NBER WORKING PAPER SERIES

OFF-BALANCE-SHEET FEDERAL LIABILITIES

James D. Hamilton

Working Paper 19253
http://www.nber.org/papers/w19253

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
July 2013

I am grateful to Marjorie Flavin, Robert Hall, Douglas Holtz-Eakin, Jeffrey Miron, Phillip Swagel, and seminar and conference participants at U.C. San Diego and the Cato Institute for helpful comments on this paper. This study was prepared for Cato Papers on Public Policy. The views expressed herein are those of the author and do not necessarily reflect the views of the National Bureau of Economic Research.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2013 by James D. Hamilton. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

Off-Balance-Sheet Federal Liabilities
James D. Hamilton
NBER Working Paper No. 19253
July 2013
JEL No. H6

ABSTRACT

Much attention has been given to the recent growth of the U.S. federal debt. This paper examines the growth of federal liabilities that are not included in the officially reported numbers. These take the form of implicit or explicit government guarantees and commitments. The five major categories surveyed include support for housing, other loan guarantees, deposit insurance, actions taken by the Federal Reserve, and government trust funds. The total dollar value of notional off-balance-sheet commitments came to $70 trillion as of 2012, or 6 times the size of the reported on-balance-sheet debt. The paper reviews the potential costs and benefits of these off-balance-sheet commitments and their role in precipitating or mitigating the financial crisis of 2008.

James D. Hamilton
Department of Economics, 0508
University of California, San Diego
9500 Gilman Drive
La Jolla, CA 92093-0508
and NBER
jhamilton@ucsd.edu

1. Introduction.

U.S. federal debt has exploded in recent years, growing from $5 trillion (or 36% of GDP) in 2007 to an estimated $12 trillion (72% of GDP) by the end of 2013. Making the interest payments on this debt poses a permanent burden on future taxpayers. At the moment, interest rates are at historic lows, with the government paying an average rate of only 2% to service its outstanding debt.[1] That contrasts with an average rate of 4.5% paid over 2000-2009 and 6.6% over 1990-1999.

Most projections call for interest rates to rise back to more usual historical levels over the next several years. For example, the consensus Blue Chip Financial Forecast anticipates a yield on 10-year Treasury bonds of 4.7% by 2017 (Bernanke, 2013). Returning to those levels of interest rates or the even higher rates seen on average during the 1990s would mean a doubling or tripling of the government's current annual interest expense, bringing it to 2.8-4.2% of GDP, even if there are no further increases in federal debt from now on. The Congressional Budget Office currently anticipates that net interest expense will exceed the entire defense budget by 2021.[2]

But the officially reported debt is only one respect in which current policy has left a burden for future taxpayers. In addition the government has made a number of implicit and explicit commitments that are not included in the net debt figures just reported, but which could potentially require much larger adjustments in future spending or taxes than those associated with paying interest on the official debt itself. The biggest items in this

[1] Federal net interest expense in 2012 was $220 B, which was 2% of the $11,281 T debt held by the public. Data are from Congressional Budget Office, Historical Budget Data, May 2013 (http://www.cbo.gov/publication/44197).
[2] "Updated Budget Projections: Fiscal Years 2013-2023," May 2013 (http://www.cbo.gov/sites/default/files/cbofiles/attachments/44172-Baseline2.pdf).

category come from Social Security and Medicare which, if current policy is maintained, will require enormous sacrifices from future taxpayers. Gokhale (2013) and the 2013 trustees reports for Social Security and Medicare recently provided updates of the size of these commitments. However, there are a number of other government guarantees and implicit commitments that are also quite significant. This paper tabulates the growth of the major categories of off-balance-sheet commitments with a particular focus on their possible role in precipitating or mitigating the financial crisis of 2008. Adding all the off-balance-sheet liabilities together, I calculate total federal off-balance-sheet commitments came to $70.1 T as of 2012, or about 6 times the size of the on-balance-sheet debt. In other words, the budget impact associated with an aging population and other challenges could turn out to have much more significant fiscal consequences than even the mountain of on-balance-sheet debt already accumulated.

The paper begins with an examination of the motivations for off-balance-sheet commitments. These include preventing or responding to financial crises, subsidizing socially desired activities, and commitments to retirees. I then review five of the most important current sources of federal off-balance-sheet liabilities, which are support for housing, other loan guarantees, deposit insurance, actions taken by the Federal Reserve, and government trust funds. I explore how these commitments have changed over the last 6 years and their possible role in contributing to or mitigating the financial strains associated with the Great Recession. A final section briefly draws on some other historical episodes to offer some concluding thoughts on how concerned we should be about the growth of off-balance-sheet federal liabilities.

2. Reasons for off-balance-sheet commitments.

There are three traditional motivations for the government to make commitments in addition to the explicit liabilities embodied in outstanding sovereign debt, which I now briefly review.

A. Preventing or responding to financial crises.

Financial institutions like banks function as intermediaries between potential lenders and borrowers. The lenders value such intermediation because they desire to hold their assets in highly liquid form such as bank deposits that could be withdrawn at any time. The borrowers have longer term investment projects with incompletely observed fundamentals, as a result of which the bank's loans are inherently illiquid. The financial sector issues short-term liquid liabilities to the lenders and holds long-term, illiquid assets (claims against the borrowers), earning a profit on the interest-rate spread.

Diamond and Dybvig (1983) suggested that such arrangements are inherently unstable. If all the bank's depositors were ever to want their money back at the same time, an immediate sale of the bank's assets would involve a loss as a necessary result of their illiquid character. In such an event, depositors would not get all their money back and a bank run could be self-fulfilling. Diamond and Dybvig showed that this problem can be prevented if the government guarantees all deposits on the basis of its taxing authority which ideally would never need to be invoked in equilibrium.

Other economists have argued that the deposit insurance could itself introduce a moral hazard problem, causing banks to make riskier loans than they would have in the absence of a government guarantee; see for example Kareken and Wallace (1978) and the surveys in Bhattacharya, Boot, and Thakor (1998) and Santos (2001). Moreover, bank

runs could alternatively be prevented by requiring the bank to carry a level of equity--initial capital provided by the bank's owners rather than obtained from depositors or short-term lenders-- that is sufficient to cover the losses should the bank be forced to liquidate. This involves a potential efficiency loss relative to government deposit insurance in that it requires capital to be tied up as reserves as a contingency against liquidity needs; for discussion see Diamond and Rajan (2000) and Cooper and Ross (2002).

An alternative role for the government could arise ex post in deciding how to respond to a financial panic if one were to occur. If banks are forced to sell off their illiquid assets at the height of a financial panic, such "fire sales" would depress the market price of illiquid assets even further. There would be social benefits in such a setting from having the government or central bank offer emergency loans, which the banks would be able to repay over time through a more orderly sale of bank assets. A classic discussion of the role for government lending in such a situation was provided by Bagehot (1873); see Flannery (1996) and Brunnermeier and Sannikov (2012) for modern assessments.

B. Subsidizing socially desired activities.

It is also possible to make a case for government loans or loan guarantees as a steady-state policy even if bank runs are not a concern. The government is able to borrow at lower rates than any private borrower. To the extent this is because of private-lending frictions such as principal-agent problems or credit rationing, it may be welfare improving to have the government directly provide loans or guarantees to many private borrowers. Nevertheless, moral hazard and other problems could again cause such

government assistance to be counterproductive; see for example Chaney and Thakor (1985), Smith and Stutzer (1989), and Bencivinga and Smith (1993).

Alternatively, a social planner might choose to direct more capital to certain activities than would be the outcome in an unregulated market if those activities are associated with positive economic externalities. For example, home ownership may be perceived to lower crime rates and increase community involvement, and education could provide a range of external social benefits. Such arguments could serve as possible justification for the large government participation in housing and student loans discussed in Section 3 below. In that discussion I will also review the potential downside of such programs.

C. Commitments to retirees.

Finally, the government would need to offer retirement benefits to any of its employees in order to compete for workers successfully with private-sector employers. The government's existing commitment to its future retired workers may take the form of off-balance-sheet liabilities. More broadly, the U.S. government has also undertaken limited provision for almost all retired and many disabled workers in the form of the Social Security Trust Fund. Such government involvement in retirement assistance to private-sector workers could be motivated on the basis of a perceived public good. As a nation, we do not want to see the elderly suffer, even if it is a result of their own decision not to save when they were working. Assisting such individuals is a public good in the sense that providing the good for me (giving me the satisfaction that Person X is adequately cared for) does not reduce the benefit to you of that same good. Such

programs could be regarded as an off-balance-sheet liability if existing policies commit the government to a certain level of assistance to be offered to retirees in years to come.

3. Key U.S. off-balance-sheet commitments.

A. Housing.

One of the most important areas of federal off-balance-sheet commitments involves assistance to the housing market. These programs began in 1934 when Congress established the Federal Housing Administration (FHA), which insures approved mortgages. Such insurance creates a contingent liability of the federal government that is not counted as part of the federal debt, and, if the loan is repaid, never shows up on the Treasury's income or balance sheet. Since its inception, the FHA has insured 40 million loans. During 2012, the FHA insured $213 B in new mortgages, bringing its total portfolio of insured mortgages to $1,300 B (U.S. Department of Housing and Urban Development, 2012).

In 1938, Congress created the Federal National Mortgage Association, commonly known as Fannie Mae, as a separate entity to purchase the loans that were guaranteed by the FHA. Although originally created through an act of Congress, Fannie Mae has for much of its history had some of the characteristics of a private corporation, with the Federal National Mortgage Association Charter Act of 1954 giving the federal government and private stockholders mixed ownership of the enterprise. In 1968, Fannie Mae was split into two separate entities. The Government National Mortgage Association (Ginnie Mae) was to be an entirely government-owned corporation intended particularly to assist lower-income households, while the remainder (which continued to

be referred to as Fannie Mae) was intended to function mostly as a private enterprise separate from the government. In 1970, Congress chartered the Federal Home Loan Mortgage Corporation (Freddie Mac) to serve a similar role and act as a competitor to Fannie Mae.

Because both Fannie Mae and Freddie Mac were originally created by an act of Congress, they are referred to as "government-sponsored enterprises", or GSEs. It is hard to regard them as ever being truly private companies. For example, they were exempt from all state and local taxes other than property taxes, and bankruptcy procedures were never clear. The Federal National Mortgage Association Charter Act did specify that in issuing any debt, Fannie Mae "shall insert appropriate language in all of its obligations issued under this subsection clearly indicating that such obligations, together with the interest thereon, are not guaranteed by the United States and do not constitute a debt or obligation of the United States or of any agency or instrumentality thereof other than the corporation" (Section 304.2.b). But lenders to the GSEs did not act as if they actually believed that. For example, a 2001 assessment by the Congressional Budget Office estimated that the GSEs would have had to pay an average interest rate that would be 41 basis points higher than the rate they actually paid to borrow, if lenders did not perceive a significant probability that the U.S. Treasury would step in, if necessary, to prevent a GSE default on the debt. See Haffner (2008) for further discussion.

