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The Rescue of Fannie Mae and Freddie Mac

W. Scott Frame, Andreas Fuster, Joseph Tracy, and James Vickery

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Abstract: We describe and evaluate the measures taken by the U.S. government to rescue Fannie Mae and Freddie Mac in September 2008. We begin by outlining the business model of these two firms and their role in the U.S. housing finance system. Our focus then turns to the sources of financial distress that the firms experienced and the events that ultimately led the government to take action in an effort to stabilize housing and financial markets. We describe the various resolution options available to policymakers at the time and evaluate the success of the choice of conservatorship, and other actions taken, in terms of five objectives that we argue an optimal intervention would have fulfilled. We conclude that the decision to take the firms into conservatorship and invest public funds achieved its short-run goals of stabilizing mortgage markets and promoting financial stability during a period of extreme stress. However, conservatorship led to tensions between maximizing the firms' value and achieving broader macroeconomic objectives, and, most importantly, it has so far failed to produce reform of the U.S. housing finance system.

JEL classification: G01, G21, H12

Key words: Fannie Mae, Freddie Mac, housing finance, financial crisis, government intervention

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The Rescue of Fannie Mae and Freddie Mac

The imposition of federal conservatorships on September 6, 2008, at the Federal National Mortgage Association and the Federal Home Loan Mortgage Corporation—commonly known as Fannie Mae and Freddie Mac—was one of the most dramatic events of the financial crisis. These two government-sponsored enterprises play a central role in the U.S. housing finance system, and at the start of their conservatorships held or guaranteed about \$5.2 trillion of home mortgage debt.

Fannie Mae and Freddie Mac are publicly held financial institutions that were created by Acts of Congress to fulfil a public mission: to enhance the liquidity and stability of the U.S. secondary mortgage market and thereby promote access to mortgage credit, particularly among low-and-moderate income households and neighborhoods. Their federal charters provide important competitive advantages that, taken together, long implied U.S. taxpayer support of their financial obligations. As profit maximizing firms, Fannie Mae and Freddie Mac leveraged these advantages over the years to become very large, very profitable, and very politically powerful. The two firms were often cited as shining examples of public-private partnerships -- that is, the harnessing of private capital to advance the social goal of expanding homeownership. But in reality, the hybrid structures of Fannie Mae and Freddie Mac were destined to fail owing to their singular exposure to residential real estate and moral hazard incentives emanating from the implicit guarantee of their liabilities (for a detailed discussion see Acharya et al. 2011). A purposefully weak regulatory regime was another important feature of the flawed design. While the structural problems with Fannie Mae and Freddie Mac were understood by many, serious reform efforts were portrayed as attacks on the American Dream and hence politically unpalatable.

In 2008, as the housing crisis intensified, Fannie Mae and Freddie Mac became financially distressed. Their concentrated exposure to U.S. residential mortgages, coupled with their high leverage, turned out to be a recipe for disaster in the face of a large nationwide decline in home prices

and the associated spike in mortgage defaults. As financial markets in the summer of 2008 turned against Fannie Mae and Freddie Mac, the federal government initially responded by passing the Housing and Economic Recovery Act (HERA), signed into law on July 30, 2008, which among many other provisions temporarily gave the U.S. Treasury unlimited investment authority in the two firms. Less than two months later, their new regulator, the Federal Housing Finance Agency (FHFA), placed Fannie Mae and Freddie Mac into conservatorship, taking control of the two firms in an effort to curtail any financial contagion and to conserve their value. Concurrently, the Treasury entered into senior preferred stock purchase agreements with each institution. Under these agreements, U.S. taxpayers ultimately injected \$187.5 billion into Fannie Mae and Freddie Mac.

This paper begins by describing the business model of Fannie Mae and Freddie Mac and their role in the U.S. housing finance system. Our focus then turns to the sources of financial distress experienced by the two firms, and the events that ultimately led the federal government to take dramatic action in an effort to stabilize housing and financial markets. We describe the various resolution options available to U.S. policymakers at the time, and evaluate the success of the choice of conservatorship in terms of its effects on financial markets and financial stability, on mortgage supply and on the financial position of the two firms themselves. Our overall conclusion is that conservatorship achieved its key short-run goals of stabilizing mortgage markets and promoting financial stability during a period of extreme stress. However, conservatorship was intended to be a temporary fix, not a long-term solution. More than six years later, Fannie Mae and Freddie Mac still remain in conservatorship and opinion remains divided on what their ultimate fate should be.

Background

By law, Fannie Mae and Freddie Mac are limited to operating in the secondary “conforming” mortgage market. This terminology means that the two firms can neither lend money to households

directly in the primary market, nor deal in mortgages with balances above a certain size -- the “conforming loan limits.” The conforming loan limits have been adjusted over time and for 2015, the national limit for single-family properties is \$417,000, but can be as high as \$625,500 in high-housing-cost areas. Mortgages with principal balances above the conforming loan limits are referred to as “jumbo” loans. Fannie Mae and Freddie Mac are further limited by law to dealing in mortgages with a downpayment of at least 20 percent, or that maintain equivalent credit enhancement via private mortgage insurance or other means. The two firms otherwise define their own underwriting standards in terms of acceptable credit scores, debt-to-income ratios, and documentation.¹

Fannie Mae and Freddie Mac’s activities take two broad forms. First, their “credit guarantee” business involves the creation of residential mortgage-backed securities by purchasing a pool of conforming mortgages from originators—typically banks or mortgage companies—and then issuing a security that receives cash flows from the mortgage pool. For these “agency” mortgage-backed securities, Fannie Mae or Freddie Mac promise investors timely payments of principal and interest, even if there are defaults and losses on the underlying loans. In return for this guarantee, the firms receive a monthly “guarantee fee,” effectively an insurance premium coming out of the borrower’s interest payment.

Second, the firms’ “portfolio investment” business involves holding and financing assets on their own balance sheets, including whole mortgages, their own agency mortgage-backed securities, non-agency mortgage-backed securities, and other types of fixed income securities. Fannie Mae and Freddie Mac largely fund these assets by issuing “agency” debt. The two firms have been historically

¹ Some mortgages not meeting Fannie Mae or Freddie Mac’s underwriting standards may alternatively be financed using government insurance programs (operated by the Federal Housing Administration or Department of Veterans Affairs). Such loans may be securitized with a public credit guarantee to investors via the Government National Mortgage Association (Ginnie Mae) operated by the U.S. Department of Housing and Urban Development.

highly leveraged, with book equity consistently less than four percent of total assets. The firms use financial derivatives, such as interest rate swaps, to help manage the market risk associated with their investment portfolios.

Fannie Mae's and Freddie Mac's federal charters provide a range of benefits that result in lower operating and funding costs (see Frame and White 2005), such as a line-of-credit with the U.S. Treasury. These advantages, coupled with two past episodes in which the federal government assisted troubled government-sponsored enterprises (U.S. General Accounting Office 1990, pp. 90–91), served to create a perception in financial markets that agency debt and mortgage-backed securities were implicitly government guaranteed—despite explicit language on these securities stating that they are not U.S. government obligations. As a result, Fannie Mae and Freddie Mac have been able over the decades to issue debt and mortgage-backed securities at lower yields than their stand-alone financial strength ratings would otherwise warrant, by 20 to 40 basis points (see Nothaft, Pearce, and Stevanovic 2002; Ambrose and Warga 2002; Passmore 2005).

This funding advantage was partially passed on to borrowers in the form of lower mortgage rates. Econometric studies find that, prior to the financial crisis, conforming mortgages had lower interest rates than jumbo mortgages, with estimates of the gap ranging from 10 to 30 basis points depending on the sample period and estimation approach (for example, Kaufmann 2014; DeFusco and Paciorek 2014; see McKenzie 2002 for a review of earlier literature).

In 1992, Congress created a two-part regulatory structure to monitor Fannie Mae and Freddie Mac for compliance with their statutory missions and to limit their risk-taking. Mission regulation was assigned to the U.S. Department of Housing and Urban Development (HUD), while safety-and-soundness regulation became the purview of a newly created Office of Federal Housing Enterprise Oversight (OFHEO) as an independent agency within HUD. Congressional placement of OFHEO within HUD can be viewed as a signal that the housing mission goals were the more important priority.

The principal manifestation of mission regulation for Fannie Mae and Freddie Mac was the establishment of affordable housing goals. These goals stipulated minimum percentages of mortgage purchases that finance dwellings in underserved areas and for low- and moderate-income households (see Bhutta, 2012, for more details). The goals were progressively increased between 1996 and 2007; for example, the target purchase percentage for low-and-moderate income households was raised from 40 percent to 55 percent during this period. This provided political cover for Fannie Mae and Freddie Mac to expand their business and take on greater risk.

As the safety-and-soundness regulator, OFHEO was authorized to set risk-based capital standards (subject to important statutory limitations), conduct financial examinations and take certain enforcement actions. However, OFHEO lacked the authority to adjust minimum capital requirements, which were set by statute at very low levels: the sum of 2.5 percent of on-balance sheet assets and 0.45 percent of credit guarantees for agency mortgage-backed securities held by outside investors. The new regulator did not have receivership authority in the event of a failure of either Fannie Mae or Freddie Mac. Finally, OFHEO was subject to the Congressional annual appropriations process and, therefore, periodically fell victim to political meddling. These and other regulatory deficiencies became clear to many observers (for example, Frame and White 2004 and references therein), but were not addressed until the passage of the Housing and Economic Recovery Act in July 2008.

Figures 1 and 2 highlight the remarkable growth of Fannie Mae and Freddie Mac in recent decades. Figure 1 plots the expansion of the two firms' single-family mortgage credit guarantee and investment portfolios, while Figure 2 plots their cumulative total equity returns compared to the overall market. The stock of agency mortgage-backed securities issued and guaranteed by the two firms (excluding those held by Fannie Mae and Freddie Mac) increased from just \$20 billion in 1981 to \$3.4 trillion by 2007, the year prior to the start of the conservatorships. Fannie Mae's and Freddie Mac's single-family mortgage investment portfolio holdings increased twenty-fold over the same period, from \$50

billion to \$1.1 trillion. Although the investment portfolios of the two firms have shrunk significantly since they were placed in conservatorship, their total market share inclusive of their mortgage guarantees has continued to grow. The two firms owned or guaranteed 47 percent of single-family mortgage debt outstanding in 2013, compared to 40 percent in 2007 and only 7 percent in 1981. (These figures exclude cross-holdings and ownership of government-guaranteed mortgage assets).

Fannie Mae and Freddie Mac's share of the mortgage market grew quite steadily between the early 1980s and the early 2000s, although the volume of mortgages they owned or guaranteed accelerated in dollar terms due to overall market growth. The two firms' portfolios of retained mortgage assets, which generate significant additional interest income, grew particularly rapidly from the mid-1990s until the accounting scandals that befell the two firms in 2003 (Freddie Mac) and 2004 (Fannie Mae).

The two firms' growing size and profitability was also reflected in their stock returns. Fannie Mae's stock did not outperform the market in the 1970s and 1980s, and experienced a period of high volatility in the early 1980s, due to the high interest rate environment that also triggered the demise of many savings and loan associations (or "thrifts"). (Freddie Mac became publicly traded in 1989.) Both firms significantly outperformed the overall stock market in the 1990s, however. These stock price gains reflected expectations and realizations of rapid, profitable growth, achieved through a combination of mortgage market growth, changes in senior management strategy, a greater understanding of how to leverage their existing funding advantage and the very low statutory capital requirements established in 1992.² The two firms also started competing more directly. Historically, Freddie Mac had securitized mortgages originated by thrifts, whereas Fannie Mae tended to hold mortgages purchased from mortgage banks, but this segmentation broke down over time.

² Demand-side forces likely also played a key role. For example, Basel I risk-based capital regulations incentivized some banks to swap their mortgages for agency mortgage-backed securities, and encouraged other banks to sell mortgage assets outright. This helped spur the firms' credit guarantee and investment portfolio businesses, respectively (Frame and White 2005).

Fannie Mae and Freddie Mac's stock returns became lower and more volatile after 2002. Their accounting scandals resulted in increased capital requirements (so-called capital surcharges) that dampened profitability and triggered legislative reform efforts that created additional uncertainty about the firms' future charter values. The firms also faced greater competition from the rapidly growing non-agency securitization market. Figure 2 also plainly illustrates the rising concerns about financial distress at Fannie Mae and Freddie Mac in 2007 and 2008, and shows how the imposition of the federal conservatorships virtually eliminated the value of common shares of the two firms. We focus on this period in the next section.

While Fannie Mae and Freddie Mac traditionally held or guaranteed prime conforming mortgages with low historical default risk, the activities of the two firms were influenced during the 2000s by the rapid growth in the higher-risk "subprime" mortgage market (for a description of this market, see Ashcraft and Schuermann, 2008; Mayer, Pence, and Sherlund, 2009). Although pools of subprime mortgages were generally turned into securities by investment banks rather than by Fannie Mae and Freddie Mac, the two firms were significant investors in these "non-agency" mortgage-backed securities, which were viewed as very profitable investments that also helped satisfy affordable housing goals. By the end of 2007, the two firms owned over \$300 billion of non-agency mortgage-backed securities.

