

**Housing Policy, Subprime Markets and Fannie Mae and Freddie Mac:  
What We Know, What We Think We Know and What We Don't Know**

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**Abstract**

We explore the role of housing policy in the collapse of Fannie Mae and Freddie Mac, the role of Fannie and Freddie in subprime markets and the sources of their default losses. We do not find evidence that their crash was due much to government housing policy or that they had an essential role in the development of the subprime mortgage-backed securities market, which occurred outside of the normal mortgage origination channels and which was funded by non agency or “private label” securities (PLS). They did build a large portfolio of AAA-rated PLS, probably in response to affordable housing goals, but such investments were unlikely to have had much of an impact on subprime mortgage origination volume because the AAA pieces of PLS deals were not the important part of the deals. Rather than brewing for a long time, their downfall was quick and had to do with purchases of risky-but-not-subprime mortgages and insufficient capital to cover the decline in property values.

## I. Introduction

On September 7, 2008, the Federal Housing Finance Agency (FHFA), in conjunction with the Treasury Department and the Federal Reserve Board of Governors, placed Fannie Mae and Freddie Mac (the Government-Sponsored Enterprises or “GSEs”) into conservatorship. This was a major turnaround for two companies that had been highly profitable. Until then Fannie and Freddie had experienced default losses (charge-offs) that were generally less than five hundredths of a percent per year and default rates less than half those of the rest of the industry.

So far the government has injected \$148 billion in capital into the companies; this is on top of \$78 billion in capital that the two had in 2008 and have lost. At roughly 1% of 2010 U.S. GDP, Treasury preferred stock purchases to date have been in the range of taxpayer losses experienced during the Savings & Loan crisis.

Given the magnitude of the losses at the GSEs and the fact that the financial crisis seemed to have its origins in the residential housing finance market, some policymakers and commentators have suggested that the GSEs bear much of the responsibility for the financial crisis (cf. Greenspan, 2010, Wallison, 2008, Wallison and Calomiris, 2008, House Committee on the Budget, 2009, among others. This narrative tends to put particular emphasis on “affordable housing goals” that the GSEs were required to meet pushing them into taking on excessive risk and into making the market in subprime loans (e.g., Rajan (2010)). That Fannie and Freddie required an expensive taxpayer-financed rescue just years after they were identified as posing a systemic risk is consistent with this line of reasoning.

That narrative is not, however, well supported by data we have so far. We use data provided by the FHFA, Fannie Mae and Freddie Mac’s annual reports, monthly volume summaries, and quarterly credit supplements, as well as Loan Performance data collected by the General Accounting Office (GAO) to explore the changes in the mortgage market and nature of the GSEs’ holdings. We find that the growth of the subprime mortgage market was largely a non-GSE phenomenon: it occurred outside of the normal mortgage origination channels and was funded by non agency or “private label” securities (PLS). The GSEs did build a large portfolio of AAA PLS, probably in response to affordable housing goals, but such investments were unlikely to have had much of an impact on subprime mortgage origination, and they were not a large share of their credit losses.

They did ramp up risk-taking, but mostly not for “goals-related” reasons. Their increased risk-taking was in “nontraditional” loans that were not especially goals rich, and they lagged behind the market. They did not purchase nontraditional mortgages in any quantity until the U.S. homeownership rate had already peaked in 2005. The bulk of risky mortgages the GSEs did acquire or guarantee after 2005 were not “subprime,” but largely “Alt-A” mortgages that were made to borrowers with “prime” credit scores and relatively sizeable equity contributions. The

magnitude of GSE credit losses is mostly attributable to a combination of acquisition of Alt-A and other “prime-like” mortgages and making the purchases at the height of the housing bubble. We do not have sufficient data to assess relative importance of the two, but indirect evidence suggests a very large share was due to property value declines.

## II. Recent History

Between 1990 and 2000, total household mortgage debt increased at a 6.8% annualized rate, while the growth in the dollar value of home mortgages financed by the GSEs grew about one-third faster, at 9% per year. By 2003, Fannie Mae and Freddie Mac accounted for 52.3% of all residential mortgage loans outstanding (Federal Reserve and Monthly Funding Summaries). The following year, GSE market share of newly originated mortgages fell precipitously and remained low for the next three years: during 2001-2003, the GSEs funded nearly 70% of all mortgages originated; from 2004-2006, the GSE share of new mortgages was 47%, 41%, and 40%, respectively (see Table 1).

(INSERT TABLE 1 HERE)

From 2003 to 2007, the growth of outstanding mortgage debt accelerated to 11.9% per year but the volume of outstanding mortgages financed by the GSEs rose by just 7.6% per year. On a cumulative basis, the overall mortgage market grew 31% faster than the volume of mortgages funded by the GSEs over this period. This shift involved two related developments: (1) the share of total outstanding mortgage debt financed by the issuance of “nonagency” or “private label” asset-backed securities (PLS) grew by 219% over this period; and (2) the origination of non-traditional mortgage products, like subprime (generally poor credit history and other negative attributes like low downpayments and less than full documentation) and Alt-A loans (seemingly prime but with a flaw, typically low documentations) that would not normally meet GSE underwriting criteria also grew exponentially. These factors were associated with the share of mortgages financed by the GSEs falling from 52% at the end of 2002 to 44% at the end of 2006 (See Chart 1).

(INSERT CHART 1 HERE)

In 2000, securitization vehicles (entities classified as asset-backed security issuers and finance companies by the Federal Reserve) financed \$572 billion in residential mortgages, equal to nearly 12% of all household mortgage debt outstanding. By the end of 2006, the volume of outstanding mortgages financed by PLS had grown to over \$2.6 trillion, or more than 27% of all residential mortgage debt. The most explosive growth occurred in 2004 and 2005 when the outstanding mortgage debt financed by PLS increased by 49% and 44% respectively. It is important to note that these growth rates reflect net annual changes in total mortgage debt; when

refinancings of existing PLS-funded mortgages are included, the growth rates on gross PLS issuance during these years exceed 90%.

The dramatic growth in PLS issuance was the capital markets' manifestation of the increase in the origination of nontraditional mortgage products outside of the GSE channel. According to the Government Accounting Office (GAO), "nonprime" mortgage loans (subprime plus Alt-A) accounted for 34% of the overall mortgage market in 2006. From 2001 to 2005, the dollar volume of subprime mortgages increased from \$100 billion to \$600 billion, while Alt-A mortgages grew from \$25 billion to \$400 billion over roughly the same period. As with the growth in PLS outstanding, the volume of subprime and Alt-A mortgage origination increased most dramatically in the middle of the decade. Combined annual subprime and Alt-A origination grew from an estimated \$171 billion in 2002 to \$877 billion in 2005, an annualized growth rate of 72%.

(INSERT CHART 1 HERE)

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### **III. Fannie and Freddie PLS Portfolios**

The growth of the nontraditional mortgage market was largely a non-GSE phenomenon in that it occurred outside of the normal origination channels and was financed by the issuance of nonagency securities (Meyer, Pence, & Sherlund, 2009). However, both Fannie Mae and Freddie Mac were major buyers of these securities. Fannie and Freddie acquired large amounts of subprime PLS because, in the words of their regulator, these securities were "goals rich" (Lockhart, 2009). Fannie and Freddie were required to meet affordable housing goals, set annually by the Department of Housing and Urban Development (HUD) in accordance with The Federal Housing Enterprises Financial Safety and Soundness Act of 1992. The purchase of PLS backed by subprime mortgages counted toward meeting these goals because the underlying mortgages tended to be made to less-than-median-income borrowers or were collateralized by properties in "underserved areas" (HUD, 2010).