Fannie and Freddie used the funds borrowed at advantageous rates to purchase significant volumes of new mortgages. As seen in Figure 1, their combined holdings increased by almost $1.3 trillion between 1994 and 2004, or over a 300% increase; U.S. nominal GDP increased only 67% over that same period. As of the end of 2009, Fannie

owed $780 B in short-term and long-term debt, which it used to finance $736 B in mortgages that it held at the time.[3] Freddie owed $781 B and held $718 B in mortgages.[4]

Separate government-sponsored enterprises were also using funds borrowed at favorable rates to purchase mortgages. For example, at the end of 2009, the Federal Home Loan Banks held $616 B in financial assets and the Farm Credit System $80 B.[5] These 4 enterprises, along with the Financing Corporation and the Resolution Funding Corporation had total debt outstanding of $2.7 T as of the end of 2009 (Flow of Funds, Table L1).

Even more important in dollar terms were the guarantees that Fannie and Freddie provided for a vastly larger volume of loans. The system worked as follows. A private entity would lend its own funds to a household for purposes of buying a house, and would then sell the mortgage to Fannie or Freddie. The GSE would then bundle a set of loans into an asset known as a mortgage-backed security (MBS) and sell these to individual investors. Fannie described its business model as follows:[6]

> We support market liquidity by securitizing mortgage loans, which means we place loans in a trust and Fannie Mae MBS backed by the mortgage loans are then issued. We guarantee to the MBS trust that we will supplement amounts received by the MBS trust as required to permit timely payment of principal and interest on the trust certificates. In return for this guaranty, we receive guaranty fees.

Although these guarantees represented a liability of the GSE, these were not counted as part of the GSE's own balance sheet-- they were in effect an off-balance-sheet liability of an enterprise that could itself be regarded as an off-balance-sheet liability of the federal government. As of the end of 2009, the assets in agency- and GSE-backed

[3] This number refers to sum of mortgages and MBS held for trading, available for sale, and held for investment. Data are from 2010 Fannie Mae Annual Report, page F-3.
[4] Data are from 2010 Freddie Mac Annual Report, page 175.
[5] See Federal Reserve Board, *Flow of Funds,* Table L122, "Government-Sponsored Enterprises."
[6] From Fannie Mae 2011 Annual Report, page 22.

mortgage pools came to $5.4 T (Flow of Funds, Table L1). The combined net equity of Fannie and Freddie that could be used to honor this guarantee came to only $70B as of 2006.

That such enterprises would be capable by themselves of actually guaranteeing such a vast sum stretches credulity. As housing prices began to fall after 2006, the GSE's net equity turned negative and the federal government placed both Fannie and Freddie into conservatorship. Beginning in 2010, the guarantees began to be reported as on-balance-sheet liabilities of the GSEs (see Figure 2).

Having been originally created through an act of Congress, and with the federal government today being the sole owner of Fannie and Freddie, it seems appropriate to consider both the direct debt obligations of the GSEs and other government housing agencies, as well as their outstanding mortgage guarantees, as an off-balance sheet liability of the federal government. It should be recognized that such liabilities do not have the same status as the direct debt obligations of the Treasury itself. For one thing, there are some offsetting assets, namely the mortgages held outright. The value of the mortgages would never fall to zero, so that using the notional exposure is a significant overstatement of the conceivable net outlays that would ever be required from the federal government to honor these commitments. Nevertheless, it seems a useful exercise to calculate the total notional value of these off-balance-sheet debts and guarantees.

Line 2 of Table 1 reports the par value of the outstanding value of the direct debt of Fannie, Freddie, the Federal Home Loan Banks, Farm Credit System, Federal Agricultural Mortgage Corporation, Financing Corporation, and Resolution Funding Corporation at the end of various fiscal years, while line 3 reports the notional value of

the separate mortgage guarantees issued by Fannie, Freddie, Government National Mortgage Association, and Federal Farmers Home Mortgages plus mortgages held outright by the Federal Financing Bank. The big jump in line 2 and fall in line 3 after September 2008 represents the accounting decision to move Fannie's and Freddie's guarantees on balance sheet. Lines 2 and 3 sum to $7.5 T as of the end of FY 2012, two-thirds as big as the entire stock of Treasury debt held by the public. Note that we have left out of this calculation the $1.3 T in loan guarantees[7] issued by the Federal Housing Administration, Veterans Housing Benefit Programs, and Rural Housing Services, on the assumption that most of these loans ended up being held as assets or part of the guaranteed pools of the GSEs and agencies that are already included in lines 2 and 3 of Table 1.

The top panel of Figure 3 provides historical perspective by plotting the combined mortgage debt either held outright by the GSEs or in mortgage pools that were guaranteed by the GSEs or other federal agencies. This nearly quadrupled between 1991 and 2006, and more than doubled as a percent of GDP over those 15 years (see the middle panel of Figure 3).

What have been the public benefits of this off-balance sheet commitment? One goal of these policies was to increase the home ownership rate. There was indeed a significant rise in home ownership from 64% in 1994 to 69% by 2005. However, these gains proved to be temporary, as they were mostly wiped out by the housing crash and Great Recession (see Figure 4).

[7] This number comes from General Accountability Office, Financial Statements of the United States Government: Notes to Financial Statements," Fiscal Year 2012.

Prior to the crash, however, the U.S. housing boom was pretty spectacular. Household mortgage debt grew significantly faster than GDP in the decade leading up to the crash (Figure 5). U.S. real house prices, which according to Shiller's (2000) data had been relatively stable for a century, nearly doubled within the span of a decade before crashing just as dramatically (Figure 6).

That the tremendous growth in implicit federal guarantees contributed to the housing bubble seems difficult to deny. However, it is important to recognize that an even bigger contribution came from outside the GSEs and federal agencies. As seen in the bottom panel of Figure 3, despite the rapid growth of mortgage debt held or guaranteed by the GSEs, the fraction of mortgage debt associated with the GSEs climbed only modestly between 1995 and 2003, after which it began to decline as a result of an even faster growth in private-label MBS.[8] These represented an adaptation of the Fannie and Freddie model. As with the GSEs, a mortgage originator would make the initial loan to a household. But rather than sell the mortgage to Fannie or Freddie, the originator would sell the loan to a private loan aggregator such as New Century Financial (which went bankrupt in 2007) or Countrywide Financial (which was purchased by Bank of America in 2008). The aggregator would collect a group of thousands of mortgages into a pool, and the income flows resulting from interest payments on the pool were then assigned to tranches, with the more senior tranches guaranteed to be paid first. The theory was that the diversification provided by pooling along with the protection provided by a more senior position in the tranche system could make such securities safe even without an explicit guarantee from a government-sponsored enterprise, despite the

[8] See Ashcraft and Schuermann (2007) for a description of private-label MBS.

fact that the credit-worthiness of the borrowers was substantially worse than that required for securitization by a GSE.

Figure 7 summarizes changing funding sources for U.S. mortgages over time. During the 1980s, GSE pools gradually displaced private banks and savings and loans as the dominant provider of mortgage funds in the U.S. During the 1990s, the GSE share increased only modestly as private-label MBS grew rapidly. The private-label MBS were far more important than the GSEs in the explosion of U.S. mortgage debt in the 2000s.

One could nevertheless make an argument that the implicit guarantees associated with the GSE and agency mortgages made an indirect contribution to the explosion of private-label MBS. The primary risk for both private and GSE MBS was that of a crash in real-estate prices. As long as prices kept rising, even the poor-quality subprime loans had very low default rates, because borrowers could refinance at a profit, turning their initial position of zero or even negative net equity into a handsome profit. As noted above, the potential federal losses from a major real-estate meltdown were quite significant. Some might have believed that, insofar as the government would do whatever necessary to prevent significant losses on the GSE debt and guarantees, the same policies would help the issuers of private MBS to keep their noses above water as well (Hamilton, 2007b).

B. Other federal loan guarantees.

There are a number of important federal loan guarantee programs in addition to those involving housing. One of the most important involves loans for post-high-school education. Donghoon Lee (2013) estimated from household-level credit data that the outstanding stock of student loans grew from a little over $300 B in 2004 to nearly a

trillion dollars by 2012. Federal loans and loan guarantees have played a key role in funding this explosion of student debt.

The Department of Education has historically provided assistance through two programs. Under the Federal Family Education Loan Program, the Department of Education guaranteed certain loans issued by state governments or private entities. There were $493 B in outstanding student loan guarantees at the program's peak in 2009.[9] This program was discontinued in July 2010 with the intention of replacing it with greater reliance on direct loans from the Department of Education.

The financing for the latter works as follows. The U.S. Treasury borrows from the public through its general auctions, and earmarks some of those funds for the Department of Education. One of the things the Department of Education then does with those funds is make direct loans to students. Treasury borrowings earmarked for the Department of Education grew from $104 B at the end of FY 2007 to $714 B at the end of FY 2012.[10] This $714 B is already included in the $11,299 B Treasury debt reported in line 1 of Table 1 to have been held by the public at the end of FY 2012, and indeed accounts by itself for 6% of the total publicly held debt. It is thus already on balance sheet as far as the reported debt is concerned. Interestingly, however, this activity is off balance sheet from the perspective of the reported deficit. Treasury borrowing earmarked for student loans is one of the reasons that the reported growth in publicly held debt in recent years has been bigger than the reported deficit.

[9] General Accountability Office, "Federal Student Loan Programs: Opportunities Exist to Improve Audit Requirements and Oversight Procedures," Report GAO-10-668, July 2010.
[10] This sum is reported in Table FD-7 of the *Treasury Bulletin* as an entry in the category "Treasury holdings of securities issued by government corporations and other agencies."

Insofar as this borrowing for student loans has been associated with the acquisition of an asset (namely, the promise by the students to repay the loans), one can make a case that the $714 B in Department of Education debt should also be moved off balance sheet. On the other hand, there is growing evidence of problems with these loans. Lee's (2013) analysis of micro data suggest that of the nearly trillion dollars in outstanding student loans, 44% are not being asked to make any payment yet, and for more than 2/3 of these, the outstanding balance due is growing. Of the 56% that are supposed to be in repayment, about 1/3 are delinquent. Presumably the Department of Education has much more information on exactly why so little is being collected on outstanding students loans, though I have not found an official report of the relevant data.

However, there are some interesting details in the financial notes to the Department of Education's annual reports of the Federal Student Aid programs. Of the $714 B in Treasury borrowing at the end of FY 2012 that had been earmarked for the Department of Education, only $549 B actually went to direct student loans.[11] Another $165 B was associated with FFEL, which as noted above had been discontinued in July 2010.

