely to have increased the availability of credit in the economy, and the amount of fiscal stimulus that is attributable to federal credit assistance that year. The results suggest that credit policies were a significant source of fiscal stimulus. The analysis draws on Gale (1991), who proposes a simple equilibrium model of credit supply and demand in the presence of government subsidies for multiple and differentiated credit programs.[2] There is also a related literature on the theoretical effects of federal credit policies, which builds on earlier papers on credit market equilibria in the presence of asymmetric information or costly state verification.[3]

The rest of the paper is organized as follows. Section 2 provides summary information and statistics on the size and scope of federal credit programs. Section 3 presents estimates of the subsidies created by federal credit assistance, which correspond to the direct fiscal effects of credit policies. Section 4 considers the fiscal effects of credit policies when credit constraints are binding on some borrowers.

2. Size, Scope and Cyclicality of Federally-backed Credit

The federal government's credit market activities include its traditional credit programs through which it provides loan guarantees and makes direct loans for housing, education, agriculture,

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[2] Gale's model embeds credit rationing as in Stiglitz and Weiss (1981). Government subsidies make banks more willing to lend to marginal groups because they increase effective repayment rates. Gale concludes that credit subsidies raise aggregate private investment between 0 and 4 percent, depending on the assumed elasticity of the supply of funds. Allocation is affected by the size of subsidies, with more incremental credit going to sectors receiving the larger subsidies. Because both new and inframarginal borrowers receive funds, the effective subsidy rate on incremental borrowing is high; Gale notes that credit subsidies may therefore not be an efficient way to assist target groups. He also emphasizes the importance of crowding out when credit supply elasticities are low.

[3] See Smith (1983), Smith and Stutzer (1989), Williamson (1994) and references therein. Foundational analyses of credit rationing include Jaffee and Russell (1976) and Stiglitz and Weiss (1981).

small businesses, energy and trade.[4] Its credit-related activities also include implicitly or explicitly guaranteeing the obligations of government sponsored enterprises such as Fannie Mae and Freddie Mac, the Federal Home Loan Banks and the Farm Credit System; and insuring bank deposits and defined benefit pension plans.[5] Some of the programs of the Federal Reserve also can be viewed as credit policies that have fiscal effects. The book value of outstanding balances provides a measure of the scale of government activity. The annual disbursements for traditional credit programs as a percentage of GDP, and a balance sheet that clarifies how credit activities affect both the government's assets and liabilities, is also presented. Those statistics, however, are not intended to be interpreted as measures of the fiscal effects of credit policies, which we will consider later in the paper.

2.1 Stock Measures of Outstanding Obligations

A narrow measure of the federal government's credit activities is given by the outstanding balances in its traditional direct lending and loan guarantee programs. The 2010 Credit Supplement to the Federal Budget lists over 150 credit programs which are administered by various federal agencies and bureaus. Figure 1 shows the outstanding balances of federal direct loans and loan guarantees originated over the period 1998 to 2010 (excluding emergency lending associated with the financial crisis), grouped by major loan type: housing, education, agriculture, business or other. Housing is the single largest category in all years, but its relative size has varied over time. The federal student loan programs have undergone the most rapid growth, particularly since the mid-2000s. The total amount of federal guaranteed and direct loans outstanding roughly doubled over the period, reaching about $2.3 trillion in 2010. Figure 1b show the outstanding balances for direct loan and loan guarantee programs from 1970 to 2012.

Following the financial crisis that began in late 2007, the credit outstanding in the government's traditional credit programs increased markedly. During that period the volume of explicitly government-backed credit also increased dramatically with the federal takeover of Fannie Mae

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[4] Tax exempt municipal borrowing also provides significant credit subsidies which are not analyzed in this preliminary draft of the paper. For the full year 2010, long-term municipal issuance volume totaled a record high $430.1 billion.

[5] Elliot (2011) provides a history and more complete discussion of federal credit programs. Tax exempt borrowing also provides credit subsidies; those are not considered here but will be included in a future revision. For the full year 2010, long-term municipal issuance volume totaled a record high $430.1 billion.

and Freddie Mac. That action converted those two government-sponsored enterprises (GSEs) from private companies with implicit government guarantees to entities that are fully owned by the government and whose losses the government currently has a legal obligation to absorb. Figure 2 shows the totals for federal credit programs that include the credit obligations of Fannie Mae and Freddie Mac, and also some of the emergency programs of the FDIC and the Federal Reserve. Including those activities brings total federally-backed credit outstanding to over $8 trillion in 2010.

The programs included in Figures 1 and 2 are ones in which the federal government has a fairly direct role in determining eligibility and underwriting standards for the credit it backs. Broader measures of obligations, for which the federal government assumes credit risk and through its pricing policies influences incentives and creates subsidies, might also include:

- *Insured deposits*. The FDIC, an independent federal agency, insured $6.2 trillion of deposits in 2010.
- *Pension guarantees*. The Pension Benefit Guarantee Corporation (PBGC) is an independent federal agency that insures benefits for 44 million workers in defined benefit pension plans sponsored by private firms. Defined benefit pension obligations are similar to corporate debt, and the PBGC's insurance program can therefore be viewed as a credit guarantee program. Munnell et. al. (2008) estimate that private defined benefit plans had liabilities of about $2.8 trillion in 2007.
- *Implicit guarantees to the Federal Home Loan Banks and the Farm Credit System.* The FHLBs and FCS are GSEs that channel funds to commercial banks and other financial institutions which in turn make loans for housing, agriculture, and other activities. The FCS also engages in some direct lending. The perception (backed by historical behavior during past crises) of federal backing lowers those institutions' funding costs. In 2010 the liabilities of the FHLBs totaled over $800 billion, and those of the FCS totaled about $200 billion.
- *Troubled Asset Relief Program*. Financial assets acquired through the TARP, including its purchases of preferred stock in financial and non-financial institutions, peaked at about $540 billion in 2009, but have since declined as companies have repurchased the

shares. Those purchases certainly were part of the federal government's credit policy because they were largely aimed at strengthening financial institutions. The resulting holdings, however, are primarily equity instruments.

- *Federal Reserve*. The Federal Reserve held $2.1 trillion of assets on its balance sheet on average during 2010. About $800 billion of that was in Treasury securities. Another $1.1 trillion was in agency MBSs and agency debt. The credit risk associated with the agency MBSs is already accounted for in the assets of the GSEs and federal housing programs. The portion of the Fed's assets that are relevant for the calculations here are its loans to financial institutions and Maiden Lane holdings, which stood at $140 billion.

2.2 Comparisons to Aggregate Credit Measures

The tabulations presented above show that the government's traditional direct loan and loan guarantee programs plus the mortgages owned or guaranteed by Fannie Mae and Freddie Mac totaled about $8 trillion in 2010. Including credit-related activities such as deposit insurance, private defined-benefit pension insurance, implicit guarantees to the FHLBs and FCS, TARP, and the Federal Reserve's non-traditional programs increases the sum to about $20 trillion.

By comparison, flow-of-funds data for 2010 indicate that home mortgage debt outstanding of $10.0 trillion, other consumer credit of $2.4 trillion, and business (corporate and non-corporate) debt of $10.8 trillion. Federal credit accounts for a large fraction of housing and consumer credit, but a small share of business debt. Governments are also large borrowers: state and local government debt in 2010 stood at $2.4 trillion, and federal debt totaled $9.4 trillion.