(INSERT TABLE 2 HERE)

In testimony before the Financial Crisis Inquiry Commission (FCIC), former Federal Reserve Chairman Alan Greenspan (2010) argued that it was the supportive bid provided by the GSEs for subprime PLS during 2003-2004 that caused mortgage yields to fall relative to 10-year Treasury notes, “exacerbating the house price rise which, in those years, was driven by interest rates on long-term mortgages.” Because these purchases were made in pursuit of affordable housing goals, Greenspan argues “a significant proportion of the increased demand for subprime mortgage backed securities during the years 2003-2004 was effectively politically mandated, and hence driven by highly inelastic demand.” By acquiring 40% of all PLS collateralized by subprime mortgages, Fannie and Freddie stoked demand for risky mortgages that contributed directly, in Greenspan’s telling, to the housing bubble and subsequent financial crisis. Similar points were made in Rajan (2009).

(INSERT CHART 2 HERE)

The data support Greenspan’s claims regarding the size of the GSEs’ PLS purchases (see Chart 2), but do not support the rest of his thesis. In 2003-2004, Fannie and Freddie combined to purchase an estimated \$214 billion in subprime PLS, or roughly 40% of all subprime securities issued, which represents more than a three-fold increase over the amount of subprime PLS purchased in 2001-2002. GSE purchases generally hovered around 30% of the subprime market for much of the decade until the market collapsed in 2007.

While the sheer magnitude of GSE purchases would seem to provide an important source of demand for subprime loan collateral, this was unlikely the case due to the specific type of securities purchased. A typical PLS involves a “waterfall” payment structure. Instead of a traditional “pass-through,” the ABS note holders are paid according to their seniority, with senior tranches getting paid first and suffering losses from defaults on the underlying collateral, if any, last. The size of the tranches is chosen to achieve AAA ratings on the senior portion(s), with the amount of subordinated securities adjusted as necessary to provide the overcollateralization required by rating agencies. Fannie and Freddie were almost exclusively buyers of the AAA piece of the PLS. According to Freddie Mac’s 2006 Annual Report, “more than 99.9 percent” of its PLS were rated AAA. Until 2007, Fannie Mae also bought exclusively AAA PLS and added only “limited amounts” of other investment grade PLS in 2007 (Fannie Mae, 2007).

That the GSEs invested in AAA tranches is significant because it largely undercuts claims that GSE purchases had a significant effect on subprime mortgage origination or the pricing of these

securities. A common theme among research that has examined the causes of the financial crisis is the “insatiable demand” that existed for safe, dollar-denominated debt. Acharya and Richardson (2009) emphasize that securitization existed to create AAA tranches, which appealed to many classes of potential investors. As explained by Brunnermeier (2009), some of those investors were money market and pension funds limited by law or investment policy to invest only in AAA assets, while others were leveraged hedge funds attracted to AAA securities because of their low haircuts and potential for greater leverage (Shleifer and Vishny, 2009).

A major source of demand for AAA assets came from foreign institutional investors. Caballero (2010, 2009) argues that global payment imbalances were the manifestation of “global excess demand” for AAA securities that placed “enormous pressure on the U.S. financial system and its incentives.” Similarly, Gourinchas (2010) argues that excess demand for AAA assets “created an irresistible profit opportunity for the U.S. financial system” to create and market “safe” asset-backed securities to the rest of the world. Diamond and Rajan (2009) find that “securitization became focused on squeezing out the most AAA paper from an underlying package of mortgages” because, according to Gorton and Metrick (2009), “there is not enough AAA debt in the world to satisfy demand.” Hull (2009) offers the same critique. Indirect evidence of strong demand can be found in the market for synthetic securities that mimicked the returns of actual ones, because there were not enough actual ones to sell.

Given this context and the apparently elastic demand for AAA securities, it is difficult to believe GSE purchases of AAA tranches of subprime PLS had any material impact on pricing or issuance volume. To acquire AAA subprime PLS, the GSEs issued agency debt, another AAA instrument. Thus, the net effect of these acquisitions was to leave the global supply of AAA rated securities unchanged.

It is also important to note that the duration of the top tranches of these securities was exceptionally short. As Gorton (2008) explains, the expectation was for the underlying mortgage collateral to be refinanced in two years with any amortization of principal prior to the refinancing generally directed to the AAA tranches purchased by the GSEs. Although Fannie and Freddie combined to purchase nearly \$600 billion of subprime PLS between 2000 and 2007, their combined holdings of subprime PLS did not likely exceed \$200 billion at any given time. At the end of 2008, the GSEs reported combined subprime PLS holdings of \$154.6 billion, another \$62.5 billion of Alt-A PLS, and \$19 billion of residential mortgage PLS not otherwise classified.

The key to the completion of the PLS market was identifying a purchaser for the risky and illiquid junior pieces that provided the subordination to support the AAA rating on the senior tranches. Some of the bids for junior pieces were provided by hedge fund managers who preferred their illiquidity both because of the profit opportunity provided by valuation challenges

and because thin trading provides the manager with some flexibility with respect to fair values (Brunnermeier, 2009). The other major source of funding for these tranches came from collateralized debt obligations (CDOs), which sought ABS collateral because of the discount to like-rated corporate bonds (Moody's, 2000).

More significantly, CDOs provided a mechanism to transform junior tranches of PLS into additional AAA securities to meet “insatiable” global demand. The data show that the share of junior tranches sold directly to investors declined over the period, suggesting that more of these tranches were purchased by CDO managers (Thomson Reuters, 2010). Neither GSE acquired junior pieces of securitizations or had any exposure to CDOs (Fannie Mae, 2007, p. 97; Lockhart, 2008). Fannie and Freddie could not use CDOs for goals credit. On the importance of the CDO market see Mason and Rosner (2007).

Like all investors in subprime PLS, the GSEs suffered large mark-to-market losses on these positions. Roughly 90% of PLS held in GSE portfolios suffered credit rating downgrades (FHFA, 2010). In 2008, Fannie Mae and Freddie Mac suffered a combined \$84 billion of losses on portfolio investments (including losses on derivatives used to hedge assets or liabilities). While \$24 billion reflected permanent impairments on PLS, much of the rest reflected temporary fair value losses caused by unusually depressed market conditions. While the exceedingly high default rates on subprime and Alt-A mortgages have eviscerated most of the protection provided by subordination and overcollateralization, the ultimate losses to the AAA tranche need not be particularly especially large. Loss rates of 15% erode the economic value of a AAA tranche that once had 20% overcollateralization but does nothing to diminish ultimate payments to the note holder unless things get even worse.