It is interesting to trace how that sum earmarked for FFEL has grown and continues to grow over time. In August 2008, the Department of Education began buying certain FFEL loans directly under programs such as the Loan Participation Purchase Program and Loan Purchase Commitment Program "to ensure credit market disruptions did not deny eligible students and parents access to federal student loans for the 2008–09 academic year" (FSA 2012 Annual Report, page 10). The dollar value of loans purchased in these programs is summarized in Table 2. Although they are described in

[11] See Note 10: Debt, in FSA 2012 Annual Report.

the FSA passage just cited as if they were a temporary response to the financial instability in the fall of 2008, the balances have declined very little in the 4 years since then, and still stand at $119 B at the end of FY 2012. Even more interesting is the category for "Guaranteed Loan Program." New loans extended in this category since October 2010 totaled $32 B; recall that the guaranteed loan program officially ended in July 2010.

I could not find much explanation for these entries provided in the financial statements. The natural inference is that the Department of Education has been using funds borrowed from the Treasury to buy up nonperforming guaranteed student loans not only during the financial crisis but every year since. To the extent that is the case, the Department of Education has been gradually moving these obligations from the category of off-balance-sheet liabilities (debt guarantees) to on-balance-sheet liabilities (debt owed by the U.S. Treasury to the public).

Lines 5 and 6 of Table 1 summarize the net implications of the student loan program for total off-balance-sheet federal liabilities. Line 5 is an estimate of the outstanding student loan guarantees. Line 6 subtracts out that portion of guaranteed debt that I calculate has now de facto been included in the officially reported on-balance-sheet debt of the U.S. Treasury.

There are a few other categories of explicit loan guarantees that the GAO recognizes as official off-balance sheet liabilities of the U.S. government. The biggest among these are small business loans and loans from the Export-Import Bank of the United States. These loans added $205 B to the off-balance-sheet total, as seen in line 7 of Table 1.

C. FDIC

The Federal Deposit Insurance Corporation (FDIC) is a government corporation that was created as part of the Banking Act of 1933. The FDIC's role was to insure small depositors against losses if their banks became insolvent. As noted in Section 2.A, in the Diamond-Dybvig (1983) model such insurance could help prevent bank runs, which had been a significant problem in the U.S. in the initial years of the Great Depression (1929-1933). Deposits insured by the FDIC grew from $2.8 T in 1990 to $7.4 T at the end of 2012 (see the top panel of Figure 8). The insurance is funded by a fee on banks. As of the end of 2012, the Deposit Insurance Fund had $33 B in assets, primarily in the form of debt obligations from the U.S. Treasury that are not included in the $11.3 T debt held by the public. Even if the $33 B represented assets other than the future taxation authority of the Treasury, this equity alone would hardly be sufficient to cover losses if there were to be a major nationwide bank panic. The Competitive Equality Banking Act of 1987 reaffirmed that "deposits up to the statutorily prescribed amount in federally insured depository institutions are backed by the full faith and credit of the United States." For this reason, these insured deposits are added in our tally of off-balance-sheet federal liabilities in line 1 of Table 3.

As seen in the bottom panel of Figure 8, FDIC-insured deposits declined as a percent of GDP up until 2007 but climbed swiftly during and after the financial crisis. The Diamond-Dybvig logic suggests that large depositors would have the same incentives to withdraw funds as small depositors, meaning that FDIC insurance of small depositors might not be enough to prevent bank runs. On October 3, 2008, Congress raised the limit on deposit insurance from $100,000 to $250,000, and on October 14, the

FDIC instituted the Temporary Liquidity Guarantee Program, which consisted of two components. The Transaction Account Guarantee Program "guaranteed in full all domestic noninterest-bearing transaction deposits, low-interest NOW [negotiable order of withdrawal] accounts, and Interest on Lawyers Trust Accounts... held at participating banks and thrifts."[12] This was initially intended to expire at the end of 2009. It was later extended twice to run through the end of 2010, and was replaced by the Dodd-Frank Act with a full guarantee that ran through the end of 2012. Deposits that were insured under Dodd-Frank in excess of the $250,000 limit grew from $854 B at the end of 2010 to $1,492 B at the end of 2012.[13] Note that this number is included in the $7,406 B in total FDIC-insured deposits as of the end of 2012 mentioned earlier. This coverage ended on December 31, so that the current figure for total FDIC-insured deposits would be approximately $5.9 T.

A second, separate component of the Temporary Liquidity Guarantee Program was an FDIC guarantee on certain senior unsecured debt issued between October 14, 2008 and October 31, 2009. The FDIC was guaranteeing an additional $346 B in debt through this program at its peak. These guarantees ended as of December 31, 2012. The FDIC reports that total fees collected under the Temporary Liquidity Guarantee Program exceeded expenses, and bank runs by depositors were never experienced during the financial crisis.[14]

To summarize, FDIC guarantees in themselves are currently about half as large as the officially reported on-balance-sheet federal debt. However, the stresses of the most

[12] FDIC, "Temporary Liquidity Guarantee Program," February 27, 2013 (http://www.fdic.gov/regulations/resources/TLGP/index.html).
[13] FDIC, *Quarterly Banking Profile,* Fourth quarter 2012, Table 1.
[14] FDIC, "Temporary Liquidity Guarantee Program," February 27, 2013 (http://www.fdic.gov/regulations/resources/TLGP/index.html).

recent financial crisis were not enough to cause these guarantees to result in direct cash outflows from the U.S. Treasury, and the program seems to have worked in this instance as intended.

D. Federal Reserve.

The Federal Reserve System was created by an act of Congress in 1913. Although it is a government entity, it maintains a separate balance sheet of assets and liabilities from the U.S. Treasury. Up until 2007, the Fed's contributions to net government indebtedness were quite straightforward. As the housing decline threatened more financial institutions, the Federal Reserve came to play a much more active role in financial markets. In this subsection, I review these recent developments and discuss their implications for overall federal liabilities.

Prior to 2007, the primary actions of the Federal Reserve consisted of simple open market operations, in which the Fed would buy a debt obligation previously issued by the Treasury, paying for it by crediting the account that the seller maintained with the Federal Reserve System. These newly created Federal Reserve deposits (which I will refer to as "reserves") represent claims on the Federal Reserve which the bank could, if it wished, subsequently ask to be delivered in the form of currency. Historically, the volume of reserves was very small, averaging $10 B in 2006. New Fed purchases of Tbills were usually followed by conversion of the newly created reserves into currency. One can thus think of the primary function of the Federal Reserve over this period to be swapping one federal liability (Tbills) for another (currency held by the public). The Fed would also occasionally create reserves in order to make a short-term loan to banks through the discount window or through a repurchase agreement (repo), where the latter can be

viewed as a collateralized short-term loan from the Fed. These also were typically quite small, averaging $0.4 B and $26 B, respectively, in 2006.

As financial conditions deteriorated in 2008, the Fed made much greater use of existing lending facilities as well as introduced a number of new emergency programs, as seen in Figure 9. Most important among these were currency swaps (agreements in which the Fed temporarily made dollar loans to foreign central banks, collateralized with foreign currency), term auction credit (which supplemented traditional discount borrowing with longer term collateralized loans to depository institutions), and the Commercial Paper Funding Facility, through which the Fed financed unsecured and asset-backed commercial paper. Some analysts have greatly exaggerated the size of these programs by adding together loans made by the Federal Reserve at different points in time. This is clearly inappropriate accounting, since it would count an overnight loan that is rolled over each day for a month as involving 30 times as much lending as would a single 30-day loan in the exact same amount to the same institution. The accurate measure of the Fed's total exposure through the emergency lending programs is given by the total outstanding loans as of any indicated date, which corresponds to the height of the top line plotted in Figure 9. This reached a maximum of $1,703 B on December 17, 2008, at which point currency swaps outstanding were $583 B, term auction credit $448 B, commercial paper lending $319 B, and all other emergency lending $353 B.

As financial conditions eased, the Fed wound down loans and sold off assets associated with all of the programs shown in Figure 9. The Fed and the Treasury ended up making a profit as a result of all of them, with receipts from interest and loan repayments exceeding the total amount lent (Hamilton, 2012).

Although these programs were wound down, the Fed's balance sheet did not return to its pre-crisis values, but instead subsequently grew considerably through a series of operations popularly referred to as "quantitative easing" or "large-scale asset purchases." The hope of these programs was that by buying a large enough volume of long-term securities, the Fed might be able to lower the long-term interest rate and thereby stimulate aggregate demand (Hamilton and Wu, 2012). Total Federal Reserve assets stood at $3,259 B on April 3, 2013, of which $1,806 consisted of Treasury securities, $1,071 mortgage-backed securities with federal agency or GSE guarantees, and $382 B other assets (see Figure 10).

How do these various Federal Reserve actions affect the net liabilities of the combined Treasury-Fed balance sheet? Consider first an open-market purchase of a Tbill. As noted above, this swaps one government liability (the Tbill) for another (currency held by the public). Should the latter be viewed as an actual or potential liability of the U.S. government? In the early days of currency issue, it very much would be-- the public was holding the paper on an explicit understanding that it could be redeemed for gold or silver on demand or at a future announced fiscal date. In the modern era, the public appears willing to hold currency indefinitely, though one could imagine circumstances in which a drop in currency demand might force the Federal Reserve to sell some assets (in effect, redeem the currency for other assets) in order to prevent inflation. For example, Judson (2012) estimated that about half the growth in U.S. currency demand between 1988 and 2011 came from holders outside the United States. Similarly, if the Federal Reserve were to make a loss on its loans to the private sector or its holdings of long-term assets, real resources in the form of Treasury tax

revenues might be necessary to recapitalize the Fed, again to prevent inflation. As noted above, in the event it turned out that the Fed made a profit rather than a loss on its emergency lending. However, Bernanke (2013) noted that recent interest-rate forecasts made by the Congressional Budget Office, Blue Chip consensus forecast, Survey of Professional Forecasters, and the Fed's interest-rate models all suggested long-term rates could rise in the next few years. Analyses by Carpenter, et. al. (2013), Greenlaw, et. al. (2013), and Hall and Reis (2013) all note that, if this were to happen, the Fed would realize substantial losses on its current holdings of MBS and long-term treasuries. On the other hand, the Fed also has significant unrealized capital gains on its gold holdings, currently valued at $42.22 an ounce. In the calculations for this project, I have decided to treat currency held by the public as entailing zero net off-balance-sheet liabilities for the Treasury or the Federal Reserve, meaning that I regard a standard open-market purchase of a Treasury security that ends up as more currency held by the public as reducing outstanding federal indebtedness by the amount of the purchase.