2.3 A Balance Sheet for Federal Credit Activities

The federal government is both a large lender and a large borrower. As a provider of credit it often relies on credit guarantees; funding for the underlying loans usually is obtained by securitization or from private financial institutions.[6] For the government, a loan guarantee is economically equivalent (absent transactions costs) to making a loan directly and financing it by

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[6]. Interesting, some loans that are classified in the government's financial statements as guaranteed are funded by the Federal Financing Bank, which is an arm of the Treasury. Effectively those loans are direct loans.

issuing Treasury debt. The credit risk on both its direct loans and loan guarantees is absorbed by taxpayers, who have a residual equity stake in its credit obligations.

Table 1 consolidates the federal government's credit activities on a stylized balance sheet. Guarantees are notionally represented as a long position by the government in the underlying asset (generally a loan) and a corresponding short position in debt used to fund it. That representation underscores that federal credit activities involve assets and liabilities that are largely offsetting. Although in Table 1 the assets and the liabilities funding them are taken to have equal and roughly offsetting book values, on a fair value basis the liabilities exceed the assets, as discussed in the next section. Table 1 also highlights the fact that the government's direct loans are assets which, from a taxpayer perspective, offset about 9 percent of the unsecured Treasury debt held by the public. It also shows that taxpayers (and other government stakeholders) effectively serve as equity holders with unlimited liability for contingent losses from credit activities.[7]

2.4 Federal Credit Backing over Time and over the Business Cycle

The data presented so far has focused on outstanding balances of federally-backed credit. Here we turn to the pattern of new federally-backed credit over time in its traditional direct loan and loan guarantee programs (the programs included in Figure 1). New federal direct or guaranteed loans in a given year are referred to as disbursements. Figure 3 shows those annual disbursements as a share of GDP from 1992 to 2011, with shaded areas indicating the peak to trough of business cycles as dated by the NBER.[8] Until 2009 disbursements volumes were fairly steady as a share of the economy, fluctuating between about 2 and 3 percent of GDP. Disbursement activity peaked in 2009 at 10.8 percent of GDP, and in 2010 stood at 4.9 percent, still about twice as high as the historical average. The time series is not long enough to discern whether the programs tend to grow in downturns, but clearly demand for federally-backed credit increased dramatically in response to the financial crisis and recession that began in late 2007.

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[7] Losses ultimately must be covered by higher future taxes or cuts to other government spending, both of which are costs to taxpayers.

[8] The series starts in 1992 because it is more difficult to obtain credit program information prior to that time.

3. Measuring the Direct Fiscal Effects of Credit Policies

The subsidy associated with federally-backed credit is the *ex-ante* value of the resources provided to borrowers (from the perspective of taxpayers) in excess of what the borrowers pay for them.[9] Defining credit subsidies on an *ex ante* or accrual basis makes them comparable with other federal spending. For example, a dollar's worth of assistance could be delivered to students in the form of a grant or as the lifetime value of the interest rate reduction on a federal student loan. (By contrast, most press accounts of federal credit costs focus on the losses absorbed by the government *ex post* rather than at the time that contingent resources were committed.) Here the sum of annual fair value subsidies delivered to borrowers through traditional federal credit programs and through Fannie Mae and Freddie Mac is taken as the measure of the direct fiscal effect of federal credit policies in 2010.[10] The "subsidy rate" is the present value subsidy per dollar of underlying loan principal.

Specifically, the subsidy conferred to a borrower who obtains federal credit assistance is the difference between the present value of the government's expected cash outflows and inflows. On a direct loan those outflows include the initial principal and associated transactions costs; inflows include fees and interest payments. For a loan guarantee, outflows include payments on default claims and associated transactions costs; inflows include fees. Any embedded options on a loan, such as the option to prepay or to defer payments, also affect subsidy value.

The choice of discount rates significantly affects subsidy estimates. For most federal credit programs, the official estimates that determine their budgetary costs are calculated using the rules specified in the Federal Credit Reform Act of 1990 (FCRA). That law prescribes that projected net expected cash flows be discounted at Treasury rates of corresponding maturities. FCRA subsidy estimates also exclude most transactions costs, which are reported separately in the budget on a cash basis. The use of Treasury rates for discounting in official cost estimates causes reported subsidy costs to be systematically lower than what a private financial institution

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[9] As is the case for most measures of fiscal policy, in this analysis the focus is on cost not benefits. The two could differ—borrowers could derive more or less utility from the credit extended than its cost to taxpayers.

[10] The taxpayer cost of the contingent liabilities from the FDIC, PBGC, FHLBs, FCS and the Federal Reserve is not discussed here, but see CBO (2005) for an older estimate of the PBGC's cost, and CBO (2010c) for an estimate of the fair value of the Federal Reserve's lending programs.

would report because it neglects the cost market risk (and any other priced risks such as prepayment risk). By contrast, a fair-value approach produces estimates of the cost of credit subsidies that either correspond to or approximate market prices.

A common argument made against using fair-value estimates for measuring government cost is that market risk does not involve costs for the government because it can borrow at Treasury rates. However, when the government finances a risky loan or loan guarantee by selling a safe Treasury security, it is effectively shifting risk to taxpayers or other federal stakeholders: if the borrower defaults, the security must be paid for through higher taxes or lower government spending in the future. This is clear from the balance sheet shown in Figure 1, and is simply the application of the logic of the Modigliani-Miller theorem to government investments; absent frictions, the cost of capital for a project depends on the risk of the project's cash flows, not on how it is financed.[11]

The resulting understatement of official subsidy costs from discounting at Treasury rates is most evident in those programs that report a gain to the government while at the same time delivering credit at rates that are well below those charged for credit of similar risk in competitive markets, such as student loans and FHA mortgage guarantees. In fact the net effect of traditional federal credit programs was to reduce the reported budget deficit in 2010 by $14.1 billion.

The fair value cost estimates reported below for most of the larger federal credit programs are based on a series of analyses undertaken at CBO and in several academic studies. In general, there are three basic approaches that can be used to estimate the fair value of federal financial transactions: comparable market prices, risk-adjusted discount rates, and derivative pricing. Although all methods should provide similar answers if correctly implemented, the most natural approach varies with the transaction under consideration and importantly, with the availability of data. Directly comparable products usually do not exist, which necessitates model-based approaches to estimating subsidies.

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[11] For a more complete discussion of federal budgeting practices for credit and other financial instruments, and of the case for fair value accounting for the government, see Lucas and Phaup (2010).

3.1 Mortgage Programs

In recent years the federal government has been the main source of mortgage credit for U.S. households. The government provides subsidies on residential mortgages through its below-market pricing of mortgage guarantees offered by programs run by the Federal Housing Administration (FHA), the Department of Veterans Affairs (VA), and other smaller agencies like the Rural Housing Administration, as well as through Fannie Mae and Freddie Mac. In 2010, Fannie Mae and Freddie Mac owned or guaranteed roughly half of all outstanding mortgages in the United States, and provided financing for 63 percent of the new mortgages originated that year.[12] Including the 23 percent of home loans insured by federal agencies such as FHA and VA (which are securitized by Ginnie Mae), about 86 percent of new mortgages made in 2010 carried a federal guarantee.

3.1.1 Fannie Mae and Freddie Mac

In 2010, the principal value of mortgages purchased by Fannie Mae and Freddie Mac was $1,011 billion ($625 billion by Fannie and $386 billion by Freddie). Most of the purchases were of fixed rate conforming mortgages on single-family homes.