Both GSEs have written up the value of their investment portfolios by a combined \$62 billion in 2009-2010. By the estimates of the FHFA, losses on PLS investments and derivatives have accounted for \$21 billion or just 9% of total GSE losses (net of income from the securities) since the end of 2007; losses on subprime PLS (*not* net of income from the securities) were \$18 billion (about 10% of overall portfolio credit losses.<sup>1</sup> This suggests that the subprime PLS business has (net) accounted for around 5% of their losses.

#### **IV. Affordable Housing Goals**

While the GSEs were likely attracted to the same extra yield on “safe” securities that made AAA PLS tranches attractive for other classes of investors, it seems reasonable to believe that affordable housing goals motivated these purchases. As explained by FHFA, PLSs were a major

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<sup>1</sup> See Conservator Report (2010).

channel through which the GSEs fulfilled their affordable housing goals. They had high ratings and were seemingly well protected by subordination. They were goals intensive, and they were short term. Because the goals were in terms of the flow purchases, rather the stock held, they could get credit for housing goals by what was essentially rolling over of the existing stock. As a result they could buy 30 to 40 % of the amount issued, but only hold around 15% of the outstanding stock.

There are two possibilities for a firm's reaction to a regulatory constraint. One is that the constraint is not binding; Fannie and Freddie might have wanted to do goals-rich lending anyway, in which case the regulations were not causal. Alternatively they were constraining, in which case profit maximizing firms will try to find least cost ways of complying. AAA PLS by and large had high levels of subordination, typically 20%, which were consistent with 40% of the loans in the pool defaulting and recovery rates of only 50%. By historical standards those were very big losses. More recently, Hull and White (2010) have come to the conclusion that AAA ratings for ABS were not unreasonable; though that was not the case for AAA ratings of CDOs. A likely explanation for the growth of PLS holdings was a way of minimizing the costs of complying with the goals.

The data are consistent with subprime PLS purchases by Fannie and Freddie being little more than reshuffling paper without changing what was originated.

PLS issuers assembled AAA tranches specifically for the GSEs that were targeted to satisfy specific goals and subgoals (FHFA, 2010). In 2007 (2006 10-K, page 16), Fannie Mae lamented the decline in subprime origination that year: "because subprime mortgages tended to meet many of the HUD goals and subgoals," the decline in subprime origination "has further limited our ability to meet these goals." Indeed, the collapse of the PLS market caused HUD in April 2008 to declare the low- and moderate-income and special affordable home purchase subgoals infeasible. FHFA took the same step in 2009 and as part of its 2010 goals rulemaking proposes to "exclude PLS from counting for purposes of the affordable housing goals." Affordable housing goals are now much less stringent, at least with respect to the overall goals and the home purchase subgoals.

Would the housing market have developed differently had these goals been less stringent? It is hard to tell, but unlikely. This is not only because demand for AAA securities would have continued to provide an incentive to securitize subprime mortgages, but also because the market's development was endogenous to the affordable housing goals themselves. That is, Fannie and Freddie were not leaders in share of low income lending. The growth of the subprime market caused the GSEs' mortgage portfolio to lag the market with respect to loans made to lower income borrowers, minorities, as well as loans made in underserved areas targeted by HUD (Case, Gillen, & Wachter, 2002). The purpose of HUD's 2004 affordable housing goals was to close the gap "so that by 2008 [GSE purchases] would equal the projected shares of goal-qualifying units financed in the primary mortgage market." The 2004 affordable housing goals



rule makes repeated reference to the GSEs' low market share for loans made to "affordable and low- and moderate-income borrowers and underserved neighborhoods" and also references a Congressional Budget Office (CBO) report estimating that the "funding advantage" created by the implicit guarantee and explicit advantages of GSE status "resulted in a \$19.6 billion annual combined subsidy for both GSEs" in 2003.

The message sent by the rule is that the GSEs do not deserve the special privileges afforded by their charter if they badly lag the "private market" with respect to funding affordable mortgages. Attributing the housing bubble to an exogenous shock introduced by overzealous regulators is simply wrong. The affordable housing goals clearly reflect a presumption that entities sponsored by the government should do as much to meet social goals as "purely private" purchasers and, in some cases, lead the market. To a large extent the goals were set to catch up with rest of the market. One can certainly argue that the goals were bad policy (an ineffective and inefficient way of providing a subsidy), but they were not the driver of the market. Had the subprime market not already developed, the goals would have been lower.

Further evidence of the relative unimportance of the goals is Jaffee (2010), who points out that: incentives were weak because when Fannie and Freddie fell short of their goals nothing happened, the goals prohibited many subprime products and Fannie and Freddie appeared to "cherry pick" among the set of eligible loans (Jaffee and Quigley (2007)). Jaffee too comes to the conclusion that the goals had little to do with losses.

## **V. Risk Characteristics of the GSE Credit Book**

The recent report by FHFA (FHFA (2010)) has dissected the deterioration in Fannie and Freddie capital since 2008. The deterioration has been \$226 billion, \$148 of which has been covered by capital injections from the government, and \$78 billion was their own capital in 2008. The report also breaks down losses by loan type. The data are not perfect; they depend on estimates of future losses, which will be revised as actual losses differ from expected. But the results are sufficiently sharp to suggest that the story is likely to hold up.

According to FHFA, losses on mortgages purchased or guaranteed accounted for \$166 billion, or 73%, of the GSEs' combined losses from the start of 2008 to the second quarter of 2010 (the remaining 18% of losses come from multifamily, dividends to Treasury, and accounting changes). The bulk of these losses have come from mortgages originated in 2006 and 2007, with 2007 having the nastiest characteristics. While mortgages from these vintages account for 34% of all mortgages guaranteed by the GSEs at year-end 2008, they have produced between 63%

and 71% of cumulative credit losses. The increased share of “nontraditional and higher-risk mortgages” in these vintages is frequently blamed for the credit losses. Jaffee (2010) argues the “GSE high-risk mortgage purchases and guarantees” during this period “helped fuel the housing bubble and financial crisis.” He cites data from Edward Pinto (2009) and the GSE credit supplements to argue that more than 40% of the loans acquired or guaranteed by the GSEs in 2004-2008 were “high risk.” The combined losses on guaranteed mortgages are thought to be the manifestation of the large increase in the volume of “high risk” mortgages purchased during this period.

Although this is an easy explanation for the spike in credit losses, it is not immediately clear what makes certain categories of mortgages “high risk.” Properties that deviate from those of “traditional” mortgages are unlikely to have the same marginal impact on default probabilities; for interest it is not clear why interest-only loans should be put in the same risk bucket as low down payment or low credit score loans, or why the latter should be put into the same category as loans with both low down payment and low credit scores. Furthermore, placing discrepant mortgages into a “high risk” bucket because of elevated *realized* default rates introduces hindsight bias that could compromise the validity of the causal relationship. Given the decline in house prices after 2006, anything originated around then was likely to have problems.

Evaluation of the GSEs’ exposure to “high risk” mortgages requires the identification of those properties that give rise to high *ex ante* default probabilities rather than those properties shared by mortgages found to have high *ex post* credit losses.