However, currency is no longer the most important entry on the liability side of the Fed's balance sheet. Figure 11 plots total Fed liabilities. Note that the height of this graph is by definition every week exactly equal to the height of the graph of total assets in Figure 10. As of April 3, 2013, currency held by the public came to $1,180 B, whereas reserves were $1,838 B, and all other liabilities $242 B-- most of the reserves that the Fed created to pay for its large-scale asset purchases are being held idle in banks' accounts with the Fed at the end of each day.

One key reason why banks are content to hold this huge new volume of reserves is that the deposits now earn interest. Granted, the rate is quite low-- 25 basis points, or a

0.25% annual rate. However, with Tbills as of April 2013 only paying 7 basis points, reserves are a more attractive asset than Tbills. As interest rates rise, the Fed will have to pay a higher interest rate in order to persuade banks to continue to hold the deposits with the Fed overnight. Purchasing a 10-year Treasury bond with newly-created interest-bearing reserves is thus just a swap of one form of government debt (a 10-year bond) for another (in effect, an overnight interest-bearing loan from the bank to the Fed). If we are going to subtract the Fed's holdings of Tbonds from net government indebtedness, we need to add reserve deposits with the Fed as an alternative new liability of the combined Treasury-Fed balance sheet.

Lines 4-7 of Table 3 show how the actions of the Federal Reserve change the on- and off-balance-sheet liabilities of the federal government. In line 4 we add reserve balances held by member banks. Although this is an unambiguous liability of the U.S. government, it is appropriate to treat it as an off-balance-sheet item, since it is matched by corresponding assets. We then subtract that part of Treasury debt which is held by the Federal Reserve (line 5) as well as subtract off agency debt and MBS purchased by the Federal Reserve (lines 6 and 7), because we have already been counting the latter as part of our off-balance-sheet total, and thus view the Fed's purchase of MBS as swapping one off-balance sheet liability (the government's implicit MBS guarantee) for another (interest-bearing reserves created by the Federal Reserve). If, however, one had not been persuaded that the MBS were already a federal liability, the Fed's actions should be viewed as making them more so, insofar as interest-bearing reserves are a more direct federal liability than the mortgage guarantees.

The bottom line is that the Federal Reserve's net contribution to off-balance-sheet liabilities (line 8) changed from -$773 B in 2006 to +$360 B at the end of 2008, a net swing of $1,133 B. In other words, the net effect of the Fed's emergency lending between 2006 and 2008 was to increase the net indebtedness of the federal government by over a trillion dollars, balanced by acquisition of corresponding assets (the emergency loans). As emergency lending was phased out, the Fed has returned to a position of on balance reducing total government liabilities by $1,128 B. Although the Fed's assets are greatly expanded relative to their historical levels, most of these new assets were already on- or off-balance-sheet liabilities of the broader federal government, so swapping these for reserves left total off-balance-sheet federal liabilities unchanged.

E. Federal government trust funds.

In addition to the $11,582 B in Treasury debt held by the public at the end of calendar year 2012, the Treasury had issued an additional $4,851 in obligations that were regarded as an asset held by other federal government entities. By far the most important of these is the Social Security Trust Fund, which held $2,610 B, a little more than half of the intragovernmental total. This sum is counted as a liability by the Treasury and as an asset by the Social Security Trust Fund. One perspective is that this is therefore money that the government owes to itself, and as a consequence should not be included in a sensible accounting of net government indebtedness. But if we are to take the entirely reasonable position that the $2.6 T in Treasury securities held by the Social Security Trust Fund should not be counted as a net federal liability, we are forced also to regard the Social Security Trust Fund as holding no assets.

However, there is a reason that Social Security wants to regard these Treasury obligations as an asset, which is, the program anticipates significant liabilities associated with payments expected by current and future retirees. It is true that these liabilities do not rise to the status of the "full faith and credit of the United States." The federal government might well choose to reduce payments to beneficiaries relative to those anticipated under the program's current practice, or might increase future payroll taxes. But these are of course the same options that the government would consider in figuring out how to honor its official on-balance-sheet liabilities as well. The political difficulties that the government might face in making changes to the public's perceived Social Security obligations should reasonably be regarded as an important influence on the government's ability to honor its on-balance-sheet liabilities. For this reason it seems entirely appropriate to include these implicit commitments in an accounting of the federal government's combined off-balance-sheet liabilities.

The Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Funds makes several efforts to estimate the present value of these obligations along with their offsetting tax receipts. Obviously there is a lot of guesswork that goes into such calculations and the results can be extremely sensitive to assumptions. For example, if one were to use an interest rate for discounting that is less than the assumed growth rate, the concept of present value calculated over an infinite horizon does not even exist. For an interest rate only slightly bigger than the growth rate, small changes can produce big effects in long-horizon calculations. Nevertheless, for a sense of scale if nothing else I use for these calculations one of the present-value concepts that has been relied on in both the Social Security and the Medicare annual

reports, which is to calculate the present value of future benefits to be paid to all current participants (that is, all Americans currently age 15 or older). The annual reports also calculate the present value of future Social Security taxes to be paid by that same group. As of the end of calendar year 2012, the difference between the two, or the present value of the unfunded obligation for current participants, came to $26.5 T, up from $16.5 T in 2006 (see line 1 of Table 4).

Note that the numbers reported in my earlier Tables 1 and 3 referred to gross off-balance-sheet liabilities with no effort made to subtract offsetting assets. By contrast, the $26.5 T in Table 4 already subtracts the off-balance-sheet asset of Social Security represented by future tax revenues targeted for the program. However, insofar as these tax revenues are indeed used for this purpose, they will not be available for servicing the costs of the $11.3 T on-balance-sheet debt. For this reason, a case could be made for using the gross Social Security liability of $52.0 T, rather than the net liability of $26.5 T reported in Table 4, in our tabulation of total off-balance-sheet federal liabilities.

These numbers are so huge it is hard even to discuss them in a coherent way. As noted above, the calculations that go into them are easily challenged. But although one can quarrel with the specific numbers, there is an undeniable important reality that they reflect-- the U.S. population is aging, and an aging population means fewer people paying in and more people expecting benefits. This reality is unambiguously going to be a key constraint on the sustainability of fiscal policy for the United States. One would think we should be saving as a nation today as preparation for retirement, and if in fact we are not, the current enormous on-balance-sheet federal debt is all the more of a concern.

Similar calculations are reported by the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds. Medicare Part A (hospital insurance) reported a present value of unfunded obligations for current program participants of $14.5 T as of the end of 2008. The Health Care and Education Reconciliation Act of 2010 added new revenues and reduced the Trustees' anticipated costs, so that this was down to $8 T by the end of 2010 but has risen back to $9.6 T by the end of 2012 (see line 2 of Table 4). Medicare Part B (medical insurance) was adding an additional $13.1 T as of the end of 2012, while Part D (prescription drug insurance) adds another $4.9 T, for a total of $27.6 T in unfunded obligations currently reported for Medicare.

Again these numbers represent the *net* off-balance-sheet liabilities associated with Medicare. For the gross liabilities (that is, without subtracting off targeted taxes), we would add $4.8 T to the total for Medicare B and $1.1 T for Medicare D. The Trustees report does not itemize separately the numbers behind the net calculations for Medicare A, but it is clear that the upward adjustment necessary to arrive at a gross figure would be quite substantial. For example, in 2013 alone Medicare A is expecting to collect $231.2 B from payroll taxes and taxation of Hospital Insurance Benefits. By 2022 the annual number is expected to grow to $410.8 B (see Table III.B4). A projection of these future revenues has already been subtracting in arriving at the $9.6 T unfunded liability for Medicare A reported in Table 4.

There are also a number of other government trust funds that, like Social Security and Medicare, claim as their assets debt obligations of the U.S. Treasury that are not included in the $11.3 T in Treasury debt held by the public. Like the Social Security

Trust Fund, these are neither an asset nor a liability of a unified federal balance sheet, but are simply an I.O.U. from one arm of the government to another. But, like Social Security and Medicare, although the government has no assets backing these funds, they may entail significant future fiscal obligations.

The largest of these are the Civil Service Retirement and Disability Fund, which claimed $904 B in Treasury obligations among its assets as of the end of calendar year 2012, and the Military Retirement Fund, to which the Treasury owes $429 B. Rather than try to go through each of these programs and assess the implicit or explicit commitments the government has made through them, I have taken the conservative approach-- and I suspect, a recklessly conservative approach-- of assuming that the programs are actuarially balanced, that is, assuming that the present value of commitments associated with the Civil Service Retirement and Disability Fund is exactly $904 B. Since there are no assets to back these commitments, future tax increases or spending cuts will be necessary to honor them, so I count this trust fund as adding $904 B to the 2012 off-balance-sheet federal liabilities. Adding together all the government trust funds not treated elsewhere in this analysis, I calculate the contribution of these commitments to total off-balance-sheet liabilities to have been $1,862 B as of 2012. The combined contribution of Social Security, Medicare, and other trust funds of $55,962 B.

F. Other off-balance-sheet liabilities.

There are a number of other off-balance-sheet commitments that are potentially substantial but that are not included in the above totals. One that could prove to be quite important is the Pension Benefit Guaranty Corporation, an independent agency of the United States government that was created by the Employee Retirement Income Security

Act of 1974. The PBGC guarantees basic pension benefits for about 43 million Americans participating in 26,000 private-sector defined benefit pension plans. The potential notional liabilities are enormous but very difficult to assign a dollar value. The federal government has never declared these guarantees to be backed by the full faith and credit of the U.S. government, and unlike Fannie and Freddie, PBGC is not in conservatorship. For these reasons I have not attempted to include pension guarantees as a current off-balance-sheet liability of the U.S. government. But this does not mean that pension benefits will not prove to develop into a very important fiscal challenge at the federal, state, and local government levels.

Another important commitment involves veterans' benefits. A 2010 assessment by the Congressional Budget Office estimated that by 2020, the annual cost of providing health care services to veterans who seek benefits through the Department of Veterans Affairs could be $69 B to $85 B, which would represent increases of 45-75% over 2010 levels.

Federal flood insurance is another potentially important off-balance-sheet federal liability. King (2013) estimated that government payouts for Hurricane Sandy under the National Flood Insurance Program could be $12 B to $15 B, in comparison with the $4 B cash assets of the program. A study by the Congressional Budget Office (2007) estimated that as of February 2007, the 5.4 million policies issued through the Federal Emergency Management Agency had a total coverage of $1 trillion. Again I have made no effort to include the potential liabilities of these and other programs in the totals reported in this paper.