There is also some evidence that the riskiness of conforming mortgages owned or guaranteed by Fannie Mae and Freddie Mac increased leading up to 2008, perhaps due to competition from non-agency securitization. For example, at Fannie Mae the percentage of newly purchased loans where the loan amount was 90 percent or more of the appraised property value increased from 8 percent in 2002 to 16 percent by 2007; for Freddie Mac, the corresponding share rose from 5 percent in 2003 to 11 percent in 2007. These statistics likely understate true borrower leverage, due to unreported second loans or "piggyback" mortgages, which became common during the housing boom. The share of loans guaranteed

by Fannie Mae and Freddie Mac with non-standard (and risky) features such as an interest-only period also increased substantially. Subsequent mortgage defaults suffered by the two firms were highly concentrated in the 2005-08 mortgage vintages.³

A range of observers had voiced concerns about the systemic risk posed by Fannie Mae and Freddie Mac some years prior to the financial crisis (for example, Greenspan 2004; 2005), although others suggested the likelihood of a insolvency or liquidity crisis from these firms was very low (for example, Hubbard 2003; Stiglitz, Orszag, and Orszag 2002). The concerns focused on the firms' concentration and hedging of mortgage-related interest rate risk, which seemingly magnified shocks to Treasury and interest rate derivatives markets in the early 2000s (See Eisenbeis, Frame, and Wall, 2007, and references therein).

Instead, the two firms were ultimately imperiled by mortgage credit risk, primarily associated with their guarantee activities. Policymakers' limited attention to credit risk at Fannie Mae and Freddie Mac was perhaps due to a history of low credit losses on their past guarantees, reflecting both relatively conservative underwriting and a long period of stable or rising home prices. Relatively few observers highlighted the firms' rising exposure to credit risk, or anticipated the possibility of a large nationwide decline in home prices.

Events Prior to Conservatorship

U.S. housing and mortgage markets became increasingly stressed during 2007 and 2008 as a result of significant house price declines and the weakening economy. A large number of borrowers found themselves in a situation where the balance on their mortgage exceeded the value of their homes (that is, "negative equity"), which is often a precursor of mortgage default (see for example Foote,

³ The Appendix contains statistics about the characteristics of mortgages held or guaranteed by Fannie Mae and Freddie Mac, as well as default rates.

Gerardi, and Willen 2008). The tremendous wave of defaults and subsequent foreclosures imperiled many financial institutions with significant exposure to U.S. residential real estate—including Fannie Mae and Freddie Mac. Below, we describe the key events that led to the conservatorships at these two firms; a detailed chronology is provided in the Appendix.

In summer 2007, as subprime mortgage defaults escalated, issuance of non-agency mortgage-backed securities essentially came to a halt, and other financial markets such as the asset-backed commercial paper market similarly dried up (for discussions of these events, see Brunnermeier 2009; Dwyer and Tkac 2009). This period is now widely considered to mark the beginning of the financial crisis. As issuance of non-agency mortgage-backed securities froze, interest rates on prime, but non-conforming, “jumbo” mortgages increased significantly—from about 25 to 100 basis points above those for conforming loans eligible for securitization via the still-liquid agency mortgage-backed securities market, as shown in Figure 3. This historically wide spread between jumbo and conforming mortgages persisted throughout the financial crisis, reflecting both the greater liquidity of conforming mortgages, and the heightened value of the agency credit guarantee. The volume of new jumbo mortgages declined, and the role of Fannie Mae and Freddie Mac expanded as commercial banks became increasingly unwilling or unable to hold new mortgages on their balance sheets (Calem, Covas, and Wu 2013; Fuster and Vickery 2015).

Losses, though, at Fannie Mae and Freddie Mac started mounting: they reported a combined net loss of \$8.7 billion during the second half of 2007, reflecting both credit losses on the mortgages they had guaranteed or were holding in portfolio, and mark-to-market losses on their investments. Nevertheless, the two firms’ role in the mortgage market further expanded following a temporary increase in conforming loan limits to as high as \$729,750 under the Economic Stimulus Act passed in February 2008 (see Vickery and Wright 2013 for details). Furthermore, during the first quarter of 2008, the Office of Federal Housing Enterprise Oversight removed limits on the size of the investment

portfolios at Fannie Mae and Freddie Mac and lowered surcharges to each firm's capital requirements so that they could purchase or guarantee additional mortgages. These portfolio limits and capital surcharges had been imposed by OFHEO between 2004 and 2006 due to concerns about accounting practices at the two firms.

By mid-2008, after adding over \$600 billion in mortgage credit exposure over the previous four quarters, the two firms had expanded to almost \$1.8 trillion in combined assets and \$3.7 trillion in combined net off-balance sheet credit guarantees. But over the year to June 2008, Fannie Mae and Freddie Mac together posted \$14.2 billion in losses and saw their capital recede to \$41.2 billion (Fannie Mae) and \$12.9 billion (Freddie Mac). At this point, their combined capital amounted to only about one percent of their exposure to mortgage risks, a tiny cushion in the face of large expected losses.

Investors became increasingly concerned about the financial condition of Fannie Mae and Freddie Mac during summer 2008. Figure 4 illustrates how their share prices first fell sharply during fall 2007 after both firms reported losses for the third quarter of 2007, and then fell from \$25-30 in April 2008 to below \$10 in mid-July. Debt investors also increasingly sought clarity from the federal government about whether bondholders would be shielded from losses.

Against this backdrop, and in an effort to calm markets, Treasury Secretary Henry Paulson proposed a plan in July 2008 to allow the Treasury to make unlimited debt and/or equity investments in Fannie Mae and Freddie Mac. (It was in a Senate Banking Committee hearing at this time when Paulson famously stated that "If you've got a bazooka [in your pocket] and people know you've got it, you may not have to take it out" (Paulson 2010).) This plan was incorporated as part of the Housing and Economic Recovery Act, which was signed into law later that month. The law also created the Federal Housing Finance Agency, and for the first time granted the new supervisor the authority to place a distressed government-sponsored enterprise into receivership. Immediately following the passage of the new housing legislation, the Treasury began a comprehensive financial review of Fannie

Mae and Freddie Mac in conjunction with the FHFA, the Federal Reserve and Morgan Stanley (Paulson 2010). (HERA required that FHFA consult with the Treasury and Federal Reserve on any resolution of Fannie Mae or Freddie Mac.)

Fannie Mae and Freddie Mac released their second quarter earnings in early August 2008. As shown in Table 1, at this time the two firms were both technically solvent, in the sense that the book value of their equity capital was positive, and indeed exceeded statutory minimum requirements. However, there was a compelling case that, when viewed on an economic basis, both firms were actually insolvent. First, both firms were recognizing large “deferred tax assets” to offset future income taxes (\$20.6 billion for Fannie Mae and \$18.4 billion for Freddie Mac). Arguably these assets had little immediate value in light of the firms’ extremely weak near-term earnings prospects. Excluding these assets, as would have been done for regulatory capital purposes if the two firms had been treated like banks, reduces their measured net worth to \$20.6 billion (Fannie Mae) and -\$5.5 billion (Freddie Mac). Second, the reported fair market value of their assets (net of liabilities) was significantly lower than book equity, and in Freddie Mac’s case was actually negative. Even these fair values may have understated the firms’ financial problems, since there is evidence that their accounting reserves against expected future credit losses were also insufficient (U.S. Financial Crisis Inquiry Commission, 2011, p. 317). These facts, together with continued deteriorating mortgage market conditions and potential near-term difficulties in rolling over the firms’ significant short-term debt (see Table 1), created a keen sense of urgency for the U.S. government to take action.

Resolution: Issues, Options and Actions

Why Was Action Needed?

Our view is that it was appropriate to provide temporary public support for Fannie Mae and Freddie Mac in September 2008. We now present the case for public intervention, drawing on economic theory and information about conditions at the time.

A key argument in favor of intervention was to support the supply of conforming mortgages. As already discussed, the sharp rise in the spread between jumbo and conforming mortgage interest rates during 2007-08 was prompted by a freeze in private jumbo securitization, generally attributed to heightened asymmetric information and uncertainty about mortgage credit risk (Leitner 2011). The freeze did not extend to agency mortgage-backed securities because of their implicit government guarantee. Public support of Fannie Mae and Freddie Mac maintained these guarantees and allowed agency securitization to continue and thereby support the supply of conforming mortgages. Theory provides support for the use of public guarantees as a crisis response; as one example, Philippon and Skreta (2012) present a model in which such guarantees are an optimal intervention in markets subject to adverse selection. Securitization was likely particularly important for mortgage supply during this period, because of the limited balance sheet capacity in the mortgage industry, due to falling capitalization and the failure of several large lenders (see Shleifer and Vishny 1992 for a model studying the effects of limited industry balance sheet capacity).

Was it important to promote mortgage supply during this period, given the already high levels of outstanding U.S. mortgage debt? We would argue “yes,” for two reasons.

First, mortgage origination was necessary to enable refinancing of existing mortgages. The overall policy response to the financial and economic crisis involved a significant easing of monetary policy, which works in part by lowering interest rates on existing debt contracts. Such a decrease in rates has been found to lower mortgage defaults (Fuster and Willen 2012; Tracy and Wright 2012;

Zhu et al. 2014) and to stimulate consumption (Keys et al. 2014; Di Maggio, Kermani, and Ramcharan 2014). Interest rates on fixed-rate mortgages, which make up the vast bulk of the stock of U.S. mortgage debt, only respond to lower market rates if borrowers can refinance. Even with the rescue of Fannie Mae and Freddie Mac, lower yields on mortgage-backed securities were only partially transmitted to primary mortgage interest rates during this time (Fuster et al. 2013; Scharfstein and Sunderam 2014). But refinancing would almost certainly have been even more difficult without Fannie Mae and Freddie Mac, considering the tight lending standards for non-conforming mortgages at the time.

Second, continued mortgage supply enabled at least some households to make home purchases during a period of extreme weakness in the housing market.⁴ A large body of theory models how changes in credit availability can lead to a negative spiral among asset prices, collateral values and credit availability (for a prominent example, see Kiyotaki and Moore 1997). Consistent with the spirit of such models, Kung (2014) finds empirically that the local increases in the conforming loan limit in 2008, which made more loans eligible for agency securitization, raised home prices by around 6 percent for homes in San Francisco and Los Angeles that were most likely to be purchased with these newly-eligible loans.

These arguments support the use of government guarantees in 2008 to help finance new mortgages. But what about legacy securities issued by Fannie Mae and Freddie Mac prior to September 2008? In our view, if explicit government support of the firms had not been forthcoming, market perceptions of a material credit risk embedded in existing agency debt and mortgage-backed securities may have substantially destabilized the broader financial system, given the sheer volume of such

⁴ RealtyTrac estimates that around 60-65 percent of single-family home purchases in 2009 involved a new mortgage loan, with the remainder going to all-cash buyers – see <http://www.realtytrac.com/content/foreclosure-market-report/q2-2014-us-institutional-investor-and-cash-sales-report-8126>.

securities outstanding, the large holdings of leveraged institutions such as commercial banks, insurance firms, and securities broker-dealers (the Appendix provides statistics about these holdings) and their widespread use as collateral in short-term funding markets. Credit losses on agency securities would have exacerbated the weak capital and liquidity position of many already-stressed financial institutions and raised the possibility of forced asset sales and runs (as in the models posited by Diamond and Rajan 2011 or Diamond and Dybvig 1983). Finally, Fannie Mae and Freddie Mac held large positions in interest rate derivatives for hedging. A disorderly failure of these firms would have caused serious disruptions for their derivative counterparties.

A further consideration was that almost one trillion dollars of agency debt and mortgage-backed securities was held by foreign official institutions, mainly central banks (see again the Appendix). Allowing these securities to default would likely have had significant international political ramifications.⁵ Furthermore, as emphasized by Paulson (2010) and Acharya et al. (2011), given the widespread perception that agency debt and mortgage backed securities were implicitly government guaranteed, there was a risk that a default by Fannie Mae or Freddie Mac would potentially raise questions about creditworthiness of the U.S. government, disrupting the U.S. Treasury debt market and increasing the government's funding costs.

Summing up, Fannie Mae and Freddie Mac were too large and interconnected to be allowed to fail, especially in September 2008 given the deteriorating conditions in U.S. housing and financial markets and the central role of these two firms in the mortgage finance infrastructure. Our view is that an optimal intervention would have involved the following elements:

⁵ Paulson (2010, p. 160) discusses learning on his trip to the 2008 Summer Olympics in Beijing that Russian officials had approached the Chinese government about a plan to jointly dump a large portion of their holdings of Fannie Mae and Freddie Mac in an effort to create a financial crisis that would force U.S. authorities to support the firms explicitly.