(INSERT TABLE 3)

The most obvious and well-defined characteristics that heighten default probabilities are low FICO scores and high loan-to-value (LTV) ratios (Demyanyk and Hemert, 2009). As seen in Table 3, the share of loans purchased with low FICO scores (below 620) did not change measurably over the course of the decade. High LTV loans (loan balances greater than 90% of the value of the house being financed) also comprised a relatively low share of annual purchase volume; although high LTV loans guaranteed in 2007 were high relative to 2005, their share over the entire period shows no well-defined upward trend. The share of mortgages with both characteristic – i.e. high LTV loans made to borrowers of poor credit quality – was very small as a share of the GSEs’ combined credit book (see Table 4). As of June 30, 2008 – the last financial disclosures made prior to conservatorship – the GSEs combined to hold \$44 billion in such mortgages, equal to just 0.97% of their combined \$4.5 trillion book of business (excluding PLS securities). When including high LTV loans made to borrowers with FICO scores above 620 (\$379 billion) and lower LTV loans made to borrowers with lower FICO scores (\$160 billion), the total volume of “high risk” mortgages is \$582 billion or 12.9% of the overall credit

book (again, refer to Table 4). It is also important to note that 93% of high LTV loans were credit-enhanced, which means that the loans either had primary mortgage insurance (which covers most but not all of the losses), an embedded put option, or some other feature that limits ultimate losses.<sup>2</sup>

(INSERT TABLE 4)

Of the remaining \$3.921 trillion in mortgages guaranteed by the GSEs as of June 2008, \$463 billion were “Alt-A.” (Of the \$497 billion Alt-A mortgage total, \$34 billion were high LTV loans or low FICO loans otherwise captured in the data. A summary of the combined Alt-A portfolio is available in Table 12). As explained by Fannie Mae, an “Alt-A mortgage loan” generally refers to a mortgage loan that can be “underwritten with reduced or alternative documentation than that required for a full documentation mortgage loan but may also include other alternative product features.” Alt-A loans were a “complementary product” that were sourced through “traditional lenders that largely specialize in originating prime mortgage loans” (Freddie Mac, 2007, p. 94). A question that requires further research is the extent to which losses were due to “flow” purchases of new mortgages or “bulk” purchases of seasoned loans.

The risk posed by an Alt-A loan is difficult to parameterize because it concerns the economic value of the incremental private information unknown at the time the mortgage is purchased. This risk was thought to be attenuated by relationships with “traditional lenders” and more conservative underwriting with respect to the available information. Relative to the overall credit book, Alt-A mortgages were half as likely to be made to a borrower with a FICO score below 620 or have an LTV above 90 (see Table 5, which scales the underwriting criteria for each category of loans by the value for the overall book; the 0.46 for Alt-A loans with FICO<620 means that the percentage of Alt-A loans with low FICO scores was equal to 46% of the percentage of all loans with low FICO scores). The average FICO scores and LTVs on Alt-A loans were roughly the same as the overall credit book.

(INSERT TABLE 5)

The additional “risky mortgages” identified by Jaffee are those with nontraditional amortization schedules: interest only and negative amortization loans (option adjustable rate mortgages are also included in the “NegAm” category). First, one should avoid double-counting these loans. According to Fannie Mae data, 45% of negative amortizing loans were Alt-A, as were 42% of interest-only loans. In total, \$161 billion of interest only loans were classified as Alt-A (the combined figure could not be reported for negative amortization loans because Freddie Mac does not provide this breakdown).

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<sup>2</sup> A missing piece of the puzzle so far is the rise of “silent second” loans, which are second mortgages not recorded at time of origination of the first mortgages and not recorded in the pool data. There is some reason to believe (see Ashcraft and Scheuerman (2009)) that these mortgages increased very rapidly around 2004.

As with Alt-A, loans with nontraditional amortization features were more conservatively underwritten. Negative amortizing loans were one-ninth as likely to have LTVs greater than 90 as the overall credit book; interest-only loans were 25% less likely to have LTVs above 90. While the percentage of negative amortizing loans with low FICO scores was somewhat higher – 8.5% of these loans versus 4.47% of all loans – interest only loans were half as likely to be made to borrowers with low FICO scores. Given that the risk posed by nontraditional amortization schedules is higher residual mortgage balances, it is not surprising that the underwriting adjustment focuses on LTV rather than FICO scores (at least as it concerns negative amortization loans) because the default sensitivity to FICO score should be no different than for other mortgages.

(INSERT TABLES 6 AND 7)

Breaking down “high risk” mortgages into specific categories allows one to compare informal *ex ante* estimates of various characteristics’ marginal contribution to default likelihood to realized default rates (as measured by serious delinquencies and loss rates). As seen in Table 6, the delinquency rates on the various categories of mortgages differ greatly, but not necessarily in ways that are in line with expectations. Beyond the classic “subprime” mortgages with low FICO scores and high LTVs, the mortgages with the highest delinquency rates are those with nontraditional amortization features. While no breakdown is available, one could reasonably surmise that the large share of such mortgages labeled Alt-A also contributes substantially to that category’s elevated default rate as well.

Table 7 provides delinquency rate by four states – California, Florida, Arizona, and Nevada. The divergence in delinquencies by state is nearly as great and adds a different perspective to the discussion. Each of these states had house price boom and busts: cumulative price increases ranged between 93% and 125% in these states compared to a cumulative 47% increase in national house prices during 2001-2005 (FHFA purchase index, 2010). In the 2006-2009 period, house prices in these states fell by between 33% and 49%, well in excess of the 7.7% cumulative national decline (see Table 10).

(INSERT TABLE 8)

Table 8 scales average delinquency rates in the various categories as a multiple of the overall default rate on GSE mortgages. For example, the average default rate on high LTV mortgages (roughly 10%) is 2.22-times the overall default rate on GSE mortgages (just under 4.5%). The mortgages with the highest default rates are interest only loans, which are more than four times as likely to be seriously delinquent as the overall book. Next are negative amortization loans, followed by loans made to low-FICO borrowers, Alt-A mortgages, and all mortgages in the state

of Nevada. Table 9 scales credit losses during 2008, 2009, and 2010 as a multiple of total loans in that category. For example, since interest only loans accounted for only 8% of Fannie Mae's total book of business, but 34% of its 2008 credit losses, the 2008 multiple for this category was 4.25. Measured as the ratio between the share of total credit losses and the share of total mortgages, Nevada loans are actually the riskiest category of loans (see Table 9).<sup>3</sup>

(INSERT TABLES 9 and 10)

What made loans in Nevada risky? Twenty-two percent of agency loans in Nevada were classified as Alt-A, twice the national rate. As of June 2010, 17.5% of Fannie Mae's Nevada loans were interest only, roughly three times the national rate of 6.1%. An additional 1.6% of Fannie's Nevada loans had negative amortization features, which was four times greater than the national average of 0.4% (see Table 11). What Nevada did not have was a high concentration of "subprime" loans: the concentration of loans with borrower FICO scores of under 620 were 30% less than the national average and the percentage of loans with initial loan-to-value ratios of 90 or higher was nearly 10% less than the national average, 9.7% compared to 10.4% for the national credit book.

The problem was the dramatic downturn in prices. During 2006-2009, house prices in Nevada fell by 49% on a cumulative basis. By June 2010, two-thirds of Fannie Mae loans in Nevada were thought to be underwater. Half had LTVs of greater than 125% (8 times the national average) and the weighted average mark-to-market LTV stood at 129%. Agency loans in Nevada were 2.85 times as likely to be in nonaccrual status as the national average, with 2010 credit losses from Nevada loans five times greater than their share of the overall credit book.