4. How concerned should we be?

Table 5 summarizes the contributions of the various components surveyed in Sections 3A-E. I calculate total off-balance-sheet federal liabilities to have been $70.1 T as of 2012, six times the size of the federal debt itself. This total comes from a range of different programs, each of which is associated with its own benefits and its own concerns. In the case of the FDIC guarantees and emergency Fed lending, these seemed to accomplish what they were intended and in my opinion do not pose significant risks to taxpayers in the current environment. Other programs, such as the federal government's big role in lending for housing and education, have less clear benefits and have been associated with more tangible costs. The biggest off-balance-sheet liabilities come from recognition of the fiscal stress that will come in the form of an aging population and rising medical expenditures.

It is worth noting that there are many historical episodes in which off-balance-sheet liabilities ended up having quite significant on-balance-sheet implications. One example is provided by the problems with saving and loans in the 1980s. Losses at these institutions ended up dwarfing the capabilities the now-defunct Federal Savings and Loan Insurance Corporation to honor its promise to guarantee depositors. Curry and Shibut (2000) estimated that the final on-balance-sheet cost to U.S. taxpayers of honoring those off-balance-sheet guarantees came to $124 B.

Some economists see the Asian crisis of 1997 as providing a more dramatic illustration. A number of Asian countries experienced rapid and dramatic currency depreciation and spiking interest rates that led to significant drops in real economic activity. According to Burnside, Eichenbaum, and Rebelo (2001), "a principal cause of

the 1997 Asian currency crisis was large prospective deficits associated with implicit bailout guarantees to failing banking systems." The authors noted for example that the costs of restructuring and recapitalizing the banking system in those episodes amounted to 65% of GDP for Indonesia, 24% of Korea's GDP, 22% for Malaysia, and 35% for Thailand. The authors suggested that market perceptions of the prospective deficits associated with bailing out problem banks were the trigger for the rapid capital flight from those countries.

More recently, the Irish government entered the Great Recession in a seemingly very strong fiscal position, with gross government debt totaling only 25% of GDP. But on September 30, 2008, in response to developing strains on the financial system, the government guaranteed all deposits, covered bonds, senior debt, and dated subordinated debt of the country's 6 largest banks. By July 2011, Ireland had needed to inject €64 B (45% of 2010 GDP) into the banking system. As a result, for 2010 the Irish government budget deficit amounted to 31% of the country's GDP, and its debt level rose above 100% of GDP. Interest rate on 10-year Irish government bonds went from 4.2% in 2008 to 14% in July 2011, as investors fled Irish sovereign debt.

I am not predicting that a similar crisis is on the verge of unfolding for the United States. Some may argue that the current off-balance-sheet liabilities of the U.S. federal government are smaller than those tabulated here; others could arrive at larger numbers. These off-balance-sheet concerns may or may not translate into significant on-balance-sheet problems. But one thing seems undeniable-- they are huge. And implicit or explicit commitments of such a huge size have the potential to have huge economic

consequences, perhaps for the better, perhaps for the worse. Acknowledging their size is a necessary first step for making wise policy decisions.

References

Ashcraft, Adam B., and Til Schuermann. 2007. "Understanding the Securitization of Subprime Mortgage Credit," Working paper, Federal Reserve Bank of New York.

Bagehot, Walter. 1873. *Lombard street: A Description of the Money Market.* London: H. S. King.

Bencivenga, Valerie R., and Bruce D. Smith. 1993. "Some Consequences of Credit Rationing in an Endogenous Growth Model." *Journal of Economic Dynamics and Control* 17: 97-122.

Bernanke, Ben S. 2013. "Long-Term Interest Rates." http://www.federalreserve.gov/newsevents/speech/bernanke20130301a.htm.

Bhattacharya, Sudipto, Arnoud W. A. Boot, and Anjan V. Thakor. 1998. "The Economics of Bank Regulation." *Journal of Money, Credit, and Banking* 30: 745-770.

Brunnermeier, Markus K., and Yuliy Sannikov. 2012. "A Macroeconomic Model with a Financial Sector." Working paper, Princeton University.

Burnside, Craig, Martin Eichenbaum, and Sergio Rebelo. 2001. "Prospective Deficits and the Asian Currency Crisis." *Journal of Political Economy* 109: 1155-1197.

Carpenter, Seth B., Jane E. Ihrig, Elizabeth C. Klee, Alexander H. Boote, and Daniel W. Quinn (2013). "The Federal Reserve's Balance Sheet: A Primer and Projections," Working paper, Federal Reserve Board (http://www.federalreserve.gov/pubs/feds/2013/201301/201301abs.html).

Chaney, Paul K., and Anjan V. Thakor. 1985. "Incentive Effects of Benevolent Intervention: The Case of Government Loan Guarantees." *Journal of Public Economics* 26: 169-189.

Cooper, Russell, and Thomas W. Ross. 2002. "Bank Runs: Deposit Insurance and Capital Requirements." *International Economic Review* 43(1): 55-72.

Congressional Budget Office. 2001. "Federal Subsidies and the Housing GSEs." (http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/28xx/doc2841/gses.pdf).

Congressional Budget Office. 2007. "Value of Properties in the National Flood Insurance Program." (http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/82xx/doc8256/06-25-floodinsurance.pdf).

Congressional Budget Office. 2010. "Potential Costs of Veterans' Health Care." (http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/118xx/doc11811/2010_10_7_vahealthcare.pdf).

Curry, Timothy, and Lynn Shibut. 2000. "The Cost of the Savings and Loan Crisis: Truth and Consequences." *FDIC Banking Review* 13: 26-35.

Diamond, Douglas W., and Philip H. Dybvig. 1983. "Bank Runs, Deposit Insurance, and Liquidity." *Journal of Political Economy* 91: 401-419.

Diamond, Douglas W., and Raghuram G. Rajan. 2000. "A Theory of Bank Capital." *Journal of Finance* 55(6): 2431-2464.

Flannery, Mark J. (1996). "Financial Crises, Payment System Problems, and Discount Window Lending." *Journal of Money, Credit and Banking* 28(4, Part 2): 804-824.

Gokhale, Jagdeesh. (2013). *Spending Beyond Our Means: How We Are Bankrupting Future Generations.* Washington D.C.: Cato Institute.

Greenlaw, David, James D. Hamilton, Peter Hooper, and Frederic S. Mishkin. 2013. "Crunch Time: Fiscal Crises and the Role of Monetary Policy." U.S. Monetary

Policy Forum, New York City (http://dss.ucsd.edu/~jhamilto/ USMPF13_final.pdf).

Haffner, Marietta E. A. 2008. "Subsidization as Motor to Residential Mortgage Securitization in the U.S." *Journal of Housing and the Built Environment* 23: 337-351.

Hall, Robert E., and Ricardo Reis. 2013. "Maintaining Central-Bank Solvency under New-Style Central Banking," working paper, Stanford University.

Hamilton, James D. 2007a. "Fannie, Freddie, and Ben." *Econbrowser,* March 11, 2007 (http://www.econbrowser.com/archives/2007/03/ fannie_freddie.html).

Hamilton, James D. 2007b. "Commentary: Housing and the Monetary Transmission Mechanism," in *Housing, Housing Finance, and Monetary Policy*, Federal Reserve Bank of Kansas City, pp. 415-422.

Hamilton, James D. 2012. "U.S. government profits from AIG bailout," *Econbrowser,* December 13, 2012 (http://www.econbrowser.com/archives/2012/12/ us_government_p.html).

Hamilton, James D., and Jing Cynthia Wu. 2012. "The Effectiveness of Alternative Monetary Policy Tools in a Zero Lower Bound Environment." *Journal of Money, Credit and Banking* 44 (no. 1, Supplement): 3-46.

Judson, Ruth. 2012. "Crisis and Calm: Demand for U.S. Currency at Home and Abroad from the Fall of the Berlin Wall to 2011," working paper, Federal Reserve.

Kareken, John H. and Neil Wallace. 1978. "Deposit Insurance and Bank Regulation: A Partial-Equilibrium Exposition." *Journal of Business* 51(3): 413-438.

King, Rawle O. 2013. "The National Flood Insurance Program: Status and Remaining Issues for Congress." Congressional Research Service (http://www.fas.org/sgp/crs/misc/R42850.pdf).

Lee, Donghoon. 2013. "Household Debt and Credit: Student Debt." Slide presentation, Federal Reserve Bank of New York (http://www.newyorkfed.org/newsevents/mediaadvisory/2013/Lee022813.pdf)

Santos, Joáo A. C. 2001. "Bank Capital Regulation in Contemporary Banking Theory: A Review of the Literature." *Financial Markets, Institutions & Instruments* 10(2): 41-84.

Shiller, Robert J. 2000. *Irrational Exuberance,* Princeton University Press.

Smith, Bruce D., and Michael J. Stutzer. 1989. "Credit Rationing and Government Loan Programs: A Welfare Analysis." *American Real Estate and Urban Economics Association Journal* 17(2): 177-193.

U.S. Department of Housing and Urban Development. 2012. "Annual Report to Congress: Fiscal Year 2012 Financial Status of FHA Mutual Mortgage Insurance Fund."

Table 1. Treasury debt held by the public and contribution of guarantees and obligations of government-sponsored enterprises to off-balance-sheet federal liabilities as of end of indicated fiscal year, in billions of dollars.

	2006	2008	2010	2012
1. Treasury debt held by public	4,867	5,837	9,052	11,299
2. Direct debt obligations of government-sponsored enterprises	2,618	3,153	6,498	6,112
3. MBS guaranteed by agencies and GSEs	3,769	4,883	1,096	1,408
4. Total off-balance-sheet commitment to housing	**6,386**	**8,036**	**7,594**	**7,520**
5. Student loan guarantees	321	405	382	285
6. Less: student loan guarantees already imputed to on-budget federal debt	0	(11)	(137)	(165)
7. Other loan guarantees	147	153	174	205
8. Combined GSE debt and loan guarantees	**6,854**	**8,583**	**8,013**	**7,845**

Notes to Table 1. Line 1: Public debt securities and agency securities held by the public from Table FD-1 ("Summary of Federal Debt"), *Treasury Bulletin*, Dec 2008 and Dec 2012. Line 2: Short-term and long-term debt issued by Freddie, Fannie, FHLB, Farm Credit System, Federal Agricultural Mortgage Corporation, FICO, and REFCORP. After September 2008 also includes MBS guarantees of Fannie and Freddie. From line 14 ("credit market debt owed by GSEs"), Table L.1 ("credit market debt outstanding"), Flow of Funds, Federal Reserve System. Line 3: Mortgages held in pools from GNMA, Freddie, Fannie, and Federal Farmers Home Administration plus mortgages held by Federal Financing Bank. After 2008 Fannie and Freddie MBS are included in line 2 but not line 3. From line 28 ("agency and GSE-backed mortgage pools"), Table L.217 ("Total Mortgages"), Flow of Funds, Federal Reserve System. Line 4: Sum of lines 2 and 3. Line 5: Principal amount guaranteed by the government for Federal Family Education Loans, from General Accountability Office, Financial Statements of the Untied States Government: Notes to Financial Statements, indicated fiscal years. Line 6: Debt owed by Department of Education to Department of Treasury associated with Federal Family Education Loans. From columns 3-6 of Table 2. Line 7: Principal amounts guaranteed by the government for programs other than FHA, Rural Housing Services, Veterans Housing Benefit Programs, and education loans, from General Accountability Office, Financial Statements of the Untied States Government: Notes to Financial Statements, indicated fiscal years. Line 8: Sum of lines 4-7.