CBO provides an estimate of the annual fair value subsidy on new mortgages guaranteed by Fannie Mae and Freddie Mac in its baseline estimates of federal spending. Those estimates correspond to the concept of subsidy value used here: The annual estimate covers only the current year's new book of business; it does not reflect losses on mortgages guaranteed or purchased in the past, nor on expected future guarantees. The 2010 fair value subsidy cost was reported to be $41 billion, which represents about a 4 percent subsidy rate on new guarantees. CBO (2010b) explains that the estimates are based on a model of expected future loss and prepayment rates, and a cost of capital based on the jumbo-conforming spread. The jumbo-conforming spread is often taken as an indicator of the difference between the private cost of insuring mortgage credit risk and what the government charges for it. The spread also reflects

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[12] The volumes that are relevant to the subsidy calculations include refinanced loans even if the previous mortgage also carried a federal guarantee because the models used to predict guarantee costs treat refinancing events as precluding further defaults.

other differences between jumbo and conforming mortgages. CBO does not state the precise portion of the jumbo-conforming spread that they attribute to other factors, but other studies have suggested it was approximately half of the spread in the pre-crisis period. Figure 4 shows that the spread had fallen from its peak levels by 2010, but it still remained substantially elevated above pre-crisis levels at about 80 bps at the beginning of 2010. The 4 percent subsidy rate reported by CBO can be understood as being roughly consistent with a 40 basis point annual subsidy over a 10-year average life.

3.1.2 Federal Housing Administration

In 2010, FHA guaranteed about $319 billion in new mortgage loans, which represents about 17 percent of single-family mortgages originated that year (see Figure 5). FHA's largest program, its single family guarantee program, is aimed at extending access to home ownership to people who lack the savings, credit history, or income to qualify for a conventional (GSE-eligible) mortgage. Guarantees are available to qualifying borrowers on 15- and 30-year fixed- and adjustable-rate mortgages with down payments as low as 3.5 percent of a property's appraised value. The maximum amounts that can be borrowed are the same as on conforming mortgages insured by the GSEs. In exchange for its guarantee, FHA charges an up-front fee and annual premiums.

The fair value subsidy cost for FHA's 2010 guarantees is based on the subsidy rate reported in CBO (2011a) for 2012, adjusted upward to account for the higher credit spreads and lower fees prevailing in 2010. Finding the fair value of FHA guarantees in the wake of the financial crisis is complicated by the lack of private subprime mortgage originations that would normally provide reference prices. However, the key idea behind the pricing in CBO (2011a) is that information about the market price of mortgage credit risk continues to be available from the private mortgage insurance (PMI) market. Fannie and Freddie require borrowers with less than a 20 percent down payment to purchase PMI. Holding borrower and other loan characteristics constant, the present value of fees paid for PMI and for a GSE guarantee (with the GSE guarantee fee adjusted up for the subsidy associated with the GSEs) should be the fair value of the guarantee provided by the FHA, which bears all of the credit risk on the mortgages it

insures.[13] The difference between the imputed fair value of that guarantee and of the fees FHA charges is the value of the FHA subsidy. A Monte Carlo model of mortgage cash flows, together with the prices of PMI guarantees, GSE guarantees, and of MBSs, was used to infer risk-neutral prices that could then be used to value FHA guarantees.

CBO estimates a subsidy rate of 1.5 percent for FHA guarantees made in 2012. Two factors would tend to make the subsidy rate higher in 2010 than in 2012: FHA's upfront fees were raised 50 basis points in April 2010, and credit spreads were wider. Assuming a subsidy rate of 2.5 percent for 2010 and applying it to the guaranteed volume of $319 billion implies a 2012 subsidy of $8.0 billion. Although it may seem surprising that the subsidy rate on relatively risky FHA loans is lower than for loans purchased by the GSEs, the difference can be explained by higher FHA fees that offset the higher expected losses. It appears that most borrowers who qualify for GSE financing choose it over the FHA, which is consistent with a higher subsidy rate on GSE-backed mortgages.

3.1.3 Veteran's Administration and Rural Housing Service

Like FHA, the VA and RHS guarantee mortgages at favorable terms to borrowers who would face higher rates elsewhere or would be unable to obtain credit at all. For example, the VA offers guarantees on mortgages, usually with no down payment, to active duty military personnel and veterans. Unlike FHA assistance, RHS loans are means-tested and offered to relatively low-income rural residents. The subsidy rates for those programs are expected to differ from FHA's because of differences in fee structures, product mix, and the borrower populations.

Estimates of fair value subsidies have not been published for VA, RHS, or other smaller housing programs. However, rough estimates can be constructed by starting with the official subsidy rates and adjusting for a risk charge based on the risk charge for FHA. That is, the FCRA subsidy estimates give the present value of projected losses discounted at Treasury rates. The difference between the fair value subsidy and FCRA subsidy is the risk charge for a program. For FHA, the FCRA subsidy rate reported for 2010 was -0.84 percent.[14] The fair value rate is estimated to be

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[13] To capture the effect of the lower average credit quality of FHA borrowers, PMI rates for borrowers with less than the highest credit scores were used.

[14] All FCRA estimates are from OMB's Analytical Perspectives, 2012.

2.5 percent. The fair value rate is therefore 3.34 percentage points higher than the FCRA subsidy rate. I assume that the risk charge is similar for all of these mortgage guarantee programs because of the many similarities between them: most of the loans are long-term, fixed rate, and highly levered, and they are exposed to aggregate risk through housing prices and unemployment. In 2010, the FCRA subsidy rates for the VA and RHS are -0.16 percent and 1.21 percent respectively. Adding a 3.34 percent risk charge implies a fair value subsidy rate of 3.2 percent for the VA and 4.4 percent for the RHS, and corresponding subsidy costs for that year of $2.0 billion and $0.7 billion.

3.2 Student Loans

The federal government makes financing for higher education widely available through its student loan programs. Since July, 2010 all new student loans have been made through the direct loan program administered by the Department of Education (ED), but prior to that time the majority of federal student loans were made through ED's guaranteed loan program.[15] The program offers long-term fixed rate loans with a variety of terms. Low-income borrowers qualify for "subsidized" loans; most students take out so-called "unsubsidized" loans. In 2010 the interest rate on unsubsidized (subsidized) loans was 6.8 percent (4.5 percent).

Lucas and Moore (2010) and CBO (2010d) provide fair value subsidy estimates for the direct and guaranteed student loan programs. The subsidies reported here are based on the subsidy rates reported in Table 3 of the CBO study.[16] Cash flows on student loans are modeled using historical loan-level data from the Department of Education, and risk-adjusted discount rates are derived from the spreads over Treasury rates charged on private student loans prior to the financial crisis. (During the crisis the spreads widened enormously and private lending volumes fell sharply.) The loans have multiple embedded options including prepayment and deferral options that were also taken into account in the pricing model. Because the interest rates on the private student

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[15] Currently the government also purchases guaranteed loans from lenders. Those purchases do not create new credit subsidies for borrowers and those loans are excluded from the reported subsidy estimates.

[16] The methodology was similar in both analyses, but the reported subsidy rates are somewhat different, in part because of the time periods considered. However, the subsidy rates reported by CBO are more applicable to this analysis because it takes into account the mix of loan types and interest rate conditions in 2010.

loans are primary rather than secondary market rates, adjustments had to be made to subtract out an estimate of the fees that were included in the quoted rates. (See Lucas and Moore for a more complete description of the valuation model.)

The subsidy rate for loans originated in 2010 is 13 percent for direct loans and 16 percent for guaranteed loans. The higher cost of the guaranteed program is because the statutory fees paid to private lenders exceed the government's cost of administering the direct loan program. Those subsidy rates are considerably higher than for any of the mortgage guarantee programs. The higher rates are plausible because student loans are long-term unsecured consumer debt, which is considerably riskier than even highly levered mortgages which are protected by the collateral value of the property. Applying the weighted average subsidy rate to the approximately $105 billion of new student loan disbursements in 2010 yields a subsidy cost of $16.1 billion.