- (i) Fannie Mae and Freddie Mac would be enabled to continue their core securitization and guarantee functions as going concerns, thereby maintaining conforming mortgage credit supply.
- (ii) The two firms would continue to honor their agency debt and mortgage-backed securities obligations, given the amount and widely held nature of these securities, especially in leveraged financial institutions, and the potential for financial instability in case of default on these obligations.
- (iii) The value of the common and preferred equity in the two firms would be extinguished, reflecting their insolvent financial position.
- (iv) The two firms would be managed in a way that would provide flexibility to take into account macroeconomic objectives, rather than just maximizing the private value of their assets.
- (v) The structure of the rescue would prompt long-term reform and set in motion the transition to a better system within a reasonable period of time.

Later in the paper, we evaluate actions taken relative to these five objectives, concluding that the path taken was quite successful on the first three, but less successful on the last two.

What Action was Taken?

On September 7, 2008, Director of the Federal Housing Finance Agency James Lockhart, Secretary of the Treasury Hank Paulson, and Chairman of the Federal Reserve Ben Bernanke outlined a plan to stabilize the residential mortgage finance market. This included: 1) placing both Fannie Mae and Freddie Mac into conservatorship; 2) having the Treasury enter into senior preferred stock purchase agreements with both firms; and 3) establishing two new Treasury-operated liquidity facilities aimed at supporting the residential mortgage market – a mortgage-backed securities purchase facility and a standing credit facility. We discuss these steps in turn.

By becoming a conservator, the Federal Housing Finance Agency assumed the responsibilities of the directors, officers and shareholders of both Fannie Mae and Freddie Mac with the purpose of

conserving their assets and rehabilitating them into safe-and-sound condition. Hence the two institutions would continue as going concerns, carry out their usual market functions and continue to pay their financial obligations. The boards of Fannie Mae and Freddie Mac consented to the appointment of the conservator, although the chief executive officers and directors of each firm were then immediately replaced.

The U.S. Treasury's senior preferred stock purchase agreements sought to ensure that Fannie Mae and Freddie Mac maintained positive net worth going forward. Under the agreements, if the Federal Housing Finance Agency determines that either institution's liabilities exceed their assets under generally accepted accounting principles (GAAP), the Treasury would contribute cash capital equal to the difference, in exchange for senior preferred stock. (Specifically, this preferred stock is senior to the prior existing common and preferred equity of the two firms, but junior to their senior and subordinated debt and mortgage-backed securities.) Each agreement was initially for an indefinite term and for up to \$100 billion, although the maximum was raised by subsequent amendments to \$200 billion per enterprise in February 2009, then to an unlimited amount through 2012 in December 2009. As we discuss in more detail later, under these agreements the two firms jointly ended up drawing a total of \$187.5 billion over the course of 2008 to 2011.

The senior preferred stock accrued dividends at 10 percent per year. The senior preferred stock purchase agreements also required both Fannie Mae and Freddie Mac to provide the Treasury with: 1) \$1 billion of senior preferred shares; 2) warrants that would allow the purchase of common stock representing 79.9 percent of each institution on a fully diluted basis;⁶ and 3) a quarterly commitment fee to be determined by the Treasury and the Federal Housing Finance Agency (as

⁶ The 79.9 percent ownership stake was selected to avoid the necessity to consolidate the assets and liabilities of Fannie Mae and Freddie Mac onto the government's balance sheet. See Swagel (2009, p. 37).

conservator) in consultation with the Federal Reserve.⁷ To date, the Treasury has not exercised the warrants to purchase common stock. In accordance with the terms of the agreement, Treasury waived the commitment fee each period, and then suspended this provision in 2012.

The senior preferred stock purchase agreements also required Fannie Mae and Freddie Mac to begin winding down their retained investment portfolios, starting in 2010, at a rate of at least 10 percent per year until they each fall below \$250 billion. This provision was intended to assuage policymaker concerns that these investment portfolios might pose future systemic risk to the financial system.

In September 2008, the Treasury also created a Government Sponsored Enterprise Credit Facility in which Fannie Mae, Freddie Mac and the Federal Home Loan Bank System could borrow on a short-term collateralized basis from the Treasury. The facility was never used and expired on December 31, 2009. The Treasury furthermore introduced a temporary Mortgage-Backed Securities Purchase Program under which it could purchase agency mortgage-backed securities in an effort to support the mortgage market. It ultimately acquired \$225 billion of these securities which were subsequently sold in 2011 and 2012.

In August 2012, an amendment to the senior preferred stock purchase agreement was announced, in which the fixed 10 percent dividend on the senior preferred stock owned by Treasury was replaced with a “full income sweep.” This implied that all profits made by the two firms would be remitted to Treasury, preventing them from building up positive capital (except for a small net worth “buffer” capped at \$3 billion per firm and declining over time). Furthermore, the amendment accelerated the reduction of their investment portfolios, going from a wind down rate of 10 percent

⁷ The senior preferred stock purchase agreements also included various covenants. Specifically, Treasury approval is required before: 1) purchasing, redeeming or issuing any capital stock or paying dividends; 2) terminating conservatorship other than in connection with receivership; 3) increasing debt to greater than 110 percent of that outstanding as of June 30, 2008; or 4) acquiring, consolidating, or merging into another entity.

per year to 15 percent. When announcing the amendment, the U.S. Department of Treasury (2012) was explicit that a main goal was to “expedite the wind down of Fannie Mae and Freddie Mac.”

Why Conservatorship? What Were the Alternatives?

As “federal instrumentalities,” Fannie Mae and Freddie Mac are exempt from the bankruptcy code. However, since its creation in 1992, the Office of Federal Housing Enterprise Oversight had the authority to place Fannie Mae or Freddie Mac into “conservatorship” in an effort to conserve their assets and restore them to a safe-and-sound financial condition. The 1992 law, though, did not provide OFHEO either with any funding to assist with a conservatorship, or with a mechanism to fully resolve financial distress at either firm by apportioning losses to shareholders and creditors (Wall, Eisenbeis and Frame 2005). Under these constraints, a conservatorship ends up looking a lot like “regulatory forbearance”—that is, allowing distressed firms to violate regulations in order to maintain their operations and allow them to grow back to financial health.

The Housing and Economic Recovery Act enacted in July 2008 expanded the supervisory options available. First, the law granted receivership authority to the newly created Federal Housing Finance Agency.⁸ This authority extends those of a conservator by allowing the supervisor to liquidate assets and/or restructure the firm in an effort to limit taxpayer losses. However, formally extinguishing the firms would require Congress to revoke their charters. Absent Congressional action, receivership for either firm would require the creation of a limited life entity (a “bridge entity” akin to a “bridge

⁸ The idea of providing the supervisor of Fannie Mae and Freddie Mac with receivership authority had been debated in the years prior to the financial crisis. Some policymakers, including those at the Federal Reserve and Treasury Department, viewed this as a way to impose greater market discipline on Fannie Mae and Freddie Mac by exposing their bondholders to potential loss. Of course, this increased market discipline would be conditional on receivership being viewed as a credible alternative by the markets. Many legislators, however, were concerned that such supervisory authority would raise the cost of housing finance.

bank” used when the Federal Deposit Insurance Corporation puts a bank into receivership) that would be financially viable and could maintain the Congressional charter.⁹

Second, as mentioned above, HERA provided the U.S. Treasury with authority to make unlimited investments in securities of Fannie Mae and Freddie Mac, conditional on an “emergency determination” by the Treasury Secretary and agreement from the firm on the terms and conditions of the investment. This investment authority was provided temporarily, through the end of 2009.

Once the federal government decided to rescue Fannie Mae and Freddie Mac and to invest public money, the choice was whether to utilize receivership or conservatorship. This choice became principally about which classes of creditors or shareholders would be made to suffer losses. (For the reasons outlined at the beginning of this section, it seemed unwise in the middle of a financial crisis to follow a course of action that would impose losses on holders of agency debt or mortgage-backed securities.)

In the case of conservatorship, U.S. Treasury purchases of common equity would restore the two firms to financial health, but would represent a public bail-out of all claimants. Alternatively, the Treasury could purchase a more senior class of securities, which would benefit holders of even more senior obligations but largely wipe out the value of junior obligations.

With a receivership, government funding could be used to capitalize the “bridge” entity in an effort to support senior creditors and any other claimants that the government wanted to protect. Subsequently, the Treasury would be expected to hold an initial public offering for the bridge entity

⁹ In the absence of any government funding, a receivership utilizing a “bridge” structure would generally work in the following way. The Federal Housing Finance Agency would first evaluate the current and expected performance of the assets and off-balance sheet credit guarantees. “Good assets” expected to perform would then be transferred to the new bridge entity, with the “bad assets” remaining with the original institution. The difference in value between the good and bad assets plus the amount of required capital would represent the amount of loss to be apportioned to claimants in order of priority within the original capital structure – i.e., common stockholders, preferred stockholders, subordinated bondholders, and senior bondholders. Mortgage-backed securities investors would maintain their interest in the underlying loans with any shortfall treated as a senior unsecured claim.

in an effort to monetize the taxpayers' investment. Indeed, the Housing and Economic Recovery Act required that the bridge entity be sold within two years of creation (although it includes an option to extend this period by up to three years).

If the Treasury had not received financing authority in the Housing and Economic Recovery Act, receivership would likely have provided the best opportunity for ultimately stabilizing the mortgage market. However, given the depth of the problems at Fannie Mae and Freddie Mac, receivership would likely have involved some losses being borne by senior creditors (that is, holders of agency debt and mortgage-backed securities) and a breach of the implicit government guarantee. Conditional on Treasury financing, there were several other reasons why the conservatorship was still preferable to receivership.

First, in the summer of 2008, there was significant uncertainty about the housing market and future losses at Fannie Mae and Freddie Mac. This meant that -- given the time frame allowed -- restructuring the two firms via receivership would entail some risk that they could potentially fail again. Hence receivership might not have solved the critical near-term problem.

Second, the business model of the government sponsored-enterprises had been the subject of intense debate in the years leading up to their failure. The structure of the conservatorship agreements essentially placed Fannie Mae and Freddie Mac in a "time-out". Receivership, by contrast, would have reorganized and released the two firms (at least within five years). The thinking was that conservatorship would force Congress to address the problems of this business model, or else face the long-term prospect of government control of the U.S. housing finance system.

Third, receivership raised an operational concern relating to the treatment of derivatives as "qualified financial contracts" (as discussed by Paulson 2010). Receivership required a determination within one business day about the status of individual counterparties: specifically, whether their claims would be transferred to the "good" entity or remain with the "bad" entity. Depending on that

determination, counterparties held the option to terminate net positions. However, under law the conservatorship did not trigger these termination options in derivatives contracts (Federal Housing Finance Agency 2008). Thus, receivership would have created greater uncertainty about business continuity and derivatives counterparty actions.

Finally, conservatorship still allowed for the receivership option to be chosen in the future, if a subsequent administration felt that it was a better course of action. Another alternative option was to nationalize Fannie Mae and Freddie Mac, by buying more than 80 percent of the firms' equity and thereby taking a controlling interest. However, as Paulson (2010) describes in his book, the Bush administration was opposed to nationalization or anything that looked like open-ended government involvement. Relative to conservatorship, nationalization would have given the administration more direct control over Fannie Mae and Freddie Mac, but would have required the firms to be put on the government's balance sheet. The 2012 "full income sweep" amendment discussed above effectively narrows the difference between conservatorship and nationalization, by transferring essentially all profits and losses from the firms to the Treasury.

Could the U.S. Treasury, instead of taking control of (or liquidating) Fannie Mae and Freddie Mac, have calmed financial markets by simply buying up large quantities of agency debt and mortgage-backed securities, or otherwise guaranteeing their performance? Direct purchases could have removed material risk from the financial institution balance sheets. However, a resolution of the financial distress at Fannie Mae and Freddie Mac would still have been necessary in order to ensure continued mortgage credit availability. The sheer quantity of agency securities outstanding, around \$5 trillion in total, would also have made a repurchase program challenging or impossible to implement in practice, given the limited time frame. Such a program would have needed to be much larger than the Troubled Asset Relief Program later used to recapitalize banks.

Effects of the Conservatorship

Effects on Financial Markets

The intent of the senior preferred stock purchase agreements and Treasury liquidity facilities was to maintain the firms' operations and to provide assurances to holders of Fannie Mae's and Freddie Mac's debt and mortgage-backed securities. By extension, these actions were expected to both lower and stabilize the cost of mortgage finance. Figure 5 illustrates the announcement effect of the actions taken by looking at the yields of Fannie Mae five-year debt and "current coupon" mortgage-backed securities, both in terms of spreads to five-year Treasury bonds. On the first trading day following the conservatorship announcement, these spreads fell by about 30 basis points (five-year debt) and 50 basis points (mortgage-backed securities). In turn, the fall in mortgage-backed securities yields was followed by a decline in conforming mortgage rates by about 40 basis points within one week. Thus, in the months prior to the announcement, the risk of a potential default by Fannie Mae and Freddie Mac seems to have substantially increased their funding costs and the cost of mortgage credit. At least in the short run, the conservatorship announcement calmed investors' fears.