Table 2. Treasury debt owed by the Department of Education, totals and contributions of separate components as of end of indicated fiscal year, in billions of dollars.

Fiscal year	(1) Treasury debt owed by Dept. of Education	(2) Direct Loan Program	(3) Loan Purchase Commitment	(4) Loan Participation Program	(5) Guaranteed Loan Program	(6) Other
2005	104	104	0	0	0	0
2006	105	105	0	0	0	0
2007	104	104	0	0	0	0
2008	128	117	0	11	0	0
2009	235	154	25	54	1	1
2010	374	237	45	80	11	1
2011	546	392	44	79	29	2
2012	714	549	42	77	43	3

Notes to Table 2. Data from financial notes to Federal Student Aid Annual Reports, 2010 and 2012, U.S. Department of Education.

Table 3. Contribution of Federal Deposit Insurance Corporation and Federal Reserve to off-balance-sheet federal liabilities as of end of indicated calendar year, in billions of dollars.

	2006	2008	2010	2012
1. Insured deposits	4,154	4,751	6,308	7,406
2. Plus: debt guarantee program	0	224	267	0
3. Net contribution of FDIC	**4,154**	**4,975**	**6,575**	**7,406**
4. Reserve balances held by member banks	6	856	1,019	1,533
5. Less: Treasury securities held by Federal Reserve	(779)	(476)	(1,016)	(1,657)
6. Less: agency debt held by Federal Reserve	0	(20)	(147)	(77)
7. Less: MBS debt held by Federal Reserve	0	0	(992)	(927)
8. Net contribution of Federal Reserve	(773)	360	(1,136)	(1,128)

Notes to Table 3. Line 1: FDIC insured deposits, from FDIC "Statistics at a Glance," December 2012 (http://www.fdic.gov/bank/statistical/stats/index.html). Line 2: from FDIC, Annual Reports, 2008 and 2010. Line 3: Sum of lines 1-2. Lines 4-7: From Federal Reserve Release H.4.1 ("Factors affecting reserve balance"s), balance as of last Wednesday of calendar year. Line 8: Sum of lines 4-7.

Table 4. Contribution of government trust funds to off-balance-sheet federal as of end of indicated calendar year, in billions of dollars.

	2006	2008	2010	2012
1. Social Security	16,500	18,700	21,400	26,500
2. Medicare Part A (hospital insurance)	11,800	14,500	8,000	9,600
3. Medicare Part B (medical insurance)	10,400	13,500	11,500	13,100
4. Medicare Part D (prescription drug insurance)	6,300	5,200	5,400	4,900
5. Sum of Medicare liabilities	28,500	33,200	24,900	27,600
6. Other government trust funds	1,308	1,487	1,646	1,862
7. Combined contribution of government trust funds	**46,308**	**53,387**	**47,946**	**55,962**

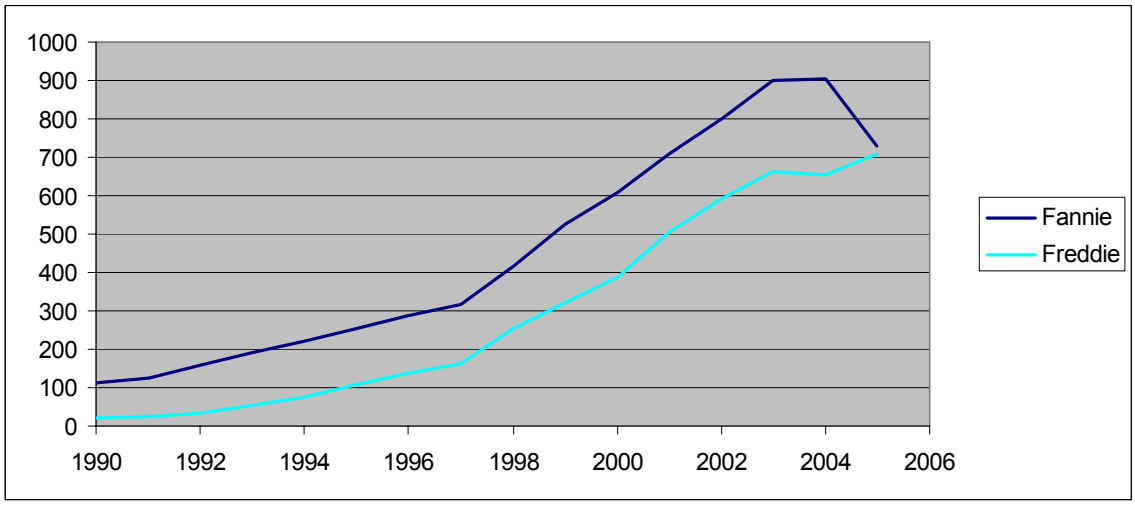
Notes to Table 4. Social Security and Medicare entries represent values as of end of calendar year, except last entry which is the end of calendar year 2011, the most recent available as of the time this was written. Other government trust funds represent values as of end of indicated fiscal year. Line 1: Present value of future OASDI cost less future taxes for current participants. From Table IV.B7, Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Funds, 2007, 2009, 2011, and 2013. Line 2: Present value of future expenditures less income for current participants in Medicare Part A. From Table III.B11 or V.G2, Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds, 2007, 2009, 2011, and 2013. Line 3: Present value of future contributions for current participants in Medicare Part B coming from general federal revenues. From Table III.C16, III.C12, or V.G4, Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds, 2007, 2009, 2011, and 2013. Line 4: Present value of future contributions for current participants in Medicare Part D coming from general federal revenues. From Table III.C24, III.D8, or V.G6, Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds, 2007, 2009, 2011, and 2013. Line 5: Sum of lines 2-4. Line 6: Government account series held by Airport and Airway Trust Fund, Employees Life Insurance Fund, Exchange Stabilization Fund, Federal employees retirement funds, FSLC Resolution Fund, Highway Trust Fund, National Service Life Insurance Fund, Postal Service Fund, Railroad Retirement Account, Unemployment Trust Fund, and Other. From Table FD-3, Treasury Bulletin, Dec 2008 and Dec 2012. Line 7: Sum of lines 1, 5, and 6.

Table 5. Treasury debt held by the public and combined federal off-balance sheet liabilities

	2006	2008	2010	2012
1. Treasury debt held by public	4,867	5,837	9,052	11,299
2. Housing-related commitments	6,386	8,036	7,594	7,520
3. Student and other loan guarantees	468	547	419	325
4. FDIC	4,154	4,975	6,575	7,406
5. Federal Reserve	(773)	360	(1,136)	(1,128)
6. Social security	16,500	18,700	21,400	26,500
7. Medicare	28,500	33,200	24,900	27,600
8. Other government trust funds	1,308	1,487	1,646	1,862
9. Total off-balance-sheet commitments	**56,544**	**67,305**	**61,398**	**70,085**

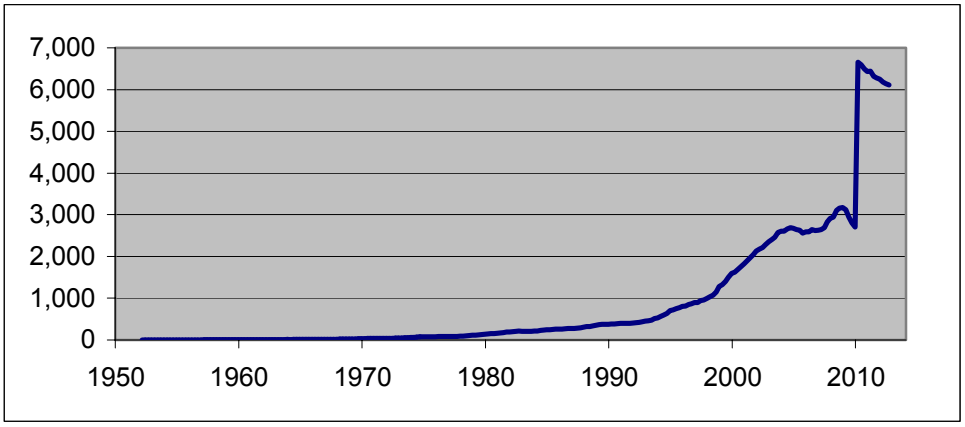
Notes to Table 5. Line 1: taken from line 1 of Table 1. Line 2: taken from line 4 of Table 1. Line 3: sum of lines 5-7 of Table 1. Line 4: taken from line 3 of Table 3. Line 5: taken from line 8 of Table 3. Line 6: taken from line 1 of Table 4. Line 7: taken from line 5 of Table 4. Line 8: taken from line 6 of Table 4. Line 9: sum of lines 2-8 in Table 5.

Figure 1. Retained mortgage portfolios of Fannie Mae and Freddie Mac, billions of dollars, 1990:Q1-2006:Q3.