3.3 Small Business Administration

The SBA assists qualifying small businesses in obtaining access to bank credit by guaranteeing a portion of their loans through its 7(a) loan guarantee program. That program had very modest default rates in the years leading up to the 2007 financial crisis, but more recently loss rates have increased dramatically. CBO estimated the market value of SBA's subsidy on guaranteed loans originated in 2006 using an options pricing model that is described in CBO (2007).[17] CBO reports a market value subsidy rate for 2006 of 1 percent, versus a FCRA subsidy estimate of 0 percent. The report also notes that under the assumption of less benign market conditions (with 20 percent higher default rates and 50 percent lower recovery rates) the market value subsidy would increase to 2.7 percent. For 2010, OMB reports a FCRA subsidy rate for the SBA of 3.53 percent. Similarly to the fair value estimates for VA and RHS, the subsidy for 2010 is approximated by adding to the FCRA subsidy rate a risk charge equal to the difference between the fair value and FCRA estimate for an earlier year. The risk charge added is 2.7 percent, reflecting the increase in default losses over the 2006 assumptions. The resulting fair value subsidy rate is 6.2 percent, and the dollar subsidy value is $1 billion for SBA loans guaranteed in 2010.

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[17] The estimate is referred to in the report as a market value estimate, but it is conceptually equivalent to what is described as a fair value estimate in later CBO publications.

3.4 Other Traditional Credit Programs

The programs discussed above account for over 85 percent of traditional credit programs. The larger programs in the "other" category provide credit assistance for agriculture and international trade. While a few of the programs exceeded $5 billion in 2010 lending volume, most were much smaller. Fair value subsidy estimates have not been published for those programs. However, OMB provides summary data that include interest rates and fees, lifetime default and recovery rates, loans originated, and the FCRA subsidy rates.[18] From that information it is possible to back out estimates of a risk charge using a simple model the annual expected cash flows on the underlying loans: Given an assumed prepayment rate, the lifetime default rate is converted into an annual default rate. Cash flows on the underlying loan are based on the borrower rate, the annual default rate, the prepayment rate, and the recovery rate conditional on default. The present value of fees is assumed to be unaffected by the discount rate.[19] Discounting expected cash flows for each program at a risk-adjusted rate yields an estimate of their fair value; the subsidy (either for a direct loan or a loan guarantee) is the difference between the loan principal and the present value of loan payments and fees. FCRA values are approximated the same way except that Treasury rates are used for discounting.[20] The difference between the fair value and FCRA cost is the risk charge. The risk charge is added to the official FCRA estimate for each program to produce a fair value subsidy estimate.[21]

To risk-adjust the discount rates, the spread over Treasury rates is set at 1.15 percent, which corresponds to the historical risk premium on BBB bonds (Hull et. al., 2005). The weighted average risk charge is 6 percent, and the weighted average official FCRA subsidy rate is close to

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[18] The data, which is reported by the federal agency running the program, is of mixed quality and in some cases clearly incorrect. In those cases the risk charge added to the FCRA subsidy rate is the average of the risk charges across all of the smaller programs.

[19] That assumption is correct for upfront fees only. The data on periodic fees is not reliable which is why the effect of differential risk adjustment is not calculated. Neglecting the difference is likely to have a very small effect on the total subsidy estimates.

[20] CBO (2011b) provides a detailed example of this approach for nuclear construction loan guarantees.

[21] The risk charge plus OMB's FCRA estimate is used instead of the rough fair value estimates because the FCRA estimates are generally based on more complete information about cash flows and their timing than is publicly released.

zero. Hence the fair value subsidy rate for the $64 billion of loans covered by other programs in 2010 is taken to be 6 percent, which implies a dollar subsidy value of $3.8 billion.

3.5 Summary of the Direct Fiscal Effect of Credit Program Spending

Table 2 summarizes the fair value subsidy costs for federal traditional credit programs, and for Fannie Mae and Freddie Mac, in 2010. The total for traditional credit programs is $31.7 billion, which is $43.4 billion more than the cost of -$11.7 billion reported by OMB. Including the subsidies provided by GSE guarantees brings total subsidy to $72.7 billion.[22] To put that figure into perspective, $72.7 billion is about 11 percent of the $666 billion in non-defense discretionary spending, and 0.5 percent of GDP.

Comparable estimates of fair value credit subsidies for federal credit programs have not been published in recent years. However, during the 1980s OMB produced annual estimates of the economic cost of credit programs that were conceptually similar to fair value estimates in its "Special Analysis F" volume of the federal budget. Gale (1991) reports OMB subsidy rates from that time of 2 percent for mortgages, 25 percent for farm credit, 32 percent for student loans, 14 percent for small business, and 19 percent for tax exempt bonds. The high subsidy rates for farm credit reflect the very risky loans that were being made at that time that eventually necessitated a bailout of the Farm Credit System; those programs have since been restructured to be safer. OMB's higher estimated subsidy rate on student loans is consistent with the more heavily subsidized interest rates at that time. The subsidy rates on small business loans were also higher in the past; expected losses have fallen because of significant program changes since that time. For housing credit, the subsidy estimate reported here for the GSEs is more than twice OMB's estimate of housing credit subsidies, and FHA and VA subsidy rates here are also considerably higher. The elevated 2010 subsidy rates reflect the severe disruptions in the housing market; as that market and the economy recover, subsidy rates are likely to be closer to OMB's earlier estimate.

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[22] OMB accounts for Fannie Mae and Freddie Mac on a cash basis. Under current law the Treasury makes cash infusions into the GSEs to prevent their capital from becoming negative. In 2010 the President's budget shows payments to the GSEs of $40 billion.

While $72.7 billion is a noteworthy transfer of value to borrowers, that amount is unlikely to significantly affect economic activity. (By comparison, the American Recovery and Reinvestment Act of 2009 added about $392 billion of additional spending and tax cuts in 2010.) However, credit policies may have a much larger economic impact when credit market frictions are important; the rest of the paper focuses on those channels of credit policy.

4. Fiscal Effects of Credit Policies in the Presence of Credit Constraints

In an economy without credit market frictions, the federal credit activities considered above would have minimal real effects on economic aggregates. The associated subsidies would cause some redistribution of wealth from taxpayers to borrowers, but aggregate spending and saving would be largely unaffected.[23] By lowering the relative price of certain types of borrowing, the subsidies would increase the demand for those funds; for instance, the 13 percent subsidy rate on direct student loans would induce many students to take out loans even if they could pay for their education without borrowing; the subsidy could be captured by turning around and investing the money in a higher-yielding activity of similar risk (or be used to replace more expensive credit card debt). Because eligibility for subsidies is linked to specific investments and increases the demand for them, some or all of the subsidy may be absorbed in higher factor prices (e.g., subsidized mortgages encourage more housing purchases, putting upward pressure on house prices).

When credit constraints are important--for instance because asymmetric information between borrowers and lenders or enforcement problems lead to a reduction in the availability of credit--it is less clear how to assess the fiscal effects of federal credit policies. The increased availability of credit to previously constrained households could significantly increase aggregate demand, and that increase may be largely unrelated to the size of the direct subsidies described earlier. For instance, by providing a small direct subsidy, the government may be able to attract a large number of both low- and high-risk borrowers in situations where no private credit could be offered without lenders taking a loss, leading to large amounts of investment or spending that

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[23] In a representative agent model where borrowers and taxpayers are one and the same and markets are complete, the only real effects would arise from distortionary tax effects.

would not otherwise have occurred, particularly if the economy is below full employment. Such effects may be less important, however, when leverage levels are already high.