(INSERT TABLE 11)

The experience of Nevada points to other trends in the data. Only 1% of negative amortization loans and 7% of interest only loans had original LTVs in excess of 90, yet 80% of negative amortization loans and 83% of interest only loans were concentrated in the four states – California, Nevada, Florida, and Arizona – that experienced cumulative price declines that were between 4.35 and 6.41 times as severe as the national decline in house prices (see Tables 10 and 11). Even more remarkable is that by June 2010, the categories of mortgages with the lowest share of high LTV loans – negative amortization (less than 1%), Alt-A (4.8%), and interest only (7%) – had the highest share of underwater mortgages (compare the second and last lines on Table 5). While the mark-to-market (MTM) credit book-wide LTV ratio has increased by between 2 and 3 percentage points, the average LTV on interest only and negative amortization loans have increased by 30 percentage points since origination. The mark-to-market average

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<sup>3</sup> This excludes loans with "risk-layering," i.e. loans with both high LTV and low FICO scores. All loans with either characteristic are included so as to identify the marginal contribution of high LTV and FICO independent of the other.

LTV on Alt-A loans is 20 percentage points higher than the average LTV at origination. Even though interest only loans were 25% less likely to have an LTV in excess of 90 as all mortgages, by 2010 they were more than 4 times as likely to be underwater as the rest of the book of business.

(INSERT CHART 3)

Would Alt-A, interest-only, and negative amortization loans really appear to be so high-risk had the average LTVs on these loans increased by between 20 and 30 percentage points? Absent loan level data, which are not available, it is very difficult to estimate what the performance of these loans would have been had the states with high concentrations of these loans experienced price declines closer to the national average. That is especially true because these mortgages may have been made in response to declines in affordability and would not have been made in the absence of dramatic price increases. The correlation between the number of Alt-A mortgages as a percentage of total housing units and cumulative price increases from 2001-2005 is 76% (Federal Reserve Bank of NY, 2010). The correlation between the percentage of Alt-A loans as a percentage of all loans and cumulative price increases in California, Arizona, Florida, and Nevada, and Michigan is 87%. It is not clear in what direction causality runs in this relationship.

One could as easily argue that the availability of nontraditional mortgage products inflated housing prices in these states and the greater concentration of such mortgages was a cause of, rather than a symptom, of the bubble. Yet, even if one accepts that these products inflated housing prices, the GSEs did not begin to purchase these mortgages in large quantities until the second half of 2005 – just as house prices in each of these states was reaching its peak. Particularly notable is that nearly 90% of all interest-only loans were acquired between 2005 and 2007 (see Table 4). The most that could be said about the GSEs' 2006 and 2007 Alt-A mortgage purchases is that they helped temporarily to stabilize house prices in these states at unsustainable levels.

(INSERT CHART 4)

(INSERT TABLE 12)

So what we have so far is very little reason to attribute GSE losses to housing policy and very little reason to attribute growth in the PLS market-especially the subprime part to the GSEs. They did take on considerable risk beginning in 2005 in nontraditional markets-especially Alt-A loans and in markets that were about to crash. But the devil didn't make them do it. Expanding into these markets was about business decisions to get back lost market share.

## VII. Conclusions

Clearly the verdict is still out and will be until we get more data, especially disaggregated data, and until we see the final results for the 2005-2007 vintages of mortgages and PLS. But we have a lot of suggestive information so far:

### *Things we know:*

- Housing policy via Subprime PLS was not a major factor in Fannie/Freddie losses. Losses mainly came from “off balance sheet” business done along traditional lines, especially in the Alt-A market. The devil didn’t make them do it.
- Fannie and Freddie did not cause the subprime boom and bust. They did have a role in buying senior pieces of structured deals, but these were the easy AAA parts that lots of investors wanted. They were not involved in the crucial CDO market or other vehicles for selling the important junior pieces of the deals.

### *Things we think we think we know:*

- They were not the victims of housing policy. Their goals explain a small share of their risk-taking. The ramping up of credit risk was especially in Alt-A lending, and it was based on business decisions, most likely regarding market share.
- A very large share of their losses on Alt-A and related loans was associated with property value declines; these loans began with smaller than average shares of high LTV loans but wound up with much higher shares of underwater mortgages, presumably because of their locations and origination years.

### *Things we don’t know:*

- We know little about the importance of goals to mortgages not in PLSs, For instance Fannie/Freddie increased purchases of high loan to value loans, especially in 2007. We would like to know the performance of goals rich loans within this category and the importance of mortgage insurance in controlling losses.
- How much of losses were from price declines and how much from loan quality (especially Alt-A). This is easily doable with disaggregated data.

The data do not provide empirical support for the notion that Fannie and Freddie were building up to a collapse. It happened quite quickly-almost entirely via loans originated after 2005 (especially 2006 and 2007).

The main problems, economy-wide, were a price bubble, which took off while their market share (including the subprime securities they acquired in 2003 and 2004) was falling, and a panic in the shadow banking system, not in agency securities (firming up the implicit guarantee took care of that). There were two major problems for the GSEs: they did not have the capital to survive

the decline in property values beginning around 2006, and they ramped up their risk-taking when their market share fell and the franchise was in danger. These are both serious problems, but they are not unique to the GSE structure.

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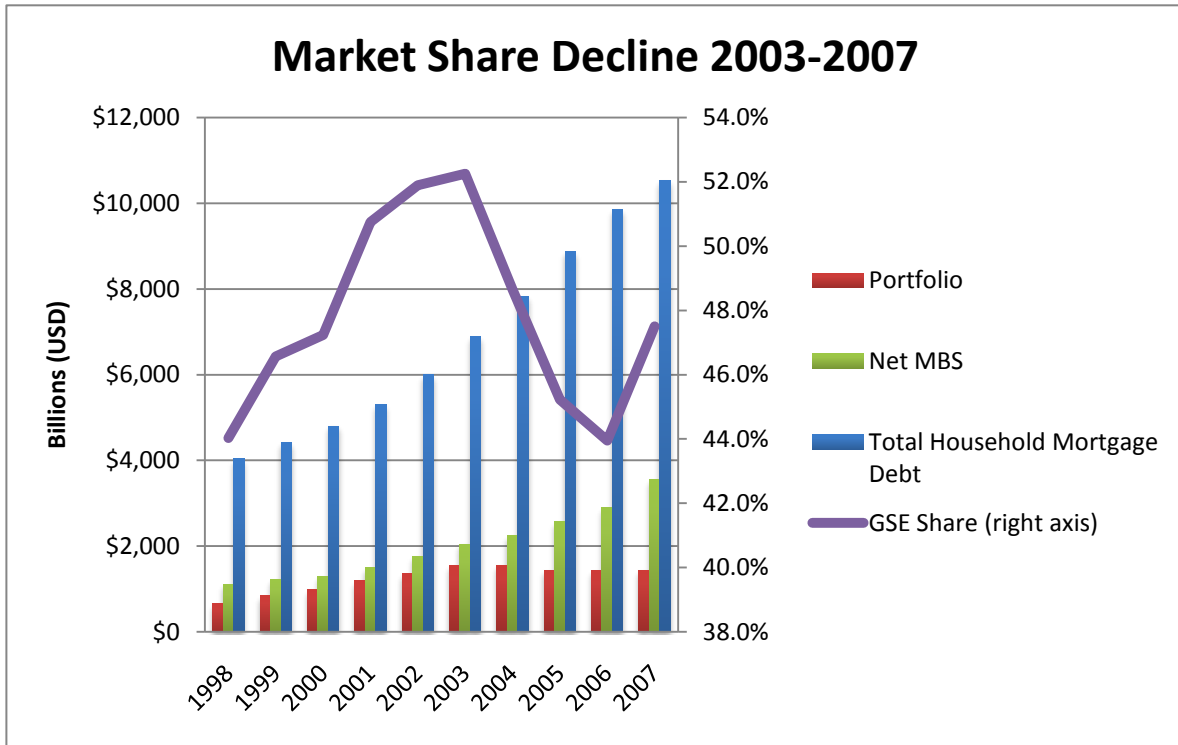
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Chart 1