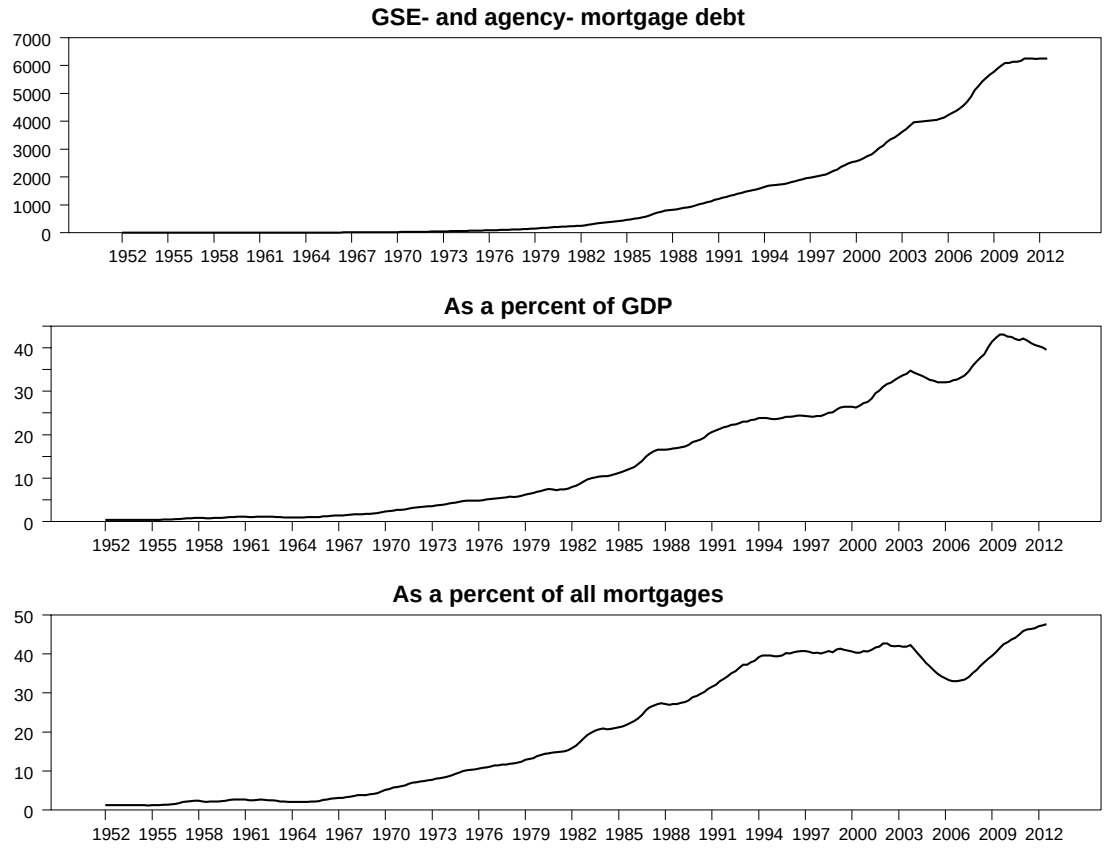
Notes to Figure 1. Source: Hamilton (2007a).

Figure 2. Total on-balance-sheet liabilities of government-sponsored enterprises, billions of dollars, 1952:Q1 - 2012:Q3.



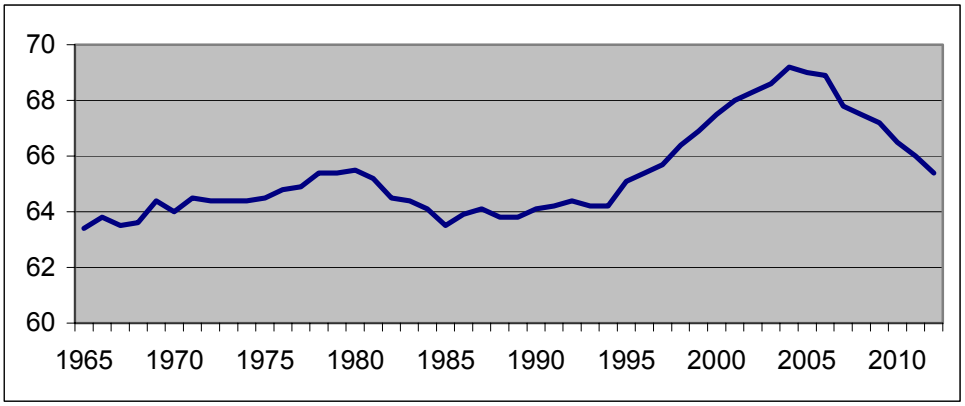
Notes to Figure 2. Data source: *Flow of Funds,* Federal Reserve Board, Table L122. Includes Federal Home Loan Banks, Fannie Mae, Freddie Mac, Farmer Mac, Farm Credit System, the Financing Corporation, and the Resolution Funding Corporation. The Student Loan Marketing Association (Sallie Mae) was included until it was fully privatized in 2004:Q4. Beginning 2010:Q1, almost all Fannie Mae and Freddie Mac mortgage pools are consolidated on Fannie Mae's and Freddie Mac's balance sheets.

Figure 3. Mortgage debt held by government-sponsored enterprises or in agency- or GSE-backed mortgage pools, 1952:Q1 - 2012:Q3.



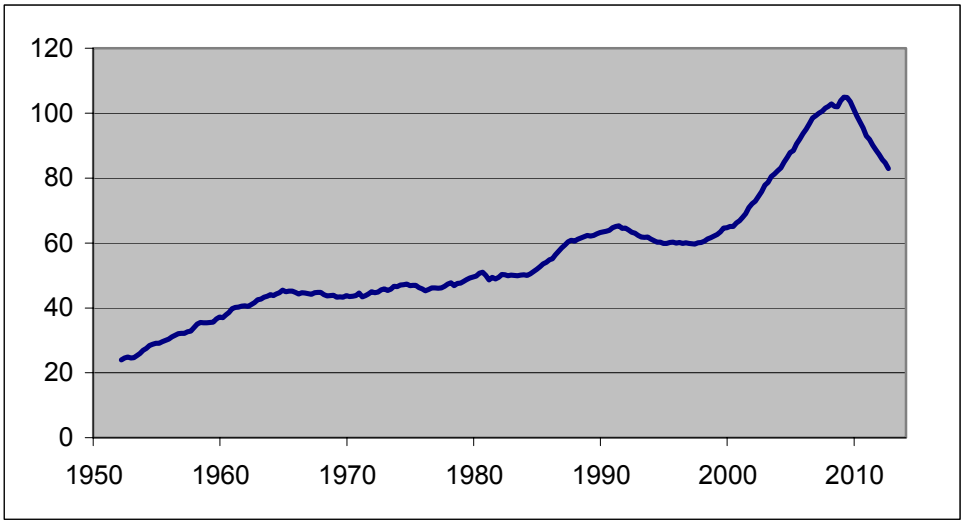
Notes to Figure 3. Top panel: in billions of dollars. Middle panel: as a percent of GDP. Bottom panel: as a percent of all mortgages. Data source: *Flow of Funds,* Federal Reserve Board, Table L217.

Figure 4. U.S. home ownership rate, in percent, 1965-2012, fourth quarter of each year.



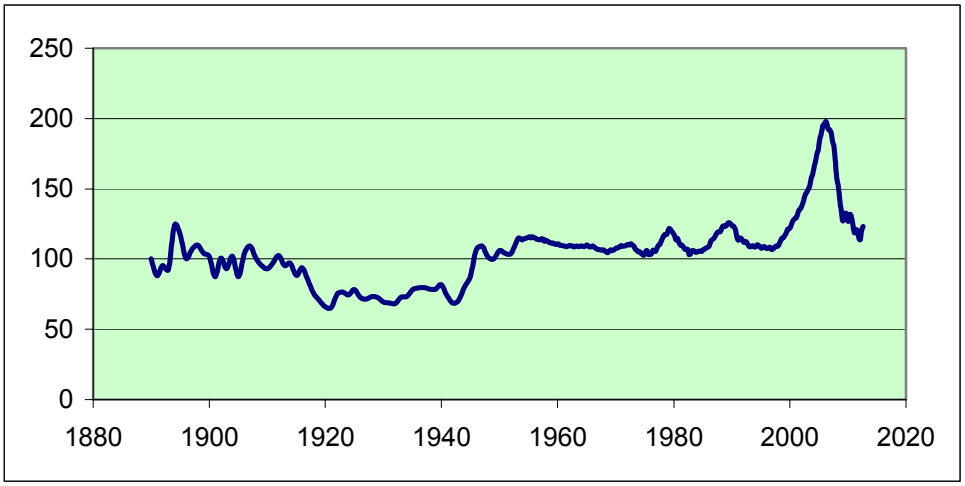
Notes to Figure 4. Data source: United States Census Bureau, Historical Table 14 (http://www.census.gov/housing/hvs/data/histtabs.html).

Figure 5. Total mortgage debt as a percent of GDP, 1952:Q1 - 2012:Q3.



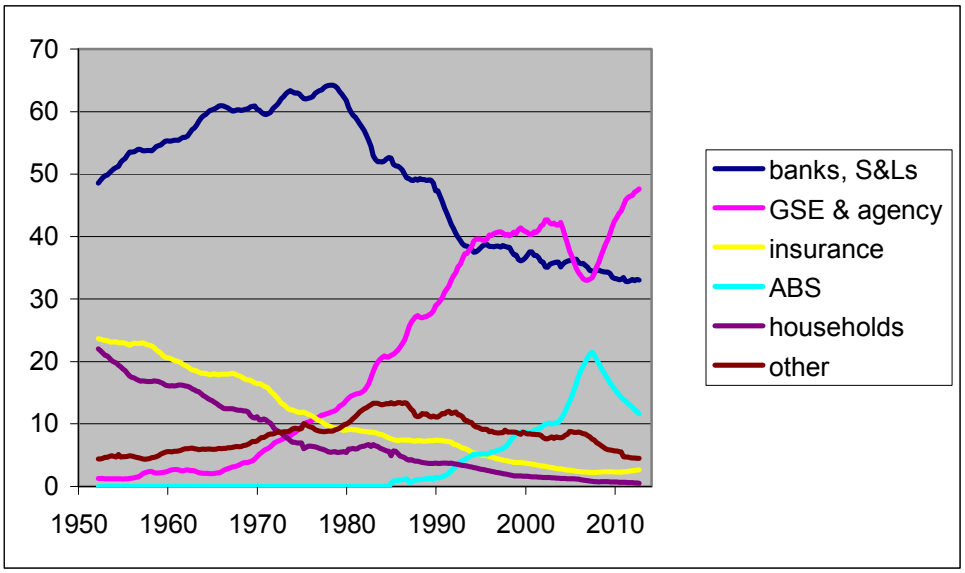
Notes to Figure 5. Data source: *Flow of Funds,* Federal Reserve Board, Table L217.

Figure 6. Shiller's real house price index, 1890-2012.