As would be expected, the agreements through which the government received preferred stock had significant negative consequences for the existing stockholders. Fannie Mae and Freddie Mac common shares quickly fell below \$1 (down from \$60 just 12 months earlier), and the Federal Housing Finance Agency subsequently directed both firms to delist from the New York Stock Exchange. Preferred shares suffered a similar fate. Indeed, several community banks became financially distressed as a result of having to write-down the value of their holdings of preferred stock in the two firms (Rice and Rose 2012). Perhaps surprisingly, the two firms maintained their payments on the relatively small amount of subordinated debt that they had outstanding.

The positive bond market reaction, coupled with a relatively smooth operational transition, suggested that the conservatorships at Fannie Mae and Freddie Mac were a success, at least initially.

However, as the financial crisis intensified later in the fall of 2008 in the wake of the Lehman Brothers bankruptcy and other events, yields on Fannie Mae and Freddie Mac obligations climbed back and soon exceeded their pre-conservatorship levels. This increase appears to have resulted primarily from a general flight to liquidity as well as tight financing conditions during fall 2008, rather than a reassessment by the market of what conservatorship would imply for the credit risk of the two firms' bonds going forward (see Krishnamurthy 2010).

Regardless of the cause, the attendant increase in mortgage rates worried policymakers and became an important contributor to the Federal Reserve's decision to engage in a "large-scale asset purchase program" – commonly referred to as "quantitative easing." On November 25, 2008, the Fed announced that it would purchase up to \$500 billion of agency mortgage-backed securities and up to \$100 billion of agency debt. As shown in Figure 5, this announcement substantially reduced yield spreads for agency securities, which subsequently normalized over the first quarter of 2009. (For discussions of the channels through which the large-scale asset purchases affected financial markets, see Gagnon et al. 2011; Hancock and Passmore 2011; or Krishnamurthy and Vissing-Jorgensen 2011.) Note that even though the Fed intervention appears to have lowered yield spreads, this does not mean that, had it come earlier, it would have stabilized Fannie Mae and Freddie Mac, since the underlying solvency issue would not have been addressed. Indeed, it seems likely that restoring the financial condition of Fannie Mae and Freddie Mac was an important precondition for the Federal Reserve to even have been willing to purchase agency securities in the first place.

Effects on Mortgage Lending

Following the decrease in conforming mortgage rates in late 2008, mortgage originations (primarily refinancings) surged, as did issuance of agency mortgage-backed securities, since the conservatorship enabled the credit guarantee businesses of Fannie Mae and Freddie Mac to continue

uninterrupted. As shown in Figure 6, since 2008, Fannie Mae and Freddie Mac have guaranteed around 60 percent of originated mortgages, the Federal Housing Administration and the Veterans Administration have insured about 20 percent (securitized by Ginnie Mae), with the remainder held as whole loans by commercial banks. Private-label residential mortgage securitization, which funded more than one-third of mortgages over 2004-2006, has remained close to zero since 2008. Fannie Mae and Freddie Mac's market share is thus higher than ever, and almost twice what it was during the height of the housing boom.

The credit profile for Fannie Mae and Freddie Mac's new business has improved since the crisis, as illustrated by the fact that the average credit score on newly guaranteed single-family mortgages increased from below 720 in 2006-07 to around 760 since 2009, on a scale from 300 to 850 (U.S. Federal Housing Finance Agency 2013). An important reason for this increase in credit scores is that Fannie Mae and Freddie Mac in early 2008 introduced "loan level price adjustments," which are risk-based up-front fees determined by the loan-to-value ratio and the borrower's credit score. These up-front fees have contributed to a steady increase in the overall guarantee fees for new mortgages. For example, Fannie Mae's average effective guarantee fee on new loans tripled from 21 basis points in the first quarter of 2009 to 63 basis points in the first quarter of 2014. Of this increase, 10 basis points was mandated by Congress to fund the 2012 payroll tax reduction.

The Composition of Losses and the Return to Profitability

Figure 7 shows the financial consequences of the rescue for the U.S. Treasury. The negative bars show the annual draws by Fannie Mae and Freddie Mac under the senior preferred stock purchase agreements, while the positive bars show the dividends paid. Over the first years of the conservatorship, both firms required very substantial support, but more recently, they have remitted large dividend payments back to the U.S. Treasury.

From 2008 to 2011, Fannie Mae and Freddie Mac posted total combined losses (in terms of comprehensive income) of \$266 billion and required \$187.5 billion of Treasury support. The biggest contributor to these staggering losses was single-family credit guarantees, which generated about \$215 billion in losses over this period, almost all due to provisions for credit losses (U.S. Federal Housing Finance Agency 2011).¹⁰ A second contributor was the dividends on the senior preferred stock held by the U.S. Treasury (paying 10 percent per year), which totaled \$36 billion over this period. Perhaps surprisingly, Fannie Mae's and Freddie Mac's investment portfolios, which at first had suffered large losses (\$83 billion in 2008), actually generated \$2 billion in comprehensive income over this entire period.

In 2012, as house prices stabilized and delinquency rates declined, both Fannie Mae and Freddie Mac stopped losing money on their credit guarantees. Given that their investment portfolios were again profitable, the firms together earned \$16 billion (after dividend payments to the Treasury). This money was subsequently remitted to the Treasury, under the full income sweep amendment to the senior preferred stock purchase agreements noted earlier, which became effective in January 2013.

One consequence of the firms' return to profitability was that their deferred tax assets (which are used to offset taxable income) became useable, and were revalued. As a result, Fannie Mae posted a record profit of \$58.7 billion in the first quarter of 2013, and the same happened for Freddie Mac in the third quarter (\$30.4 billion). The firms jointly paid dividends of \$130 billion to the Treasury during 2013. As of end-2014, the cumulative Treasury dividend payments by Fannie Mae and Freddie Mac have now exceeded their draws: specifically, Fannie Mae has paid \$134.5 billion in dividends in

¹⁰ Single-family credit guarantees reflect both guarantees of the firms' agency mortgage-backed securities and whole loans retained on their balance sheets. While losses on the former exceeded the latter, exactly quantifying the two is difficult due to a change in accounting rules in 2010 (see U.S. Federal Housing Finance Agency Office of Inspector General, 2012).

comparison to \$116.1 billion in draws, while Freddie Mac has paid \$91.0 billion in dividends in comparison to \$71.3 billion in draws.

Should these figures be interpreted to mean that the Treasury, and therefore taxpayers, have been “repaid” by Fannie Mae and Freddie Mac, and that the two firms should now pay dividends to their regular shareholders again? The answer is no. As an economic matter, one cannot simply compare nominal cash flows, but must also take into account that the Treasury took on enormous risk when rescuing the two firms in 2008, and should therefore earn a substantial risk premium, similar to what private investors would have required at the time, in addition to the regular required return (Wall 2014). Furthermore, the effective guarantee has lowered funding costs for Fannie Mae and Freddie Mac and thereby directly contributed to their profits. The U.S. Congressional Budget Office (2010) took these factors into consideration when calculating the total subsidy provided to the firms. Finally, as indicated earlier, the Treasury never collected its commitment fee, which if fairly priced and paid would have significantly reduced the earnings of the two firms. That said, there is some controversy surrounding these issues. In particular, several shareholder lawsuits are contesting the legality of the full income sweep amendment, although with little success to date.¹¹

Evaluating the Conservatorships

Earlier, we outlined five desirable objectives of an optimal intervention in response to Fannie Mae and Freddie Mac’s financial distress. We believe that the conservatorships largely accomplished the first three objectives, relating to short run financial stability and credit supply. First, the conservatorships, and particularly the financial support provided by the U.S. Treasury, enabled Fannie

¹¹ At the time of this writing, the most recent relevant judgment was that on September 30, 2014, Judge Royce Lamberth of the U.S. District Court for the District of Columbia dismissed several of these claims, based on the view that the Housing and Economic Recovery Act of 2008 empowered Treasury and the Federal Housing Finance Agency to change the terms of the senior preferred stock agreements in this manner. Lamberth’s Memorandum Order is at https://ecf.dcd.uscourts.gov/cgi-bin/show_public_doc?2013mc1288-46.

Mae and Freddie Mac to support mortgage supply through the crisis and its aftermath. Second, holders of agency debt and mortgage-backed securities did not suffer credit losses (despite the substantial defaults by individual mortgage borrowers), insulating the broader financial system from contagion effects due to the failure of the two firms. Third, both common and preferred equity holders were effectively wiped out, consistent with market discipline. Inconsistent with this objective, however, subordinated debt did not experience losses. While this debt represented only a small part of the liability structure of the two firms, allowing subordinated debt holders to suffer losses may have been desirable in signaling that such debt is indeed risky, thereby curbing moral hazard in similar institutions going forward.

The conservatorship structure was arguably less successful on the fourth objective of aligning the activities of Fannie Mae and Freddie Mac with broader macroeconomic objectives during the Great Recession. The key mission of the conservatorships is to return the two firms to financial health. One year into the conservatorships, Federal Housing Finance Agency Director Lockhart (2009) noted that “We recognize that FHFA’s duties as conservator means just that, conserving the Enterprises’ assets. This is our top goal.”

This focus on the financial performance of the two firms conflicted to some degree, however, with other public policy objectives during this period. One example of this ongoing tension is that, following conservatorship, Fannie Mae and Freddie Mac aggressively enforced “representations and warranties” made by entities that had sold mortgages to them. In practice, the two firms tried to “put back” defaulted mortgages to the originator or seller of the loan, forcing that entity to bear the credit losses.¹² This action was typically justified by flaws in the original documentation or loan underwriting,

¹² Fannie Mae estimates that 3.7 percent of single-family loans acquired between 2005 and 2008 were put back to lenders (source: Fannie Mae 10-K 2013, p. 143). FHFA has also reached a number of settlements with financial institutions related to securities law violation or fraud involving private-label securities purchased by Fannie Mae and Freddie Mac during the boom, totaling more than \$16 billion as of mid-2014

although importantly, it is not required that the defect be shown to have contributed to mortgage defaults. A consequence of this approach is that the fear of violating representations and warranties on new loans has been cited (especially by originators) as a contributing factor behind tight underwriting standards and higher costs of mortgage lending since the financial crisis (Goodman and Zhu, 2013). This tightening of mortgage credit supply has not been helpful to the ongoing recovery of the housing market.

A second example is the role of “principal writedown” (a certain percentage of the borrower’s mortgage balance is forgiven) as a policy tool. By the fourth quarter of 2009, an estimated 11.3 million mortgages or 24 percent of borrowers were in negative equity (First American CoreLogic 2010). Borrowers with negative equity are more likely to default, and to produce larger default losses. Such defaults can generate negative externalities, such as reducing prices of nearby properties (Campbell, Giglio, and Pathak 2011). In addition, many argued that the larger issue of debt overhang contributed to lower consumption and created a persistent headwind to economic growth (for example, Mian and Sufi, 2014). Absent an explicit policy to address mortgage-related negative equity, this debt overhang would only unwind slowly over time through foreclosures, debt amortization and any future home price appreciation.

The primary federal program for assisting mortgage borrowers at risk of default was the Home Affordable Modification Program (HAMP), introduced in 2008. Initially, HAMP focused on reducing mortgage payments through reducing interest rates and extending loan terms. Some argued, however, that principal writedown could be a more effective intervention for underwater borrowers (Haughwout, Okah and Tracy, 2010; for an alternative view, see Adelino, Gerardi and Willen 2014; Eberly and Krishnamurthy 2014). In June 2010, the Treasury expanded HAMP to include a “principal

(<http://www.fhfa.gov/Media/PublicAffairs/Pages/FHFAs-Update-on-Private-Label-Securities-Actions.aspx>).

writedown alternative”, known as HAMP-PRA. The Federal Housing Finance Agency decided that Fannie Mae and Freddie Mac would not participate in this program, however, due to moral hazard concerns (Fannie Mae 2012). Putting aside the relative merits of principal writedown as a policy tool, what is instructive is the contrast between the broader housing policy perspective of the Treasury versus the FHFA’s narrower financial performance goals. In his book, former Treasury Secretary Geithner (2014) recalls: “It was amazing how little actual authority we had over Fannie and Freddie, considering they were entirely dependent on Treasury’s cash to stay alive.”

The conservatorships to date have also strikingly failed in relation to our fifth and final objective of producing long-term mortgage finance reform. As Paulson (2010) writes in his book, “We described conservatorship as essentially a “time out,” or a temporary holding period, while the government decided how to restructure the [government-sponsored enterprises].” However, starting the conservatorships turned out to be easier than ending them, and the “time out” has now stretched into its seventh year.