Source: Federal Reserve, Enterprise Monthly Funding Summaries

Chart 2

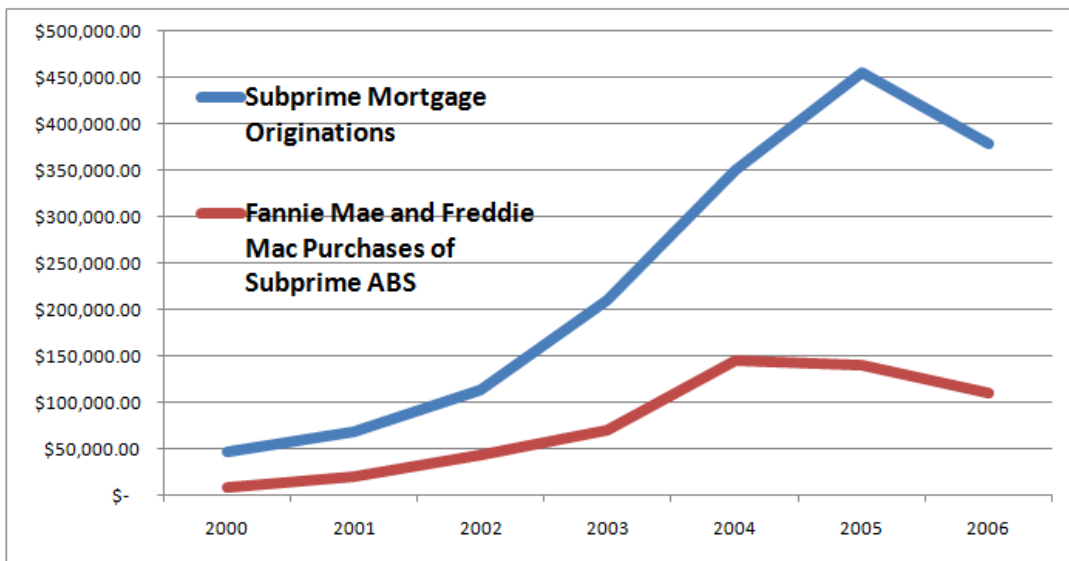
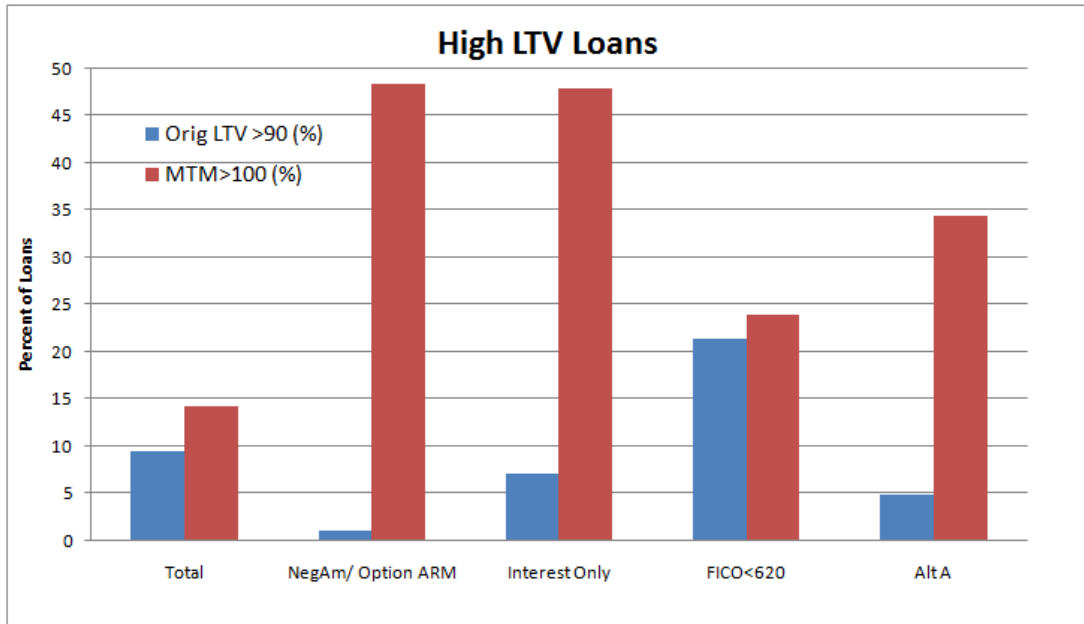