4.1 How Much Do Federal Credit Programs Increase Credit Availability?

Following Gale (1991), I consider the effect of each major federal credit program on the availability of credit in the economy, but make somewhat different assumptions. Gale considers two scenarios for the world without credit subsidies in order to provide upper and lower bounds for his calculations of the effects of policy on the allocation and quantity of credit. The first is that all markets would clear. The second is that tax-exempt and mortgage markets would clear, but farmers, students, and small businesses would be "redlined," meaning that credit would not be available even at very high interest rates.

Here I consider two different scenarios for the effects of federal credit assistance on the availability of credit. The first scenario is for normal market conditions, the second is for periods of financial market distress. The assumptions are meant to reflect the most likely outcomes in each case rather than to establish ranges. Ideally the inferences would be model-based, but applicable models have not been developed.[24] Hence as in Gale's analysis the estimates are based largely on judgment, but nevertheless provide a basis for quantitative assessments.

4.1.1 Housing

 Real estate is often accepted as collateral, making it relatively easy for firms and households to borrow against it. Perhaps for that reason, Gale assumes that the mortgage market would clear in the absence of federal housing programs. However, because house prices are volatile, there are limits to the amount that can be borrowed against the value of a home. Government programs can increase the availability of mortgage credit by permitting higher loan-to-value ratios than a private financial institution would accept. FHA, VA and RHS all allow borrowers to make very small or no down payments. A larger down payment requirement would discourage some people from purchasing a home at all and cause others to buy a less expensive home. To take into

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[24] An exception is Jeske et. al. (2011), which proposes a structural model to assess the effects of the GSEs.

account that those programs loosen collateral constraints even during normal times, the constrained share of borrowing for the FHA, VA and RHS is set to 10 percent (i.e., 10 percent of the funds borrowed through those programs would not be available at any price without government assistance). By contrast, the GSEs require 20 percent down or private mortgage insurance; it seems unlikely that they increase the availability of mortgage credit in normal times.[25]

Federal backing is likely to have a much larger effect on the availability of mortgage credit during periods of financial stress. The shift from private label mortgages to government-backed mortgages following the 2007 financial crisis is not necessarily indicative of that effect, however, because the government also attracts additional borrowers at such times because its pricing is relatively favorable. I assume that 90 percent of FHA borrowing is incremental during distress periods because the program is specifically designed for borrowers with no credit history, low savings, and low incomes. For the VA and RHS, I set the constrained share to 50 percent because some VA borrowers are more likely to be in a position to obtain some credit privately than are FHA borrowers. For the GSEs, even during periods of stress most conforming borrowers probably would be able to obtain credit at higher interest rates from private lenders. I assume that 25 percent of the volume of GSE credit is incremental during distress periods.

4.1.2 Student Loans

The federal student loan programs make unsecured, long-term credit available to borrowers that may have no credit history and little in the way of income or assets. Such loans are generally not offered by private financial institutions. For those reasons, the student loan program is thought to greatly increase the availability of funds for higher education. I assume that during normal times, 75 percent of student loan volume would become unavailable without federal support. The presumption that a quarter of the loans could have been obtained anyway is supported by the fairly sizable private student loan market that had emerged prior to the financial crisis. Also, some student loans are made to parents of students who are more likely to be able to obtain credit elsewhere. During the financial crisis many private lenders withdrew from the student loan market, and the ones that remained raised their underwriting standards and rates considerably. I

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[25] A number of studies have come to this conclusion empirically.

assume that during times of market stress 95 percent of federal student loans represent incremental borrowing volume. That estimate may be on the high side if families choose to use home equity or other types of loans to finance education when student loans are not available.

4.1.3 Small Businesses and Other Traditional Credit Programs

The SBA 7(a) program is intended to increase access to credit by businesses that are unable to obtain credit on their own. The pricing that small businesses obtain through that program does not appear to be particularly favorable, and the volume of SBA loans did not increase much following the onset of the financial crisis.[26] I assume that the constrained share of those loans is 75 percent in normal times and 85 percent in stress periods. The relatively small difference between the normal and distressed share of constrained borrowers reflects the view that the program is relatively unattractive in good times for unconstrained borrowers. As a result, the share of constrained borrowers in good times is assumed to be higher than for most other federal credit programs.

Other traditional credit programs contain a mix of support for agriculture, trade, energy, and other activities. I assume a constrained share of 50 percent in normal times and 75 percent in periods of stress.

4.1.4 Summing Up the Effects on Availability

The incremental borrowing volume attributed to the relaxation of availability constraints from federal credit assistance is shown in Table 3. The percentage increases in availability just discussed are applied to the 2010 loan volumes to calculate incremental credit availability in dollar terms. The conclusion is that under normal market conditions the volume estimated to have been incremental would be $163 billion. However, under distressed market conditions the amount of incremental borrowing is $741 billion. Conditions in 2010 probably were somewhere between those two cases.

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[26] de Andrade and Lucas (2009) find that SBA subsidies may benefit banks more than small businesses.

4.2 How Much Do Federal Credit Programs Increase Private Spending and Investment?

To go from an estimate of the increase in the availability of credit to an estimate of increased spending and investment attributable to federal credit assistance requires several additional steps. The first is to calculate how much incremental borrowing is induced by the direct subsidies provided by the programs. The second is to adjust for the partially offsetting effect of crowding out. The final step is to estimate the share of increased borrowing that is spent or invested rather than saved.

The net change in aggregate borrowing attributed to federal credit assistance is given by:

$$dA + S(dB/dS) - C \qquad (1)$$

Total federally-backed borrowing, B, includes the incremental borrowing volume attributed to increased credit availability, dA, and the amount that would have been borrowed in any case. It also includes the incremental borrowing volume induced by the direct subsidy, $S(dL/dS)$. (Notice that the direct subsidy effect is assumed to increase loan demand by both previously constrained and unconstrained borrowers.) The net crowding out effect, C, is the reduction in private borrowing caused by the increased demand for funds caused by federal credit policies.

The incremental volume in 2010 attributed to credit availability, dA, is based on the estimates in Table 3, assuming that conditions in 2010 were halfway between normal and distressed. The incremental volume is $326 billion from traditional credit programs and $126 billion from the GSEs.

The incremental borrowing induced by the direct subsidies in 2010, $S(dB/dS)$, can be approximated by assuming a demand elasticities for each type of borrowing and using the subsidy rates reported in Section 3. The demand elasticities are taken from Gale (1991). Table 4 reports the elasticities and the implied induced demands: $33 billion for traditional credit programs and $75 billion for the GSEs.

Gale considers a supply elasticity of 0.5 and 5.0 to span the range of plausible values. The increasing integration of world financial markets suggests using a value at the high end of that

range. Extrapolating from Gale's analysis, a supply elasticity of 5 would imply a negligible crowding out effect.

Adding together the three components in equation (1) implies a net change in aggregate borrowing due to federal credit assistance of $559 billion, of which $359 billion was through traditional credit programs.

The final question is how much of the increase in aggregate borrowing is expected to translate into an increase in aggregate demand? Because borrowing is costly, borrowed funds are likely to be spent fairly quickly. However, not all of the spending is on consumption or new investment. Mortgage refinancing accounted for about 73 percent of U.S. mortgage originations in 2010, according to Freddie Mac's 2010 Annual Report. Refinancing frees up cash for borrowing-constrained households because it lowers monthly mortgage payments (both through a lower interest rate and because principal is re-amortized), but the increase in free cash flow is much less than the principal amount refinanced.[27] To adjust for the lower level of incremental demand from refinances, only 30 percent of the net change from housing programs is included. With a downward adjustment of $217 billion for refinances, I take $342 billion as the estimate of the increase in aggregate demand attributable to federal credit assistance in 2010. That figure is almost five times higher than the $70.7 billion calculated as the direct fiscal effect of those policies.