On February 11, 2011, two years into the Obama administration, the U.S. Treasury and U.S. the Department of Housing and Urban Development (2011) issued a joint white paper on residential mortgage reform. In a press release, Treasury Secretary Geithner described the white paper as follows: “This is a plan for fundamental reform to wind down the [government-sponsored enterprises], strengthen consumer protection, and preserve access to affordable housing for people who need it.” But the white paper was only a plan to develop a plan. While the paper outlined three broad possible alternatives for reform, it offered only options without specifics.

Although there appears to be broad consensus that Fannie Mae and Freddie Mac should be replaced by a private system—perhaps augmented by public reinsurance against extreme tail outcomes—substantial disagreement remains about how to implement such a system. The many legislative proposals to date all reflect the cross-currents of trying to protect the taxpayer, preserve

support for the 30-year fixed rate mortgage and keep homeownership affordable to a wide spectrum of borrowers.¹³ At the time of writing, there is still no agreed-upon plan for the future of residential mortgage finance.

Conclusions and the Road Ahead

The public actions taken to support Fannie Mae and Freddie Mac were successful in their short-term aims of supporting the housing market and removing the two firms as an immediate source of systemic risk to the financial system. However, the conservatorships have not yet achieved the goal of reforming the system of residential mortgage finance.

The path forward for reform of Fannie Mae and Freddie Mac does not look promising. As time passes since September 2008, the perceived urgency for reform seems to recede. Delay prolongs the uncertainty over the government's future role in residential mortgage finance, which in turn is a deterrent to private capital re-entering the market, and makes the government's role appear more difficult to replace. Delay also raises the likelihood that deeper reform will be judged as too difficult to accomplish, and raises the risk that the conservatorships are ended by returning Fannie Mae and Freddie Mac to private status with only minor changes to their charters. That is, the key recommendation of the U.S. Treasury and U.S. Department of Housing and Urban Development (2011) white paper – that Fannie Mae and Freddie Mac should be wound down – would in fact not come to pass. This would be a colossal missed opportunity to put U.S. residential mortgage finance on a more stable long-term footing.

¹³ In the U.S. Senate in 2014, the Housing Finance Reform Act of 2013 (S.1217) sponsored by then-Banking Committee Chairman Tim Johnson (D-SD) and Ranking Member Mike Crapo (R-ID) passed through the Banking Committee. However, it is unclear whether this bill can provide the framework for future reform bill. The current Banking Committee Chairman Senator Richard Shelby (R-AL) voted against the bill, and it is unclear how much support the bill would find in the House of Representatives.

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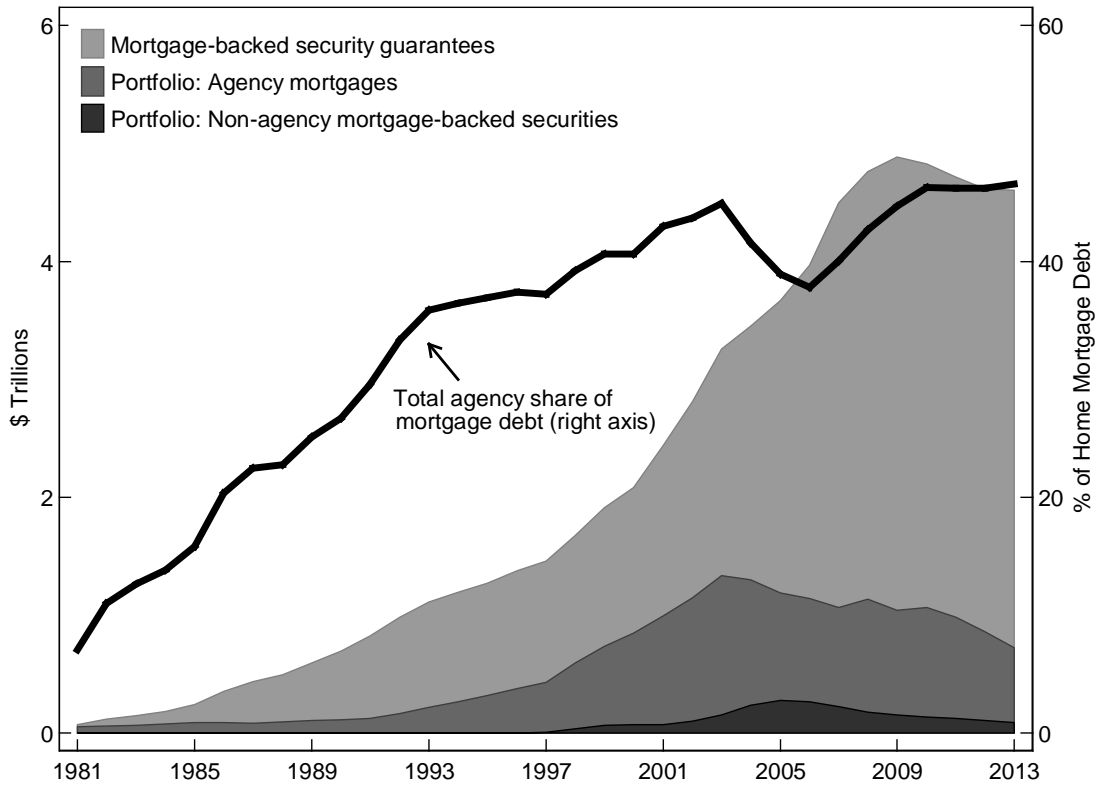
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Table 1: Balance sheet composition as of June 2008

	Accounting Value (\$ billions)	
	Fannie Mae	Freddie Mac
Assets		
Cash, Federal Funds, and Repurchase Agreements	\$49.4	\$58.8
Investment Securities, at fair value	\$344.8	\$684.7
Agency Mortgage-backed Securities	\$220.4	\$490.2
Private-label Mortgage-backed Securities & Revenue Bonds	\$96.1	\$181.6
Other Investment Securities	\$28.3	\$12.9
Whole Mortgage Loans	\$418.2	\$89.1
Deferred Tax Assets	\$20.6	\$18.4
Other Assets	<u>\$52.9</u>	<u>\$28.1</u>
Total Assets	\$885.9	\$879.0
Liabilities		
Short-term Debt (Maturity < 1 year)	\$240.2	\$326.3
Long-Term Debt	\$550.3	\$505.0
Subordinated Debt	\$9.0	\$4.5
Other Liabilities	<u>\$45.0</u>	<u>\$30.2</u>
Total Liabilities	\$844.5	\$866.0
Equity		
Common Stock, Other Paid-In Capital, Retained Earnings	\$32.5	\$27.1
Preferred Stock	\$21.7	\$14.1
Treasury Stock	(\$7.3)	(\$4.1)
Accumulated Other Comprehensive Loss	<u>(\$5.7)</u>	<u>(\$24.2)</u>
Total Equity	\$41.2	\$12.9
Memo: Off Balance Sheet Credit Guarantees (Net)	\$2,289.9	\$1,409.9

Notes: This table provides summarized balance sheet information for Fannie Mae and Freddie Mac as of June 30, 2008. Balance sheet measures are presented at historical cost according to generally accepted accounting principles as reported in each firm's 10-K. Off-balance sheet credit guarantees are from each firm's "monthly summary" and net of their own mortgage-backed securities held on balance sheet. A more detailed balance sheet is presented in the Appendix.

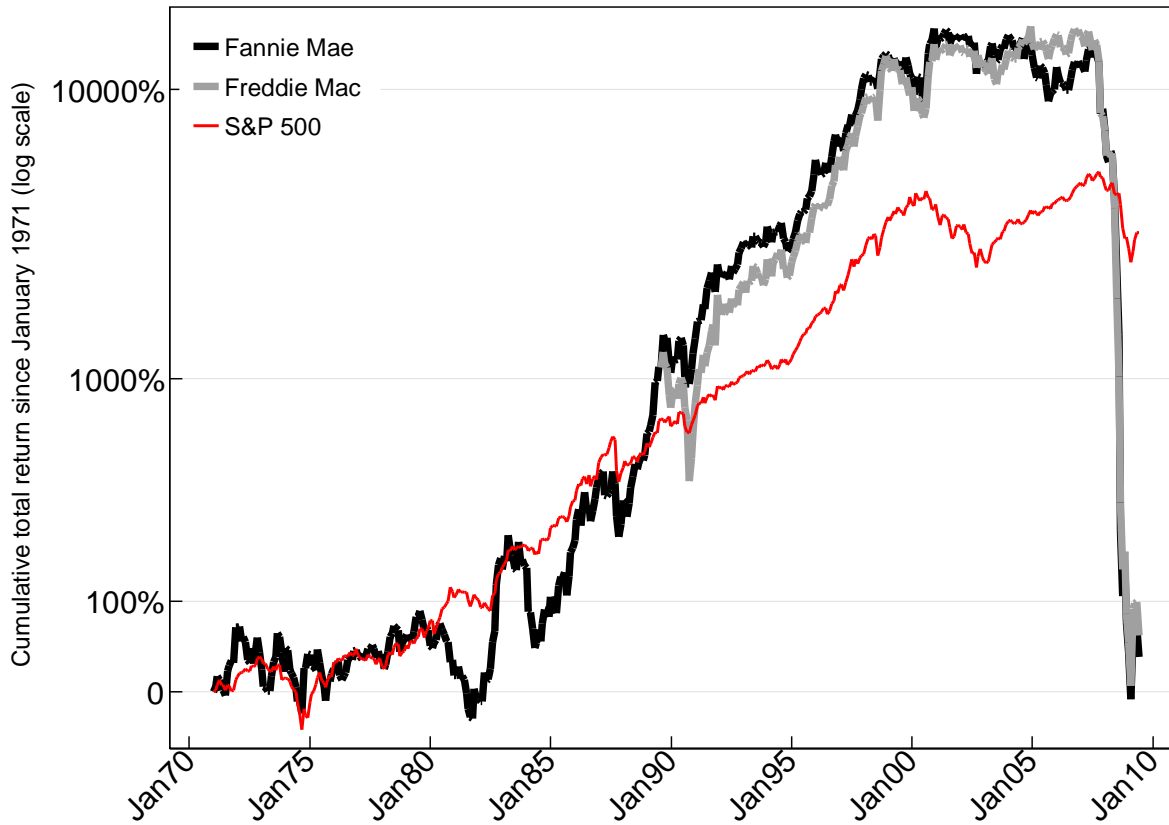
Figure 1: The Growing Role of Fannie Mae and Freddie Mac in the U.S. Mortgage Market



Sources: U.S. FHFA (2014) Annual Report to Congress, Federal Reserve Flow of Funds.

Notes: Statistics reflect single-family mortgages only. The category “Mortgage-backed security guarantees” measures agency mortgage-backed securities held by third parties. To avoid double counting, portfolio holdings exclude cross-holdings (that is, securities issued by either of Fannie Mae or Freddie Mac that are owned by the other). They also exclude government-guaranteed FHA loans. The Appendix to this paper contains more details about figure construction.

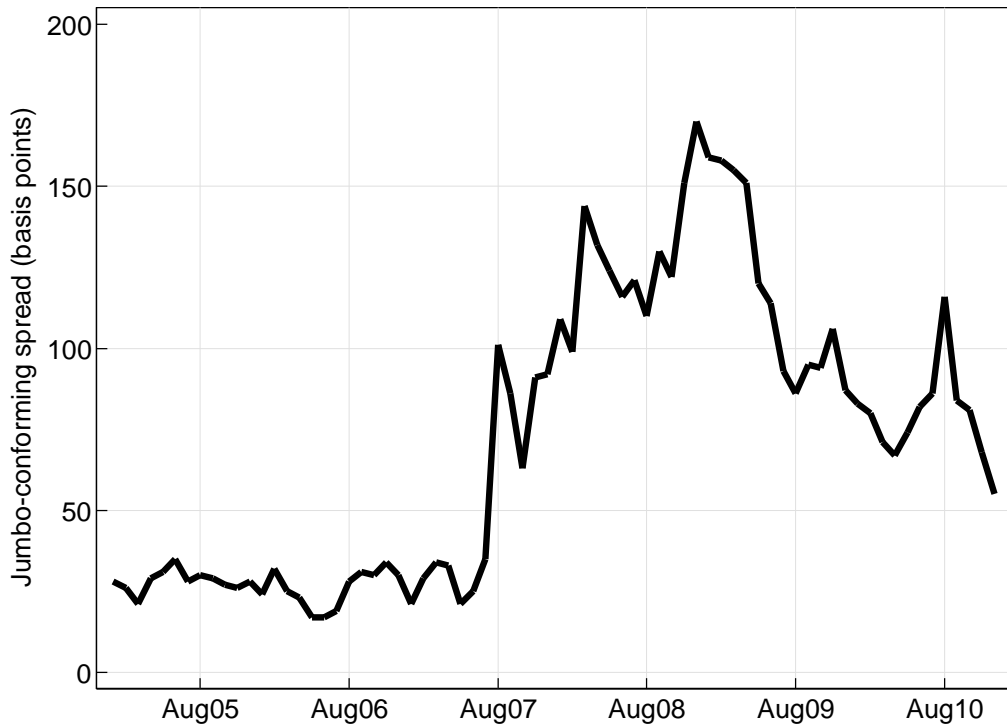
Figure 2. Cumulative Total Equity Returns of Fannie Mae and Freddie Mac Relative to S&P 500



Source: Center for Research in Security Prices.