Chart 3



Source: Credit Supplements 2010

Chart 4

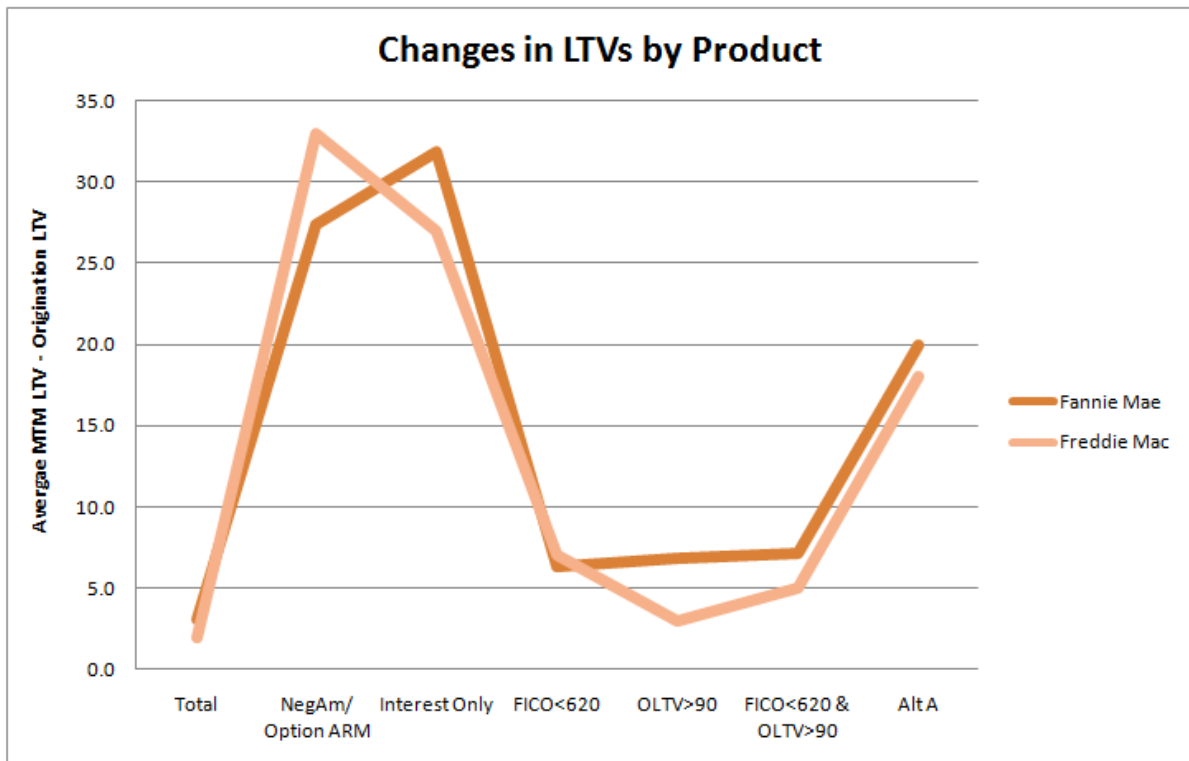


Table 1  
(in billions \$)

	Fannie Mae		Freddie Mac		Total Book of Business	Total Household Mortgage Debt	GSE Share (outstanding)	GSE Share (new business)
	Portfolio	Net MBS	Portfolio	Net MBS				
1998	415.2	637.1	255.0	478.4	1,786	4,041	44.0%	NA
1999	522.8	679.2	324.4	537.9	2,064	4,416	46.6%	NA
2000	607.4	706.7	385.7	576.1	2,276	4,798	47.2%	NA
2001	705.2	858.9	491.7	646.4	2,702	5,305	50.7%	67%
2002	790.8	1,029.5	568.2	742.9	3,131	6,010	51.9%	68%
2003	898.4	1,300.2	645.5	752.2	3,596	6,894	52.3%	70%
2004	904.6	1,402.8	653.6	852.0	3,813	7,835	48.6%	47%
2005	727.2	1,598.1	710.0	974.2	4,009	8,874	45.2%	41%
2006	724.4	1,780.1	703.6	1,122.8	4,331	9,865	44.0%	40%
2007	724.0	2,165.6	720.8	1,381.9	4,992	10,539	47.5%	58%

Source: Federal Reserve, Enterprise Monthly Funding Summaries

Table 2  
**PLS Market Summary**

	<b>Total Market</b>		<b>Fannie Mae</b>		<b>Freddie Mac</b>		<b>Combined GSE %</b>	
	Subprime	Alt-A	Subprime	Alt-A	Subprime	Alt-A	Subprime	Alt-A
<b>2007</b>	\$ 72,204.75	\$ 164,883.71	\$ 15,971	\$ 5,288	\$ 43,667	\$ 10,008	82.6%	9.3%
<b>2006</b>	\$ 377,522.86	\$ 431,092.31	\$ 35,606	\$ 11,973	\$ 74,761	\$ 30,546	29.2%	9.9%
<b>2005</b>	\$ 455,714.38	\$ 421,250.99	\$ 24,469	\$ 16,109	\$ 114,636	\$ 26,994	30.5%	10.2%
<b>2004</b>	\$ 349,602.10	\$ 243,331.10	\$ 67,003	\$ 21,999	\$ 77,129	\$ 18,162	41.2%	16.5%
<b>2003</b>	\$ 210,465.52	\$ 99,610.86	\$ 25,769	\$ 8,104	\$ 44,051	\$ 10,373	33.2%	18.5%
<b>2002</b>	\$ 113,986.83	\$ 57,914.40	\$ 5,144	\$ 1,756	\$ 37,823	\$ 8,906	37.7%	18.4%
<b>2001</b>	\$ 67,509.82	\$ 36,470.98	\$ 5,087	\$ 492	\$ 15,586	\$ 3,670	30.6%	11.4%
<b>2000</b>	\$ 47,310.17	\$ 17,164.53	\$ 2,410	\$ 1,185	\$ 6,564	\$ 1,546	19.0%	15.9%

Source: GAO Analysis of LoanPerformance data, FHFA, Enterprise Credit Supplements

Table 3

Percentage of Annual Mortgage Purchase Volume

	<b>Fannie Mae</b>		<b>Freddie Mac</b>	
	<b>FICO&lt;620</b>	<b>LTV&gt;90</b>	<b>FICO&lt;620</b>	<b>LTV&gt;90</b>
2001	5.0%	13.0%	4.0%	11.0%
2002	6.0%	8.0%	4.0%	7.0%
2003	5.0%	7.0%	3.0%	5.0%
2004	5.0%	9.0%	9.0%	6.0%
2005	5.0%	9.0%	4.0%	6.0%
2006	6.0%	10.0%	5.0%	6.0%
2007	6.0%	16.0%	6.0%	11.0%
2008	3.0%	10.0%	4.0%	9.0%

Source: Annual Reports, FHFA

Table 4

MTM stands for mark-to-market loan-to-value ratios (LTV) as of June 30, 2008 and 2010

<b>Combined</b>	<b>Total</b>	<b>NegAm/ Option ARM</b>	<b>Interest Only</b>	<b>FICO&lt;620</b>	<b>OLTV&gt;90</b>	<b>FICO&lt;620 &amp; OLTV&gt;90</b>	<b>Alt A</b>
Total (\$B)	\$4,504	\$32	\$381	\$203	\$422	\$44	\$497
LTV at Origination	71.47	71.47	74.89	77.00	97.24	97.65	72.41
Orig LTV >90 (%)	9.42	0.99	7.02	21.31	100.00	100.00	4.83
MTM LTV (6/2008)	65.52	79.88	84.05	72.63	91.24	92.24	74.80
MTM LTV>100(%)	6.23	28.97	27.80	9.99	27.99	30.20	13.63
2005-2007 (%)	50.70	66.20	86.33	58.93	60.37	66.86	75.04
FICO (avg)	722.82	702.12	722.55	588.41	692.00	590.78	721.04
FICO< 620 (%)	4.47	8.50	1.99	100.00	10.30	100.00	2.05
UPB	\$145,297	\$158,233	\$246,151	\$129,395	\$136,942	\$121,291	\$173,183
MTM (avg; 2010)	73.8	101.2	104.7	83.3	102.4	103.9	91.8
MTM>100 (%) 2010	14.2	48.4	47.9	23.9	41.7	46.7	34.4

Source: Credit Supplements

Table 5

### As a Multiple of the Overall Book

(the average of each category of mortgage is divided by the average for the entire credit book)