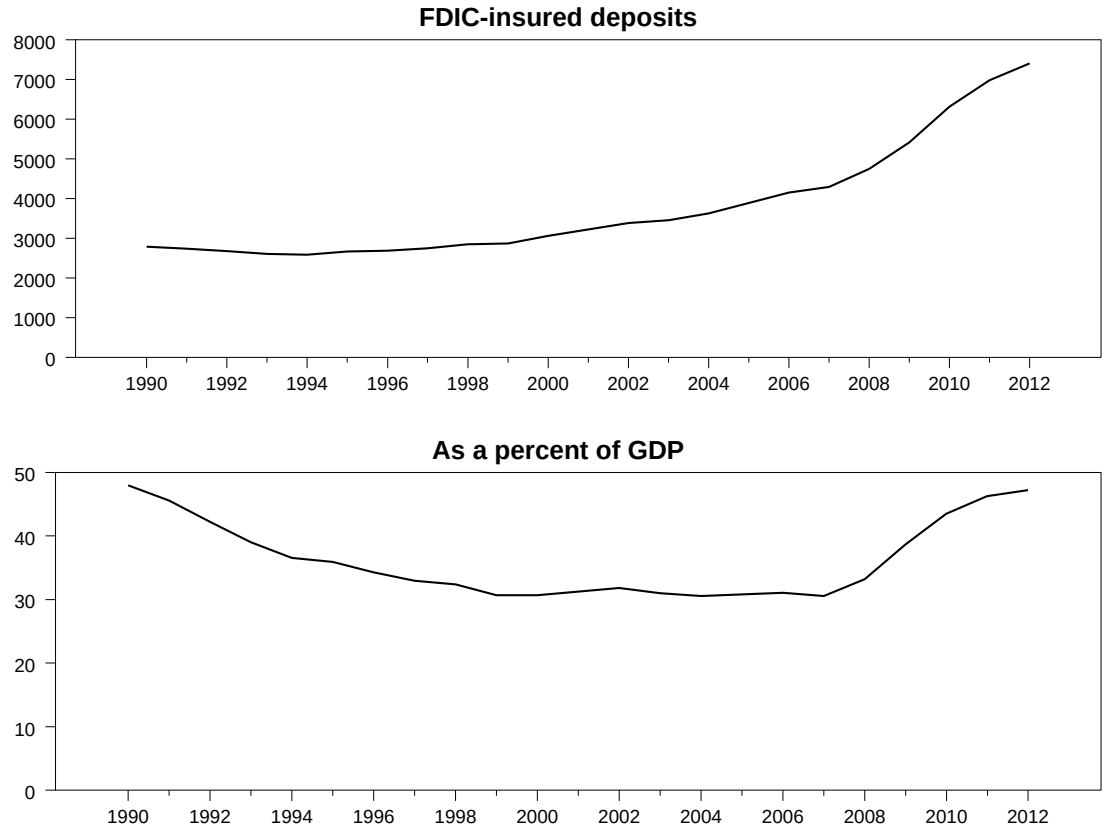
Notes to Figure 6. Data source: Shiller (2000), as updated at ttp://www.irrationalexuberance.com/index.htm.

Figure 7. Percent of U.S. mortgage debt financed by different sectors, 1952:Q1 - 2012:Q4.



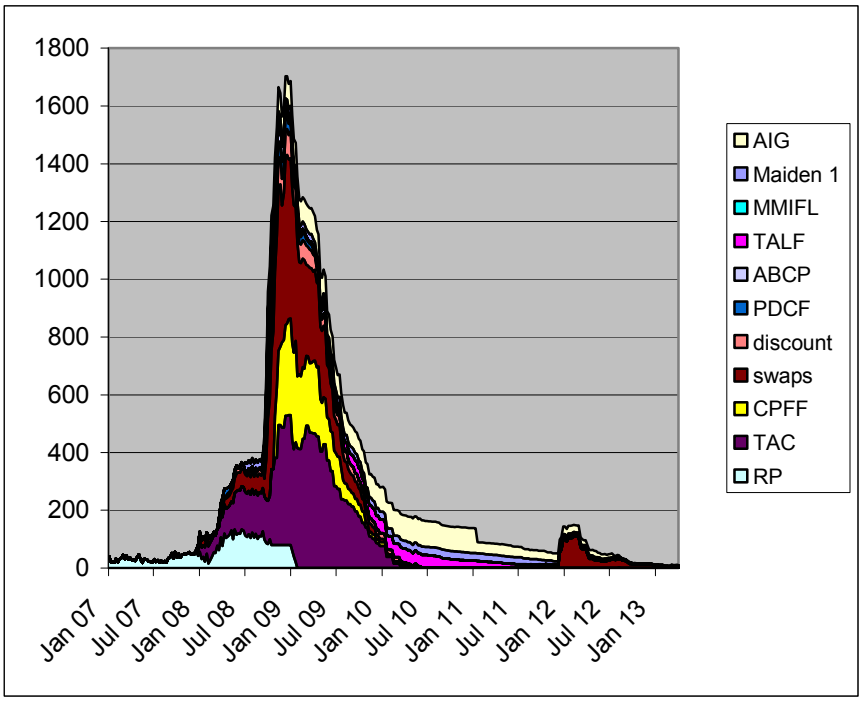
Notes to Figure 7. Banks: sum of U.S.-chartered depository institutions, foreign banking offices in U.S., in U.S.-affiliated areas, and unions; GSE and agency: sum of mortgages held by government-sponsored enterprises and in agency- and GSE-backed mortgage pools; insurance: sum of mortgages held by property-casualty insurance companies and life insurance companies; ABS: mortgages held in the form of privately-issued asset-backed securities; households: mortgages owned by U.S. household sector; other: all other mortgage holdings. Data source: *Flow of Funds,* Federal Reserve Board, Table L217.

Figure 8. Total FDIC-insured deposits, 1990-2012.



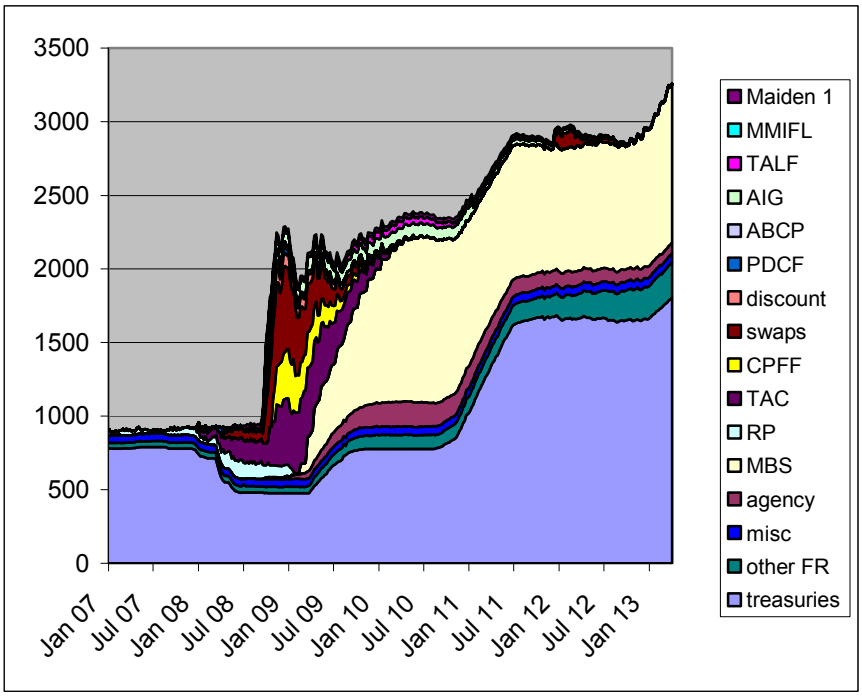
Notes to Figure 8. Top panel: in dollars. Bottom panel: as a percent of GDP. Data source: FDIC, December 2012 (http://www.fdic.gov/bank/statistical/stats/index.html).

Figure 9. Fed emergency lending, in billions of dollars, seasonally unadjusted, from Jan 1, 2007 to Apr 3, 2013.



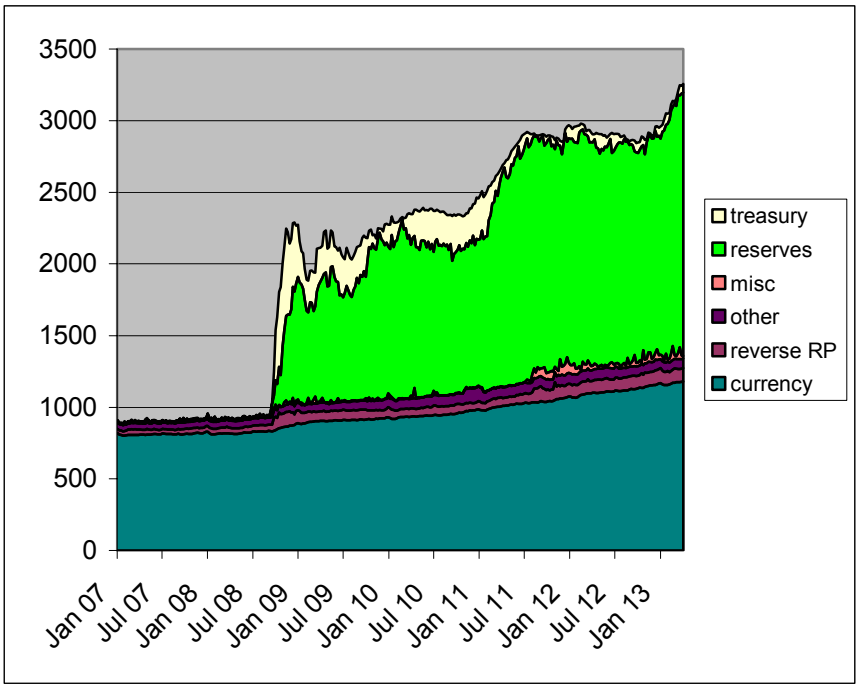
Notes to Figure 9. AIG: sum of credit extended to American International Group, Inc. plus net portfolio holdings of Maiden Lane II and III plus preferred interest in AIA Aurora LLC and ALICO Holdings LLC; Maiden 1: net portfolio holdings of Maiden Lane LLC; MMIFL: net portfolio holdings of LLCs funded through the Money Market Investor Funding Facility; TALF: loans extended through Term Asset-Backed Securities Loan Facility plus net portfolio holdings of TALF LLC; ABCP: loans extended to Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility; PDCF: loans extended to primary dealer and other broker-dealer credit; discount: sum of primary credit, secondary credit, and seasonal credit; swaps: central bank liquidity swaps; CPFF: net portfolio holdings of LLCs funded through the Commercial Paper Funding Facility; TAC: term auction credit; RP: repurchase agreements. Data source: "Factors Affecting Reserve Balances," H41 release, Federal Reserve.

Figure 10. All Federal Reserve assets, in billions of dollars, seasonally unadjusted, from Jan 1, 2007 to Apr 3, 2013.



Notes to Figure 10. MBS: mortgage-backed securities held outright; agency: federal agency debt securities held outright; misc: sum of float, gold stock, special drawing rights certificate account, and Treasury currency outstanding; other FR: Other Federal Reserve assets; treasuries: U.S. Treasury securities held outright; treasuries: U.S. Treasury securities. For other category definitions, see notes to Figure 9. Data source: "Factors Affecting Reserve Balances," H41 release, Federal Reserve.

Figure 11. All Federal Reserve liabilities, in billions of dollars, seasonally unadjusted, from Jan 1, 2007 to Apr 3, 2013.



Notes to Figure 11. Treasury: sum of U.S. Treasury general and supplementary funding accounts; reserves: reserve balances with Federal Reserve Banks; misc: sum of Treasury cash holdings, foreign official accounts, and other deposits; other: other liabilities and capital; service: sum of required clearing balance and adjustments to compensate for float; reverse RP: reverse repurchase agreements; currency: currency in circulation. Data source: "Factors Affecting Reserve Balances," H41 release, Federal Reserve.