Notes: Figure plots the natural logarithm of cumulative returns, inclusive of dividends and other distributions, over the period from January 1971 – June 2009. The cumulative return for Freddie Mac is set to be at the same level as Fannie Mae’s in August 1989, when our total return series for Freddie Mac starts.

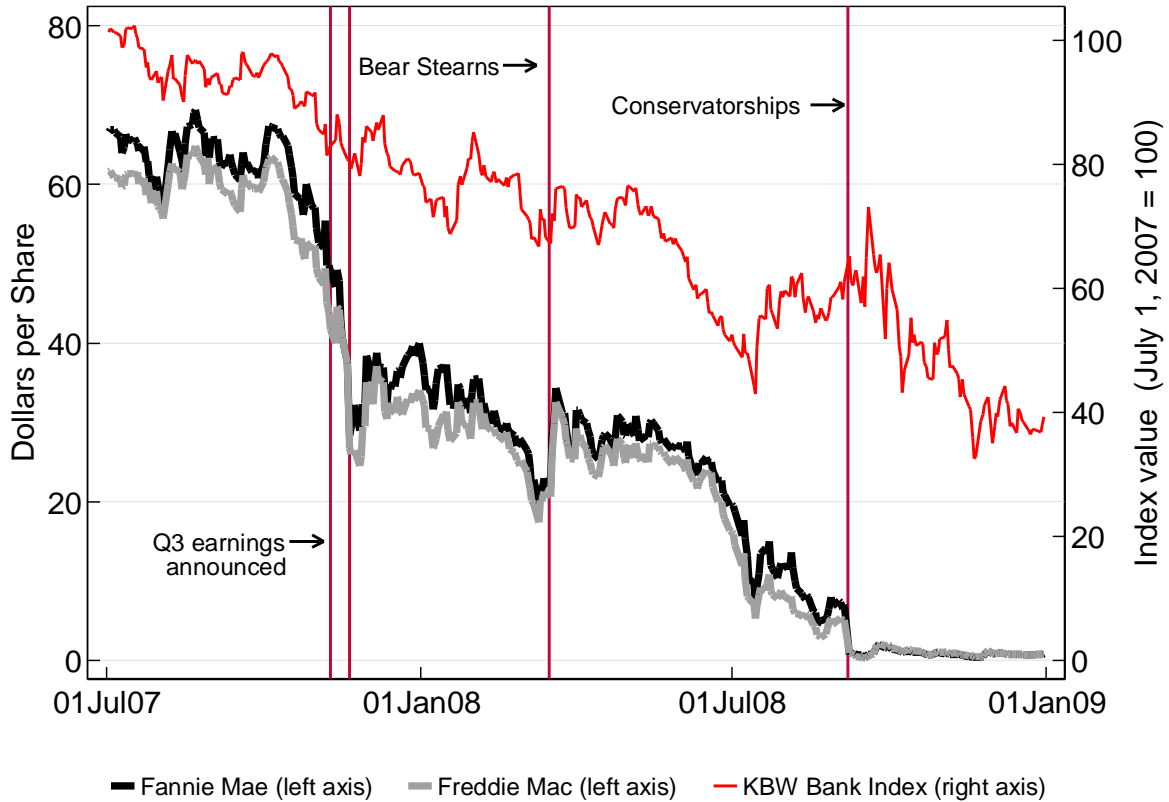
Figure 3: Jumbo-conforming spread



Source: Bankrate.

Notes: Unconditional difference in 30-year fixed rate mortgage interest rates between prime jumbo mortgages and conforming mortgages (monthly averages). Jumbo mortgages have a loan amount exceeding the conforming loan limit, making them ineligible for purchase or securitization by Fannie Mae and Freddie Mac.

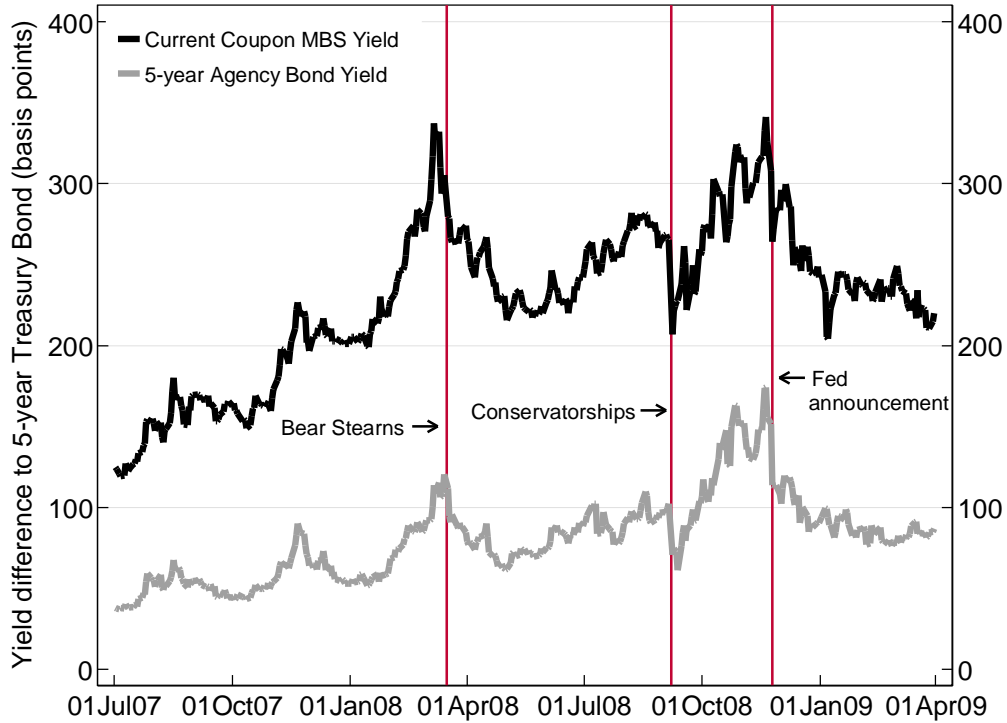
Figure 4: Fannie Mae and Freddie Mac stock prices, July 2007 - December 2008



Source: Bloomberg L.P..

Notes: Vertical lines mark November 9 and 20, 2007 (when Fannie Mae and Freddie Mac announced their earnings for the 3rd quarter of 2007); March 16, 2008 (Bear Stearns acquisition); and September 7, 2008 (conservatorship announcement).

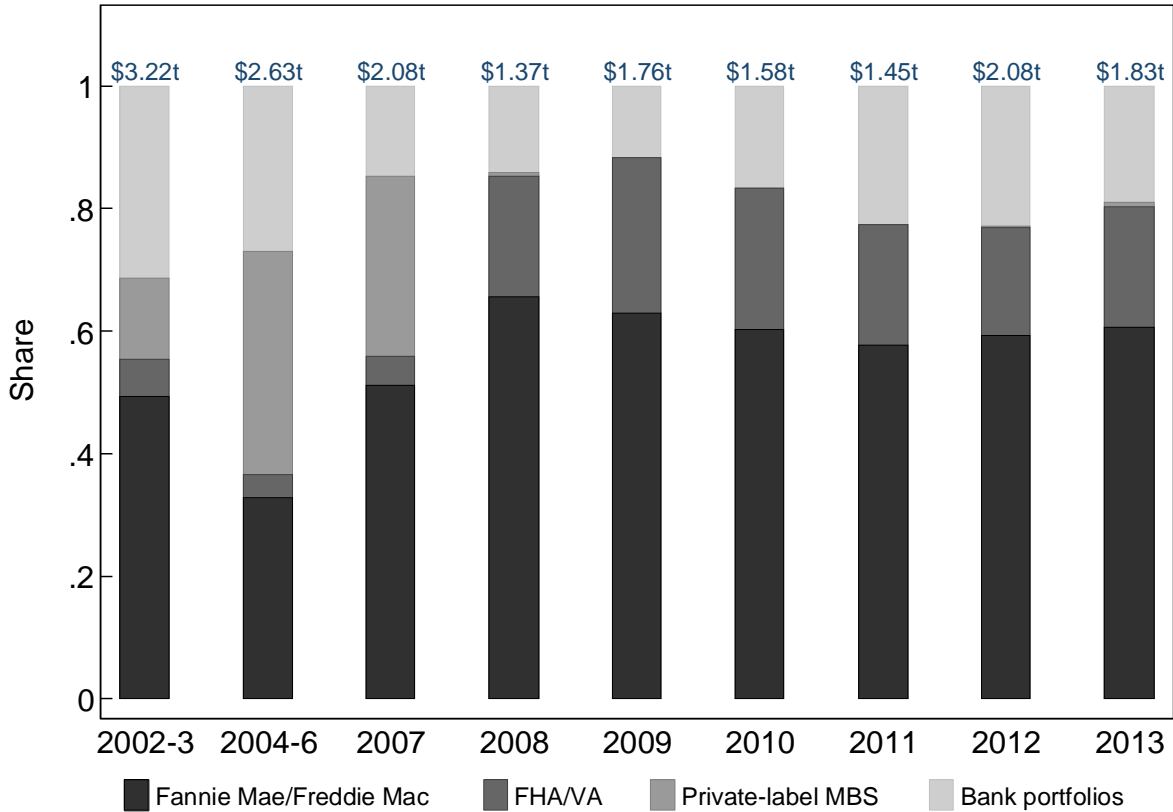
Figure 5: Yields on Fannie Mae debt and mortgage-backed securities, July 2007 – March 2009



Sources: J.P. Morgan Chase, FRED (Federal Reserve Bank of St. Louis).

Notes: Vertical lines mark March 16, 2008 (Bear Stearns acquisition); September 7, 2008 (conservatorship announcement); and November 25, 2008 (Fed asset purchase announcement. “Current Coupon MBS” refers to yield of hypothetical mortgage-backed security (MBS) trading at par (see Fuster et al., 2013, for details). The gap between MBS yields and Treasury or swap yields after accounting for the value of the embedded prepayment option (the “option-adjusted spread”) displayed qualitatively similar patterns over this period (not shown).

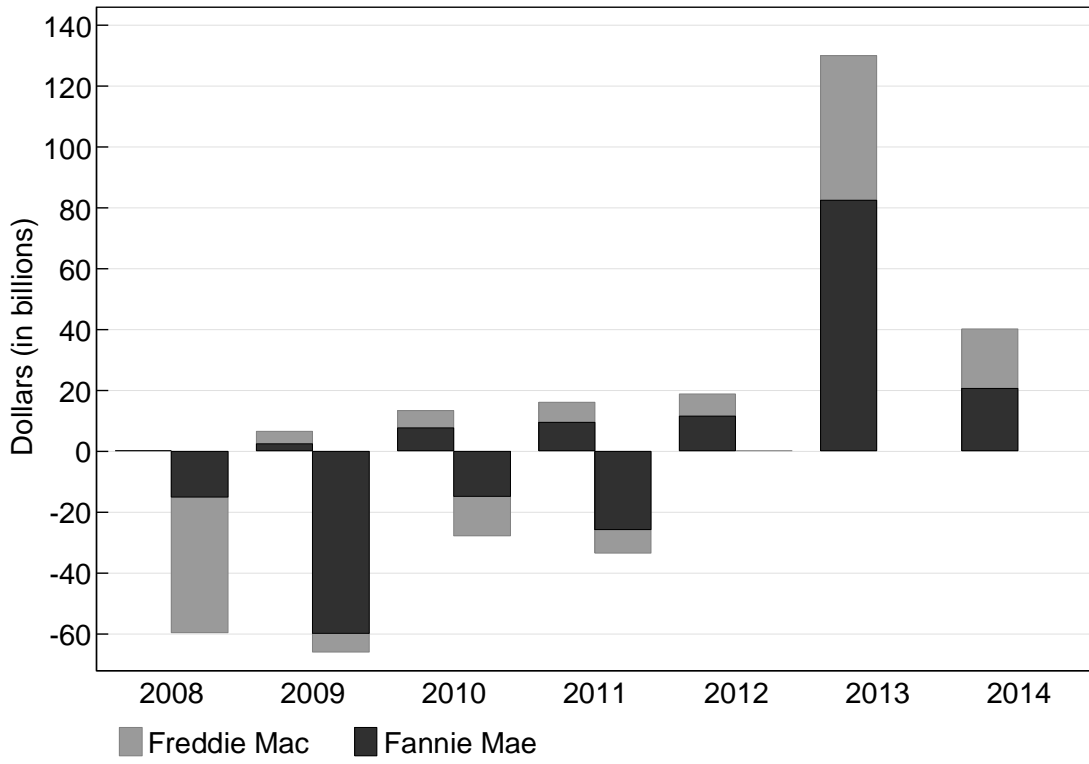
Figure 6: Shares of different funding channels for newly originated mortgages



Source: Inside Mortgage Finance.