<b>Combined</b>	<b>Total</b>	<b>NegAm/ Option ARM</b>	<b>Interest Only</b>	<b>FICO&lt;620</b>	<b>OLTV&gt;90</b>	<b>FICO&lt;620 &amp; OLTV&gt;90</b>	<b>Alt A</b>
Orig LTV	1.00	1.00	1.05	1.08	1.36	1.37	1.01
Orig LTV >90 (%)	1.00	0.11	0.75	2.26	10.61	10.61	0.51
MTM LTV (2008)	1.00	1.22	1.28	1.11	1.39	1.41	1.14
MTM LTV>100(%)	1.00	4.65	4.46	1.60	4.49	4.85	2.19
2005-2007 (%)	1.00	1.31	1.70	1.16	1.19	1.32	1.48
FICO (avg)	1.00	0.97	1.00	0.81	0.96	0.82	1.00
FICO< 620 (%)	1.00	1.90	0.45	22.35	2.30	22.35	0.46
UPB	1.00	1.09	1.69	0.89	0.94	0.83	1.19
MTM (avg; 2010)	1.00	1.37	1.42	1.13	1.39	1.41	1.24
MTM>100 (%) 2010	1.00	3.40	3.36	1.68	2.93	3.28	2.42

Source: Credit Supplements



**Table 6****Percent Seriously Delinquent**

	<b>Total</b>	<b>NegAm/ Option ARM</b>	<b>IO</b>	<b>FICO&lt;620</b>	<b>OLTV&gt;90</b>	<b>FICO&lt;620 &amp; OLTV&gt;90</b>	<b>Alt A</b>
Fannie Mae	4.99	9.91	19.43	16.12	11.55	24.28	15.17
Freddie Mac	3.96	20.30	18.40	14.44	8.45	17.86	12.44

Source: Credit Supplements, 2010

**Table 7****Percent Seriously Delinquent**

	<b>Total</b>	<b>CA</b>	<b>FL</b>	<b>AZ</b>	<b>NV</b>
Fannie Mae	4.99	5.5	10.4	6.8	12.3
Freddie Mac	3.96	5.0	12.6	7.5	12.8

Source: Credit Supplements, 2010

**Table 8****Scaled Delinquency Rates**

<b>Characteristic</b>	<b>Multiple</b>
Interest Only	4.27
NegAm/ Option ARM	3.56
FICO<620	3.44
Alt A	3.09
NV	2.85
2007	2.78
FL	2.63
2006	2.50
OLTV>90	2.22
AZ	1.62
2005	1.44
CA	1.18
2008	0.96
2004 & Earlier	0.59

Source: Credit Supplements 2010

**Table 9****Percentage of Fannie Mae Credit Losses as a Multiple of Percentage of Loans**

	2008	2009	2010
Nevada	5.00	7.00	5.00
Interest Only	4.25	4.13	3.75
Arizona	2.67	3.67	3.33
Alt-A	4.18	3.64	3.27
Florida	1.57	2.29	2.71
2006	2.50	2.21	2.14
2007	1.40	1.80	1.85
California	1.56	1.50	1.44

**Percentage of Freddie Mac Credit Losses as a Multiple of Percentage of Loans**

	2008	2009	2010
Nevada	4.00	6.00	5.00
Interest Only	5.56	5.22	4.33
Alt-A	5.00	4.40	4.00
Arizona	3.00	3.67	3.67
Florida	1.43	2.14	2.71
2006	2.73	2.33	2.00
California	2.14	2.29	1.86
2007	1.32	1.89	1.79

Source: FHFA Conservator's Report

**Table 10****Cumulative Price Changes**

Period	California	Florida	Arizona	Nevada
2001-2005	125.0%	112.2%	93.3%	110.8%
2006-2009	-38.68%	-35.5%	-33.4%	-49.2%

**Cumulative Price Changes as a Multiple of National Average**

Period	California	Florida	Arizona	Nevada
2001-2005	2.63	2.36	1.96	2.33
2006-2009	5.04	4.63	4.35	6.41

Source: OFHEO and FHFA

**Table 11**

		CA	FL	AZ	NV	National
FRE	Delinquency	5.0	12.6	7.5	12.8	4.0
Combined	Alt-A (% of Loans)	16.0	16.0	14.6	22.0	11.0
FNM	Delinquency	5.5	10.4	6.8	12.3	5.0
	Orig LTV (avg)	63.8	73.2	73.8	74.6	71.3
	Orig LTV > 90	3.4	10.4	10.3	9.5	
	MTM LTV (avg)	75.3	101.5	100.4	129.1	74.4
	MTV LTV > 100 <125	10.5	18.5	19.3	16.3	8.5
	MTM LTV > 125	10.3	27.3	25.1	49.6	5.9
	Underwater	20.8	45.8	44.4	65.9	14.4
	2005-2007	45.4	61.5	64.1	62.7	32.7
	Interest Only (%)	9.7	10.2	12.5	17.5	6.1
	Interest Only (\$B)	48.2	19.3	9.2	5.8	169.9
	% of all IO Loans	28.4	11.4	5.4	3.4	100.0
	NegAm (%)	1.4	1.0	0.5	1.6	0.4
	NegAm(\$B)	7.0	1.9	0.4	0.5	12.3
	% of All NegAM Loans	56.5	15.4	3.0	4.3	
	MTM LTV as % of orig	105.6	142.4	140.8	181.1	

Source: Credit Supplements

**Table 12**

Alt- A Summary

<b>Combined</b>	<b>Total</b>	<b>2008</b>	<b>2007</b>	<b>2006</b>	<b>2005</b>	<b>2004 and earlier*</b>
Total (\$B)	\$497	\$20	\$139	\$142	\$90	\$106
% of Total	100	4	28	29	18	21
FICO (avg)	721	734	717	718	723	724
FICO<620 (%)	2	1	1	1	1	3
FICO<620 (\$B)	\$10	\$0	\$2	\$2	\$1	\$3
<b>% of Total</b>	<b>100</b>	<b>1</b>	<b>21</b>	<b>21</b>	<b>13</b>	<b>33</b>
Orig LTV> 90(%)	5	3	8	4	3	4
Orig LTV> 90 (\$B)	\$24	\$1	\$10	\$6	\$2	\$4
<b>% of Total</b>	<b>100</b>	<b>3</b>	<b>43</b>	<b>25</b>	<b>10</b>	<b>16</b>
ARM (%)	33	12	30	38	48	21
ARM (\$B)	\$166	\$2	\$41	\$55	\$43	\$22
<b>% of Total</b>	<b>100</b>	<b>1</b>	<b>25</b>	<b>33</b>	<b>26</b>	<b>13</b>
Interest Only (%)	32	10	41	42	32	10
Interest Only (\$B)	\$161	\$2	\$57	\$60	\$29	\$10
<b>% of Total</b>	<b>100</b>	<b>1</b>	<b>35</b>	<b>38</b>	<b>18</b>	<b>6</b>
California (%)	22	20	24	20	21	21
California (\$B)	\$108	\$4	\$33	\$29	\$19	\$22
<b>% of Total</b>	<b>100</b>	<b>4</b>	<b>31</b>	<b>27</b>	<b>17</b>	<b>21</b>
Florida (%)	10	7	11	12	12	8
Florida (\$B)	\$52	\$1	\$15	\$17	\$11	\$8
<b>% of Total</b>	<b>100</b>	<b>3</b>	<b>28</b>	<b>33</b>	<b>21</b>	<b>16</b>

\* FNM does not break out 2004 purchases; FRE purchased \$18 B Alt-A in 2004.

Source: Credit Supplements, 2010