In 2010, the economy was well below full employment and interest rates were near the zero lower bound. Many economists have argued that fiscal policies are likely to be more effective than usual under such conditions. Hence, the increase in aggregate demand of $342 billion might also be interpreted as a measure of the fiscal stimulus created by federal credit policies that year. Clearly the estimate of the stimulus effects of credit policies is highly sensitive to the many assumptions that went into the calculation, and the true value could be considerably more or less than the point estimate here. However, the conclusion that federal credit policies have provided a significant amount of fiscal stimulus in recent years would be robust to a fairly wide range of parameter choices. An important question, but one which cannot be answered without extending

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[27] See Remy et. al. (2011) for an estimate of the effects on households of a large-scale mortgage refinancing program.

the framework used here, is whether or not credit policy is a relatively efficient way to provide fiscal stimulus.

**Figure 1: Total Non-Emergency Federal Loans Outstanding
(Direct and Guaranteed) by Category: 1998-2010**

Source: Budget of the U.S. Government, Analytical Perspectives, FY2001-2012, as reported in Uncle Sam in Pinstripes, by Doiuglas Elliott.
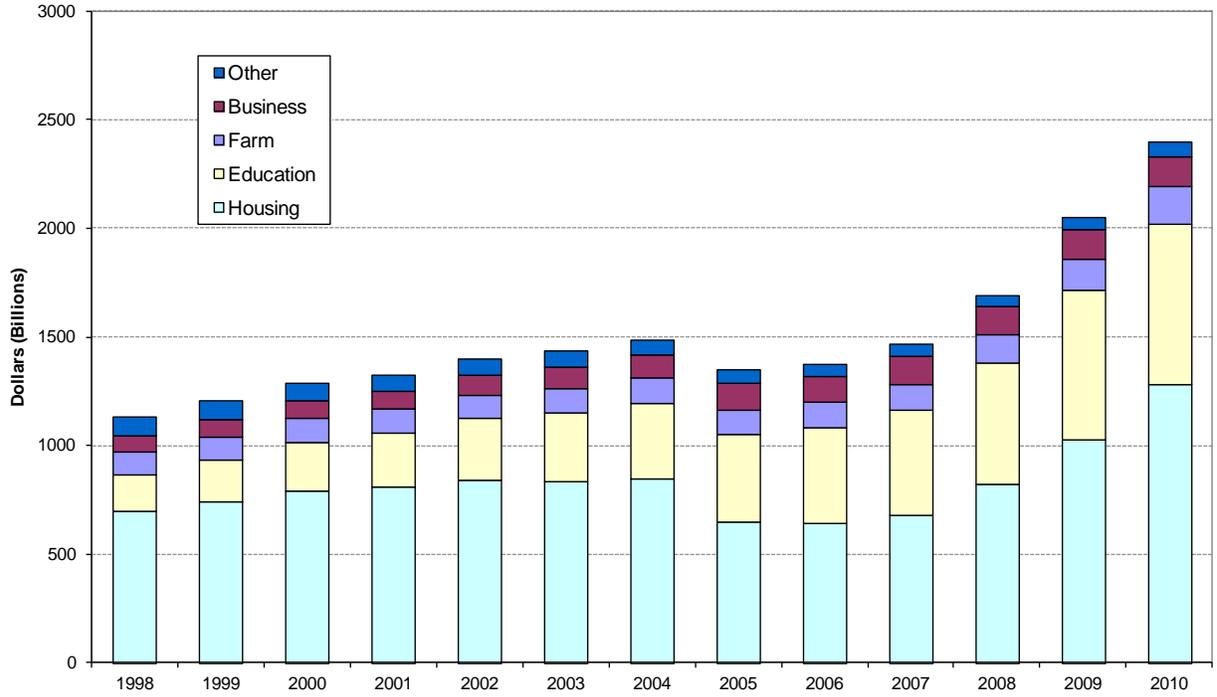
Figure 1B: Nominal Face Value of Federal Credit Outstanding

Dollars in trillions

Loan Guarantees
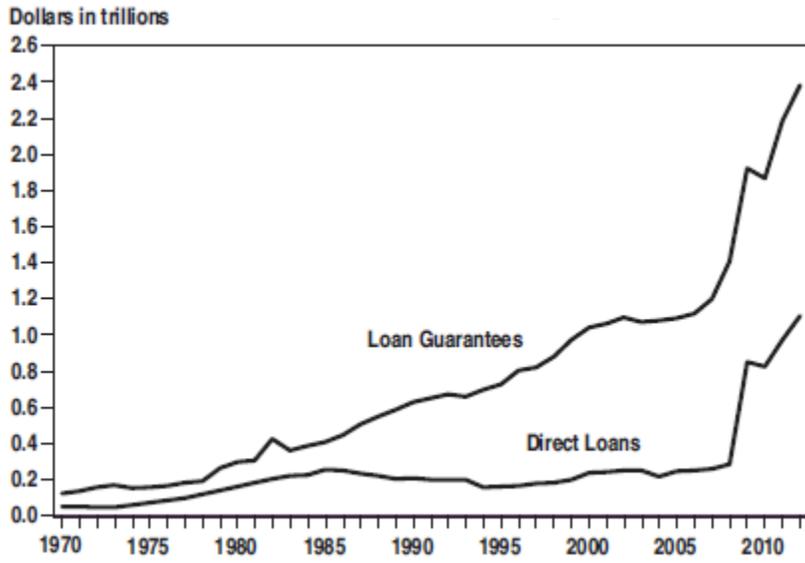
Direct Loans

Source: Analytical Perspectives 2012, Office of Management and Budget

Figure 2: Total Federal Loans and GSE Obligations Outstanding (Direct and Guarantees): 1998-2010
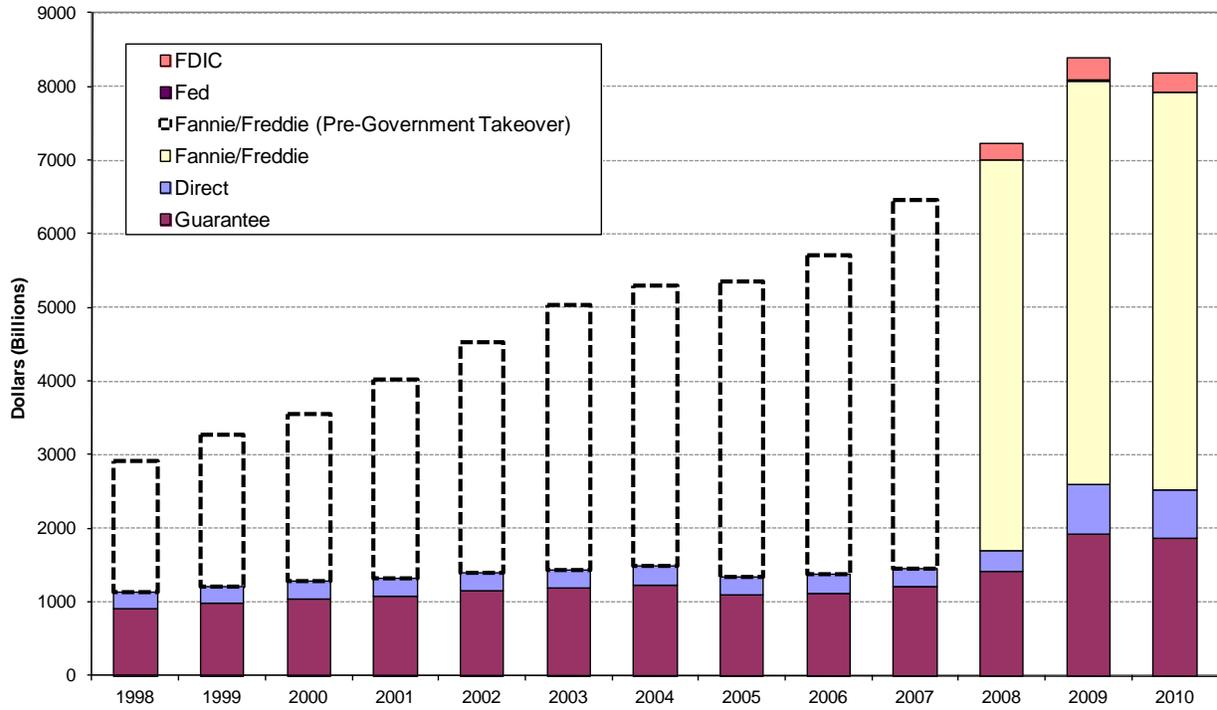
Source: Budget of the U.S. Government, Analytical Perspectives, FY2001-2012, as presented in Bankers in Pinstripes by D. Elliott.