Notes: Numbers at the top of each bar indicate total first-lien issuance for the year (in case of 2002-3 and 2004-6, these are annual averages). “FHA/VA” stands for Federal Housing Administration and the Veterans Administration, which are government agencies that insure loans that are then securitized in Ginnie Mae mortgage-backed securities.

Figure 7: Annual Treasury Draws and Dividend Payments, 2008-2014.



Source: Fannie Mae and Freddie Mac Financial Results Releases, 3rd quarter of 2014.

Notes: Negative numbers represent draws by Fannie Mae and Freddie Mac, positive numbers represent dividends paid to Treasury. Draws and dividend payments occur one quarter after profits or losses are made.

**Appendix for
“The Rescue of Fannie Mae and Freddie Mac”**

By W. Scott Frame, Andreas Fuster, Joseph Tracy and James Vickery

Contents:

1. Balance sheets of Fannie Mae and Freddie Mac as of June 2008
2. Risk characteristics of Fannie Mae and Freddie Mac mortgage purchases: 2002-2013
3. Fannie Mae and Freddie Mac default and foreclosure rates by vintage: 2002-2013
4. Chronology of events leading up to the conservatorships
5. Ownership of agency MBS and agency debt
6. Calculations underlying construction of Figure 1

1. Balance sheets of Fannie Mae and Freddie Mac

As of Second Quarter, 2008 (\$mil)

Assets	GAAP Value	
	Fannie Mae	Freddie Mac
Cash	\$13,681	\$43,553
Federal Funds, and Repurchase Agreements	\$35,694	\$15,265
Investment Securities	\$344,788	\$684,660
Mortgage Loans	\$418,231	\$89,069
Accrued Interest Receivable	\$3,651	\$6,247
Real Estate Owned	\$5,995	\$2,580
Guaranty Assets	\$10,258	\$11,019
Deferred Tax Assets	\$20,604	\$18,399
Partnership Investments	\$10,113	\$4,362
Other Assets	<u>\$22,903</u>	<u>\$3,889</u>
Total Assets	\$885,918	\$879,043
Liabilities		
Short-term Debt	\$240,223	\$326,303
Long-Term Debt	\$550,279	\$505,013
Subordinated Debt	\$9,000	\$4,496
Reserve for Guaranty Losses	\$7,450	\$5,345
Guaranty Obligations	\$16,441	\$14,022
Other Liabilities	<u>\$21,135</u>	<u>\$10,785</u>
Total Liabilities	\$844,528	\$865,964
Equity		
Preferred Stock	\$21,725	\$14,109
Common Stock	\$642	\$152
Other Paid-In Capital	\$3,994	\$864
Retained Earnings	\$27,898	\$26,128
Accumulated Other Comprehensive Loss	(\$5,738)	(\$24,180)
Treasury Stock	<u>(\$7,295)</u>	<u>(\$4,125)</u>
Total Equity	\$41,226	\$12,948
Memo: Off Balance Sheet Credit Guarantees (Net)	\$2,289,933	\$1,409,896

Notes: This table provides balance sheet information for Fannie Mae and Freddie Mac as of June 30, 2008. Balance sheet measures are presented at GAAP historical cost as reported in each firm's 10-K. Off-balance sheet credit guarantees are from each firm's "monthly summary" and net of their own MBS held on balance sheet.

2. Risk Characteristics of the Annual Flow of Conventional Single-Family Mortgage Credit Guarantees (Whole Loans and Agency MBS)

	Fannie Mae											
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total Volume (\$Billions)	\$804.2	\$1,322.2	\$588.1	\$537.0	\$524.4	\$659.4	\$583.0	\$700.3	\$607.8	\$558.3	\$836.0	\$733.2
	%	%	%	%	%	%	%	%	%	%	%	%
Origination LTV												
≤ 60%	23	29	23	22	18	17	23	33	30	29	25	22
60.01 – 70%	16	18	16	16	15	13	16	17	16	16	15	14
70.01 – 80%	42	38	43	46	50	45	39	40	38	37	35	35
80.01 – 90%	11	8	8	7	7	9	12	7	9	9	9	10
90.01 – 100%	8	7	10	9	10	16	10	3	5	7	8	12
FICO Credit Score												
< 620	6	4	6	5	6	6	3	*	*	1	1	*
620 to < 660	11	10	12	11	11	12	6	2	2	4	2	2
660 to < 700	18	18	19	19	20	19	14	7	7	10	7	7
700 to < 740	23	24	24	23	23	23	22	17	16	18	16	16
≥ 740	41	44	39	42	40	40	55	74	75	67	74	75
Product												
Fixed Rate – Long Term	66	63	62	69	71	76	78	82	72	67	74	76
Fixed Rate – Inter Term	25	27	16	9	6	5	12	15	22	26	23	22
Fixed Rate – Interest Only	0	0	0	1	6	9	2	*	*	*	*	*
Adj. Rate – Interest Only	1	1	5	9	9	7	4	1	1	1	*	*
Adj. Rate – Neg. Am.	1	1	2	3	3	0	0	*	0	0	0	0
Adj. Rate - Other	7	8	15	9	5	3	4	2	5	6	3	2
Occupancy												
Primary Residence	92	93	91	89	87	89	89	93	91	89	89	87
Secondary Residence	3	3	4	5	6	5	5	5	4	5	4	4
Investment	5	4	5	6	7	6	6	2	5	6	7	9
Purpose												
Purchase	30	22	43	47	52	50	41	20	22	24	21	30
Refinance – Cash Out	32	32	29	35	34	32	31	27	20	17	14	14
Refinance – Other	38	46	28	18	14	18	28	53	58	59	65	56

	Freddie Mac											
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total Volume (\$Billions)	\$533.2	\$701.5	\$354.8	\$381.7	\$351.3	\$466.1	\$357.6	\$475.4	\$386.4	\$320.8	\$426.9	\$422.7
		%	%	%	%	%	%	%	%	%	%	%
Origination LTV												
≤ 60%		29	23	21	19	18	24	34	28	29	25	22
60.01 – 70%		19	16	16	14	14	16	18	16	16	14	14
70.01 – 80%		40	46	50	54	49	40	41	39	37	32	36
80.01 – 90%		7	8	7	7	8	11	5	14 ⁽¹⁾	14 ⁽¹⁾	17 ⁽¹⁾	20 ⁽¹⁾
90.01 – 100%		5	7	6	6	11	9	2	3 ⁽²⁾	4 ⁽²⁾	7 ⁽²⁾	5 ⁽²⁾
FICO Credit Score												
< 620		3	4	4	5	6	3	0	1	1	1	1
620 to < 659		8	11	10	10	11	7	2	2	2	2	3
660 to < 669		17	20	19	19	19	15	7	8	8	8	10
700 to < 739		23	24	23	24	22	22	18	18	18	17	20
≥ 740		49	41	44	42	42	53	73	71	71	72	66
Product												
Fixed Rate – Long Term												
Fixed Rate – Inter Term												
Fixed Rate – Interest Only												
Adj. Rate – Interest Only												
Adj. Rate – Neg. Am.												
Adj. Rate - Other												
Occupancy												
Primary Residence		95	92	91	89	89	89	93	93	92	91	88
Secondary Residence		3	4	5	6	5	6	5	4	4	4	4
Investment		2	4	4	5	6	5	2	3	4	5	8
Purpose												
Purchase		19	40	44	53	47	41	20	20	22	18	27
Refinance – Cash Out		26	27	35	32	32	31	26	21	18	15	16
Refinance – Other		55	33	21	15	21	28	54	59	60	67	57

Source: Annual reports for Fannie Mae, Freddie Mac, and FHFA.

¹ Reports the % of Origination LTV between 80.01 – 100%

² Reports the % of Origination LTV above 125%

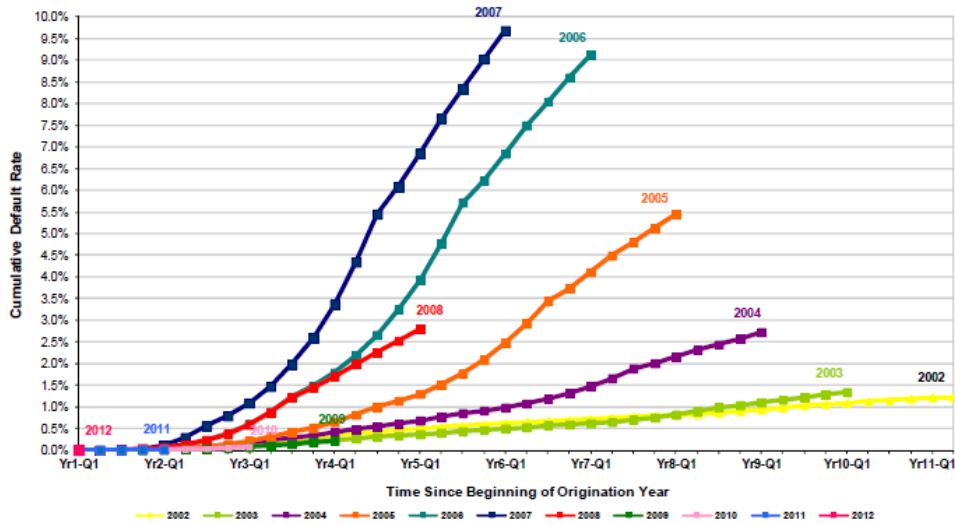
3. Cumulative Default Rates, by Origination Year

3a. Fannie Mae Cumulative Default Rates by Vintage

As of 2012:Q1 (top panel) and 2014:Q1 (bottom panel)

Fannie Mae Single-Family Conventional Cumulative Default Rates

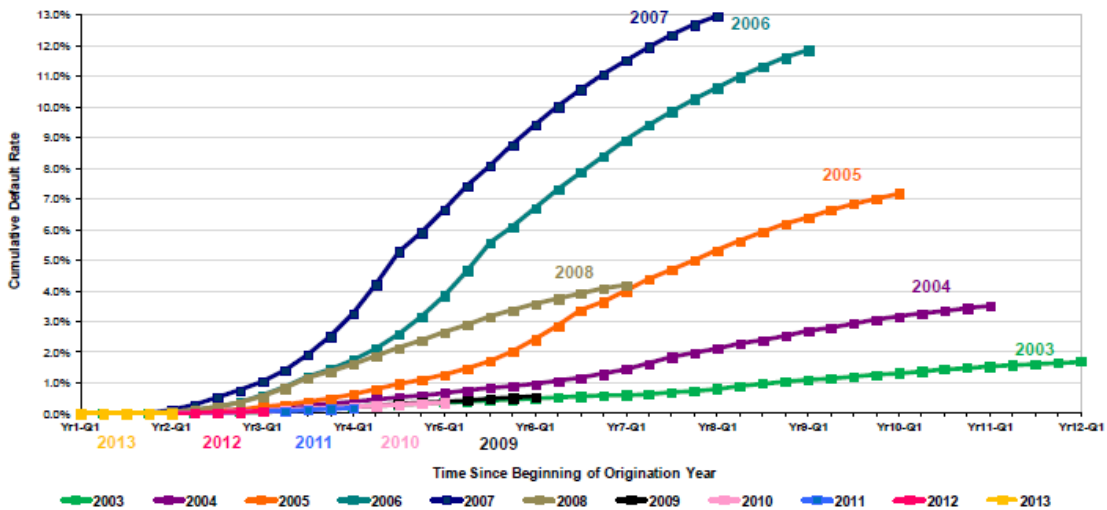
Cumulative Default Rates of Single-Family Conventional Guaranty Book of Business by Origination Year



Note: Defaults include loan liquidations other than through voluntary pay-off or repurchase by lenders and include loan foreclosures, preforeclosure sales, sales to third parties and deeds in lieu of foreclosure. Cumulative Default Rate is the total number of single-family conventional loans in the guaranty book of business originated in the identified year that have defaulted, divided by the total number of single-family conventional loans in the guaranty book of business originated in the identified year.

Data as of March 31, 2012 are not necessarily indicative of the ultimate performance of the loans and performance is likely to change, perhaps materially, in future periods.