Figure 3: Disbursements from Traditional Federal Credit Programs as a Percentage of GDP 1992 to 2010
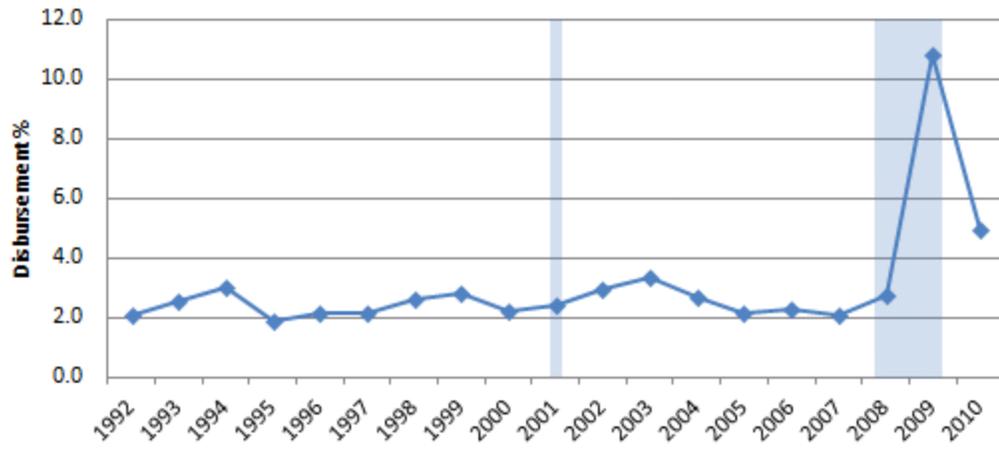
Figure 4.

Spread Between Interest Rates on Jumbo and Conforming Mortgages

(Percentage points)
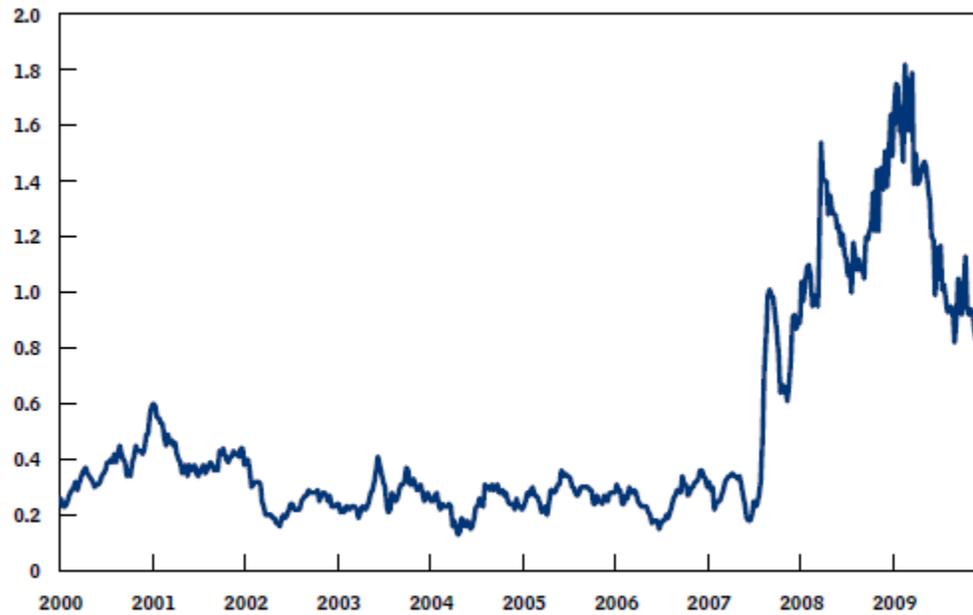
Source: Congressional Budget Office based on data from Bloomberg L.P.

Note: Conforming mortgages are loans eligible for sale to Fannie Mae or Freddie Mac because the original mortgage amount does not exceed an annually adjusted dollar limit (in much of the United States, $417,000 for a single-family home in 2009). Jumbo mortgages are loans that exceed the dollar limit for conforming mortgages.

Figure 5.

## FHA's Share of the Market for Single-Family Mortgages

(Percentage of total originations)

Source: Congressional Budget Office based on data from the Federal Housing Administration (FHA) and Haver Analytics.
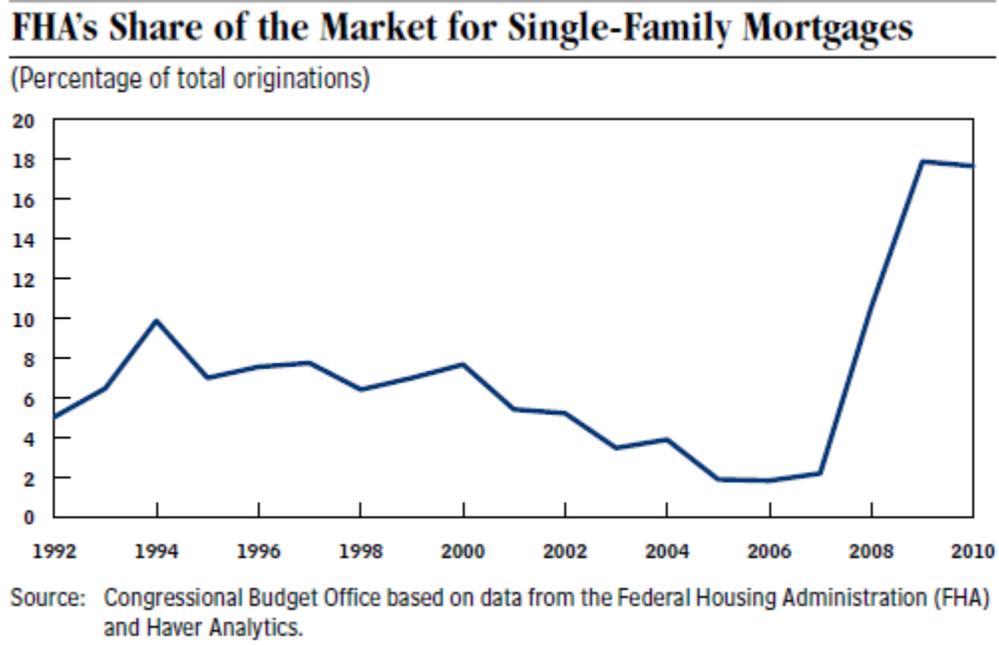
Table 1: Credit-related Assets and Liabilities of the U.S. Government, 2010
(billions of dollars)

Assets		Liabilities	
Direct loans	828	Treasury debt held by public	9,060
Guaranteed loans	1,867	Off-balance-sheet guaranteed loan financing	1,867
Mortgages guaranteed or held by Fannie Mae and Freddie Mac	5,321	Fannie and Freddie debt	1,453
		Fannie and Freddie MBSs	3,868
Other federally-backed credit (FDIC, FHLBs, FCS, PBGC, Federal Reserve loans and SIVs)*	10,140	Off-balance-sheet financing of other federally-backed credit	10,140
		Taxpayer/stakeholder equity	-8,232

Source: Authors tabulations based on Treasury Financial Statements, FDIC and
Federal Reserve Releases, OMB Analytical Perspectives,
and FHFA 2010 Annual Report to Congress

*Figures are approximate and not adjusted for expected losses.

*PBGC is 2007 insured balances.

Table 2: Summary of Fair Value Subsidy Estimates for Federally-Assisted Credit in 2010

	Category	Agency	Disbursements /Purchases ($ billions)	Fair Value Subsidy Rate (%)	Fair Value Subsidy ($ billions)	
	Housing	Federal Housing Administration	319	2.5	8.0	
	Housing	Department of Veteran's Affairs	63	3.2	2.0	
	Housing	Rural Housing Service	17	4.4	0.7	
	Student Loans (guaranteed)	Department of Education	20	16.0	3.1	
	Student Loans (direct)	Department of Education	85	13.0	11.0	
	Business	Small Business Administration	17	6.2	1.0	
	Other Traditional	Various	64	6.0	3.8	
Subtotal[*]			**584**		**29.8**	
	Housing	Fannie Mae and Freddie Mac	1,011	4.1	40.9	
Total			**1,595**		**70.7**	

*The sum of disbursements is lower than the total in OMB's Analytical Perspectives because Treasury TARP and MBS transactions and ED purchases of seasoned student loans are excluded.

Table 3: Incremental Borrowing Volume Attributed to Relaxation of Availability Constraints from Federal Credit Assistance

	Category	Agency	2010 Volume ($ billions)	Constrained share, normal times	Constrained value, normal times ($ billions)	Constrained share, distressed mkt	Constrained value, distressed mkt ($ billions)	
	Housing	FHA	319	0.10	32	0.90	287	
	Housing	VA and RHS	80	0.10	8	0.50	40	
	Student Loans	ED	105	0.75	79	0.95	100	
	Business	SBA	17	0.75	12	0.85	14	
	Other Traditional	Various	64	0.50	32	0.75	48	
Subtotal*			**584**		**163**		**488**	
	Housing	Fannie & Freddie	1,011	0.00	0	0.25	253	
Total			**1,595**		**163**		**741**	

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Table 4: Subsidy-Induced Credit Demand Increases						
	Category	Agency	2010 Volume ($ billions)	Elasticity	Subsidy Rate	Induced Demand ($ billions)
	Housing	FHA	319	1.8	2.5	14.3
	Housing	VA and RHS	80	1.8	3.5	5.0
	Student Loans	ED	105	0.65	14.0	9.6
	Business	SBA	17	0.8	6.2	0.8
	Other Traditional	Various	64	0.8	6.0	3.1
Subtotal[*]			**584**			**33**
	Housing	Fannie & Freddie	1,011	1.8	4.1	74.6
Total			**1,595**			**107**

References

Congressional Budget Office (2005), "The Risk Exposure of the Pension Benefit Guarantee Corporation," CBO Study.

_____ (2007), "Federal Financial Guarantees under the Small Business Administration's 7(a) Program," CBO Study.

_____ (2010a), "The Budget and Economic Outlook: An Update," August.

_____ (2010b), "CBO's Budgetary Treatment of Fannie Mae and Freddie Mac," background paper, January.

_____ (2010c), "The Budgetary Impact and Subsidy Cost of the Federal Reserve's Activities During and Financial Crisis" CBO Study.

_____ (2010d), "Costs and Policy Options for Federal Student Loan Programs," CBO Study.

_____ (2011a), "Accounting for FHA's Single-Family Insurance Program on a Fair-Value Basis," Letter to the Honorable Kent Conrad, May.

_____ (2011b), "Federal Loan Guarantees for the Construction of Nuclear Power Plants," CBO Study.

de Andrade, Flavio and Deborah Lucas (2009), "Why Do Guaranteed SBA Loans Cost Borrowers So Much?" MIT Working Paper.

Elliott, Douglas (2011), Uncle Sam in Pinstripes, Brookings Institution.

Gale, William (1991), "Economic Effects of Federal Credit Programs," *American Economic Review*, Vol. 81, No. 1, p. 133-152.

Hull, John Mirela Predescu, and Alan White (2005), "Bond Prices, Default Probabilities and Risk Premiums," *Journal of Credit Risk*, pp. 53-60

Jaffee, Dwight M. and Russell, Thomas (1976), "Imperfect Information, Uncertainty, and Credit Rationing," *Quarterly Journal of Economics*, 90, 651-66.

Jeske, Karsten, Dirk Krueger, and Kurt Mitman (2011), "Housing and the Macroeconomy: The Role of Bailout Guarantees for Government Sponsored Enterprises," NBER Working Paper 17537.

Lacker, Jeffrey (1993), "Does Adverse Selection Justify Government Intervention in Loan Markets?" Working paper, Federal Reserve Bank of Richmond (1993).

Lucas, Deborah (2011), "Evaluating the Government as a Source of Systemic Risk," MIT working paper

Lucas, Deborah and Damien Moore (2010), "Guaranteed Versus Direct Lending: The Case of Student

Loans," in Measuring and Managing Federal Financial Risk, edited by D. Lucas, University of Chicago Press

Lucas, Deborah and Marvin Phaup (2010), "The Cost of Risk to the Government and Its Implications for Federal Budgeting," in Measuring and Managing Federal Financial Risk, edited by D. Lucas, University of Chicago Press

Munnell, Alicia, Jean-Pierre Aubry and Dan Muldoon (2008), "The Financial Crisis and Private Defined Benefit Plans," Center for Retirement Research at Boston College Brief.

Office of Management and Budget, Credit Supplement to the President's Budget, multiple years.

_____ Budget of the U.S. Government, Analytical Perspectives, 2012.

Remy, Mitchell, Deborah Lucas and Damien Moore (2011), "An Evaluation of Large-Scale Mortgage Refinancing Programs," CBO Working Paper.

Smith, Bruce (1983), "Limited Information, Credit Rationing, and Optimal Government Lending Policy," American Economic Review, 73, 305-18.

Smith Bruce and Michael Stutzer (1989), "Credit Rationing and Government Loan Programs: A Welfare Analysis," Real Estate Economics, Vol. 17, no. 2, 177-193.

Stiglitz, Joseph and Andrew Weiss (1981), "Credit Rationing in Markets with Imperfect Information," American Economic Review.

U.S. Treasury, "Financial Statements of the United States Government for the Years Ended September 30, 2010, and 2009."

Williamson, Stephen D. (1994), "Do Informational Frictions Justify Federal Credit Programs?" Journal of Money, Credit and Banking, Vol. 26, No. 3, Part 2, pp. 523-544