Cumulative Default Rates of Single-Family Conventional Guaranty Book of Business by Origination Year

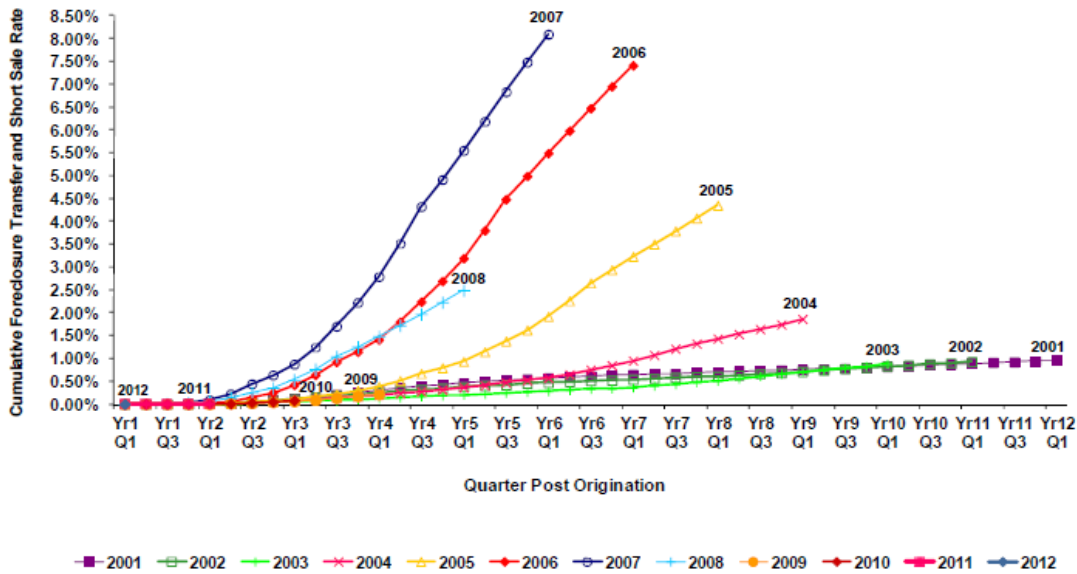


Note: Defaults consist of loan liquidations other than through voluntary pay-off or repurchase by lenders and include loan foreclosures, short sales, sales to third parties and deeds-in-lieu of foreclosure. Cumulative Default Rate is the total number of single-family conventional loans in the guaranty book of business originated in the identified year that have defaulted, divided by the total number of single-family conventional loans in the guaranty book of business originated in the identified year.

Data as of March 31, 2014 is not necessarily indicative of the ultimate performance of the loans and performance is likely to change, perhaps materially, in future periods.

3b. Freddie Mac Foreclosure Rates by Vintage
As of 2012:Q1 (top panel) and 2014:Q1 (bottom panel)

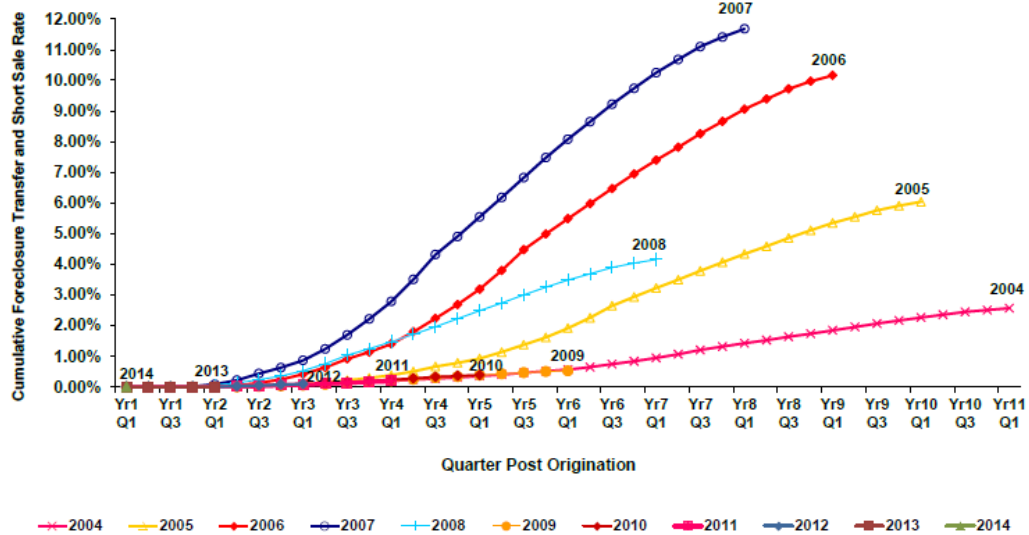
Single-family cumulative foreclosure transfer and short sale rates¹ by book year



¹ Rates are calculated for each year of origination as the number of loans that have proceeded to foreclosure transfer or short sale and resulted in a credit loss, excluding any subsequent recoveries, divided by the number of loans in the company's single-family credit guarantee portfolio. Includes Other Guarantee Transactions where loan characteristic data is available.

26

Single-family cumulative foreclosure transfer and short sale rates¹ by book year



¹ Rates are calculated for each year of origination as the number of loans that have proceeded to foreclosure transfer or short sale and resulted in a credit loss, excluding any subsequent recoveries, divided by the number of loans originated in that year that were acquired in the company's single-family credit guarantee portfolio. Includes Other Guarantee Transactions where loan characteristic data is available.

31

Sources for charts shown above:

Fannie Mae:

as of 1Q2012 (see slide #15): http://www.fanniemae.com/resources/file/ir/pdf/quarterly-annual-results/2012/q12012_credit_summary.pdf

as of 1Q2014 (see slide #17): http://www.fanniemae.com/resources/file/ir/pdf/quarterly-annual-results/2014/q12014_credit_summary.pdf

Freddie Mac:

as of 1Q2012 (see slide

#26): http://www.freddie.mac.com/investors/er/pdf/supplement_1q12.pdf

as of 1Q2014 (see slide #31):

http://www.freddie.mac.com/investors/er/pdf/supplement_1q14.pdf

4. Chronology of events leading up to the conservatorships

Date	Event	Source [html link]
August 2007	Non-Agency MBS issuance comes to a halt; jumbo-conforming mortgage interest rate spread begins increasing significantly.	Vickery and Wright (2013)
Feb. 13, 2008	Economic Stimulus Act temporarily raises conforming loan limit to up to \$729,750 (depending on local house price level).	Economic Stimulus Act
Feb. 27, 2008	OFHEO lifts temporary caps on size of the firms' investment portfolios.	Calculated Risk
March 16, 2008	Bear Stearns is acquired by JP Morgan Chase.	SEC Edgar Database Agreement and Plan of Merger
March 19, 2008	OFHEO reduces each firm's capital surcharge from 30 to 20 percent with a pledge by each firm to raise capital.	FHFA
July 7, 2008	Lehman Brothers report speculates that Fannie Mae and Freddie Mac will have to raise substantial capital under new accounting rules.	HousingWire
July 10, 2008	OFHEO releases statement declaring that Fannie Mae and Freddie Mac are "adequately capitalized."	OFHEO: quoted in Bloomberg
July 13, 2008	Treasury Secretary Paulson proposes three-part support plan for Fannie Mae and Freddie Mac: (1) temporary increase in the firms' line of credit with the Treasury; (2) temporary authority for Treasury to purchase equity in either firm if needed; (3) giving the Federal Reserve a consultative role in setting capital requirements and other prudential standards. The same day, the Federal Reserve announces that Fannie Mae and Freddie Mac are granted access to "discount window" lending.	Text of Paulson statement (reproduced on Bloomberg) Federal Reserve
July 30, 2008	President Bush signs the Housing and Economic Recovery Act of 2008, establishing FHFA as the regulator of Fannie Mae and Freddie Mac (succeeding OFHEO) and giving it the legal authority to place the firms into receivership.	Housing and Economic Recovery Act
Aug. 6/8, 2008	Fannie Mae and Freddie Mac announce second quarter losses of \$2.3bn and \$0.8bn respectively, noting adverse market developments during June and July.	SEC: Fannie Mae 10-Q SEC: Freddie Mac 10-Q
Sept. 6/7, 2008	FHFA places both firms into conservatorship. Treasury enters into senior preferred stock agreements (PSPAs) with each firm.	Statement by FHFA's Lockhart announcing conservatorship FHFA: terms of PSPAs
Sept. 15, 2008	Lehman Brothers files for Chapter 11 bankruptcy protection.	SEC: Lehman Brothers press release announcing filing
Nov. 25, 2008	Federal Reserve announces large-scale asset purchase program of \$100 billion in Agency debt and \$500 billion in Agency MBS.	Federal Reserve

Notes: HTML hyperlinks active at time of writing, but may no longer be functioning.

5. Estimated ownership of agency securities at time of the conservatorship

The first column of data in Table 5a presents estimated ownership of agency MBS based on data reported by Inside Mortgage Finance. The second column presents ownership shares of agency securities (including both agency MBS and agency debt, including obligations of the Federal Home Loan banks) from the Federal Reserve Flow of Funds.

5a. Ownership breakdown: agency MBS and agency debt securities

As of second quarter, 2008

Source:	Inside Mortgage Finance	Flow of funds
Set of securities considered:	Agency MBS	Agency and GSE- backed securities (debt and MBS)
Ownership shares (%)		
Government sponsored enterprises (GSEs)	18.3%	10.7%
Banks and other depository institutions	21.1%	16.9%
Securities Brokers & Dealers	2.3%	3.9%
Insurance Firms	8.4%	6.5%
REITs	0.9%	1.3%
Foreign investors	16.1%	20.9%
Pension funds and mutual funds	21.9%	19.2%
Government and other	10.9%	15.6%
ABS issuers	n/a	4.9%
Amount outstanding (\$bn)	4,799.7	7,888.8

Notes: Constructed from statistics reported in Inside Mortgage Finance and the U.S. Federal Reserve Flow of Funds table L.210.

Table 5b reports a breakdown of foreign ownership of long-term government sponsored enterprise securities, broken down into agency asset backed securities (which primarily consist of agency MBS) and other securities (which primarily consist of debt issued by Fannie Mae and Freddie Mac, although it also includes debt issued by the Federal Home Loan Banks). These data are taken from the Report of Foreign Portfolio Holdings of U.S. Securities.

5b. Breakdown of foreign ownership: agency securities

Value of foreign holdings by major investing country, as of June 30, 2008

Country	Agency long term debt (\$bn)		Total
	Asset-backed securities (ABS)	Other long-term agency debt	
China, mainland	369	158	527
Japan	121	149	270
Middle-East oil exporters	17	43	60
Cayman Islands	38	5	43
Luxembourg	21	8	29
Ireland	17	11	28
United Kingdom	16	10	26
Belgium	2	22	24
Netherlands	15	2	17
Switzerland	5	7	12
Canada	2	3	5
Rest of the world	150	273	423
Total	773	691	1464
Of which: holdings of foreign official institutions	435	532	967

Source: Table 5, Report on Foreign Portfolio Holdings of U.S. Securities produced by the Department of the Treasury, Federal Reserve Bank of New York and Board of Governors of the Federal Reserve System.

6. Calculations underlying construction of Figure 1

The figure is constructed from information in the FHFA 2013 report to Congress, and the Federal Reserve Flow of Funds.

Details of figure construction:

- Generally speaking, the figure reflects the size of retained and/or securitized single family mortgages for which Fannie Mae or Freddie Mac are liable for credit risk. Thus, the figure excludes multifamily mortgages and MBS, and also excludes portfolio holdings of loans and MBS already guaranteed by another Federal agency (e.g., a government sponsored enterprise or the FHA/VA).
- To avoid double counting, agency MBS retained in portfolio by the issuing firm are not counted as part of the guarantee portfolio (they are considered as part of the retained portfolio).
- For each firm, the guarantee and retained portfolio is calculated as follows:
 - MBS guarantees are calculated as total conventional MBS owned by third parties, from table 4a and 13a of the FHFA report to Congress. The figures reported are not inclusive of multifamily mortgages, or resecuritizations of MBS issued by others. (e.g. for FNMA in 2013, the total is \$2,505,614m).
 - Agency mortgage portfolio holdings are calculated as the sum of single family conventional whole loans (e.g., for FNMA in 2013, this is \$237,501m) plus securities issued by the firm in question held in portfolio and backed by single family mortgages (e.g., for FNMA in 2013 this is \$94,722m of FRMs + \$12,710m of ARMs = \$107,432m in total).
 - Note: securities held in portfolio but issued by government sponsored enterprises or by Ginnie Mae are not counted, to avoid double-counting and because the MBS is already guaranteed by another entity.
 - Private label holdings exclude holdings of nonagency MBS backed by multifamily properties. (e.g., for FNMA in 2013 total nonagency MBS held was \$30,854m, of which \$3,987m reflected MBS backed by multifamily loans; correspondingly, holdings of single family nonagency MBS are \$26,867m).

The graph then shows the sum of these calculations across the two firms. The market share calculation is normalized by total home mortgages as reported in the Federal Reserve Flow of Funds.

- For some categories, statistics were not reported by the FHFA for the early years of the sample. In these situations, figures were interpolated based on proportionate shares in the first year that the series became available.