Information Failure and the U.S. Mortgage Crisis

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INTRODUCTION

The global financial crisis of 2008 developed out of the failure of mortgage finance markets to adequately price risk. This paper focuses on the role of securitization in housing finance. It does so both because of the role of securitization in the recent debacle and because of the importance of securitization for assuring the widespread availability of the long-term fixed-rate mortgage, which has been the bedrock of American homeownership since the Depression and the prevalence of which is critical for rebuilding a sustainable housing finance system.

The paper argues that markets failed to price risk correctly because of an informational failure, caused by the complexity and heterogeneity of private-label mortgage-backed securities (MBS) and structured finance products such as collateralized debt obligations (CDOs). Correcting this failure requires not only better disclosure about the collateral supporting MBS, but also substantive regulation of mortgage forms and MBS and CDO structures in order to make disclosures effective.

Disclaimer: This version is an unedited draft, not for citation, of a work that has been accepted for publication in The American Mortgage System: Rethink and Reform, *co-editors, Susan Wachter and Marty Smith, to be published in Spring, 2011 by the University of Pennsylvania Press.*

When markets work, costs and risks are signaled through prices and rates, which allows for efficient resource allocation based on this information. In markets in which information flows between consumers and producers (such as mortgage borrowers and lenders or investors and sellers of securities) are shrouded or blocked, prices do not reflect costs and risks, and resources are allocated inefficiently. Complexity and heterogeneity shroud information. Complex products are more difficult for consumers and investors to analyze. Similarly, heterogeneous products are difficult to analyze because heterogeneity defeats cross-product comparisons.

The housing bubble was marked by the extraordinary growth of two types of complex, heterogeneous products: nontraditional mortgages and private-label securitization (PLS). The growth of these products was inextricably interlinked. Nontraditional mortgages did not qualify for purchase and securitization by the regulated government sponsored entities (GSEs), Fannie Mae and Freddie Mac, and were far too risky for originators to want to hold them to maturity. The only option, then, was to securitize these mortgages in the unregulated PLS market. The rapid expansion of nontraditional mortgages and the PLS market set the stage for the crisis. The growth of nontraditional mortgages and PLS was spurred by set of principal-agent problems inherent to securitization.

Mortgage origination and securitization is a volume business, which incentivizes the financial institutions that intermediate between mortgage borrowers and the capital market financiers of mortgages to find products that maximize volume, both in terms of dollar amount and number of mortgages, regardless of the effect on product suitability for borrowers or credit quality for investors. These financial institutions serve as economic (but not legal) agents for the end borrowers and lenders. There are two sets of institutions involved in the intermediation role:

mortgage originators and mortgage securitizers. Often originators and securitizers are affiliated with each other; the origination channel provides product for the securitization operation.

In their intermediation role, these financial institutions do not hold more than a temporary interest in the mortgages they facilitate, so they have very different, and often adverse incentives than borrowers and investors, the economic principals to mortgage loans. The financial intermediaries involved in mortgage origination and securitization are incentivized to maximize the volume of mortgages being securitized and the spreads on these mortgages in order to maximize their own revenue.

Informationally shrouded mortgages and MBS can serve to disguise risks and costs, thereby inducing greater origination and securitization volume and profits than would have attained in a deshrouded environment. Therefore, financial intermediaries are incentivized to push these informationally shrouded products, even to the detriment of homeowners and investors. Regulatory standards kept these principal-agent problems in check for GSE securitization, but in the PLS market, there were no such constraints, and the principal-agent problem resulted in a shift in mortgage products to unsustainable nontraditional products that boosted origination and securitization volume—and hence profits—in the short-term, but with disastrous longer-term effects.

To correct the informational failures in the mortgage finance market, it is insufficient to simply require greater data disclosure about the collateral and borrowers supporting MBS, as the SEC's proposed amendments to Regulation AB would do. (U.S. Securities Exchange Commission 2010). Instead, investors need to have access to meaningful data that can be analyzed effectively in real time. Disclosure of hundreds of loan-level data elements is useless unless the relationships among those elements is known. While it may be possible to design

effective multivariate risk models, excess information and variables reduce the predictability of such models, especially when new terms, for which there is no track record, are introduced. Reducing potential variables through product standardization facilitates mortgage risk-modeling and real time analysis of changes in underwriting standards. This means that whatever the ultimate form of the reconstituted housing finance market, the regulatory response to the crisis should concentrate on ensuring sufficient standardization of MBS products—and by necessity, standardization of the underlying mortgage products—to make the disclosure of information about credit risk a meaningful basis for pricing.

The paper begins with discussion of the importance of homeownership as a policy goal and the critical role of the long-term, fixed-rate, fully amortized mortgage in achieving sustainable homeownership and housing market stability. The paper then explains why absent securitization the long-term, fixed-rated, fully-amortized mortgage would not be widely available. Next the paper turns to a consideration of the changes in the securitization market that begat the housing bubble, in particular the rise of PLS and nontraditional mortgage products. The paper shows how the normal constraints on underwriting declines—regulation, credit ratings, limited risk appetite from savvy subordinated debt investors, and short pressures—all failed to constrain the PLS market.

Ultimately, the expansion of PLS and nontraditional mortgages were their own undoing. These products drove the housing bubble, but ultimately priced out too many potential homeowners, making home prices increases unsustainable. Without home price appreciation, homeowners could not refinance their way out of highly leveraged nontraditional mortgages as payment shocks—large increases in monthly mortgage payments upon the expiration of teaser interest rates—occurred. The result was a cycle of foreclosures and declining housing prices. The

paper concludes with a proposal for restricting securitization to a limited set of proven traditional mortgage products. There are appropriate niches for nontraditional products, but the informational asymmetries and principal-agent problems endemic to the secondary market counsel for restricting these products to banks' books.

I. SUSTAINABLE HOME OWNERSHIP AND THE FIXED-RATE MORTGAGE

The United States and many other countries have had a long history of supporting homeownership as a public policy goal. Public policy has favored homeownership is that homeownership offers many social benefits. Historically,

> there has been widespread agreement in the U.S. that homeownership is the preferred model for the vast majority of the population, both for reasons of "economic thrift" and "good citizenship," and for reasons of better health, recreation and family life expressed through the physical form of the detached single-family house and garden. (Weiss 1988, 7).

While some of the arguments in favor of homeownership developed in reaction to the condition of renters in urban slums and tenements (Stoner 1943, 225; Glaeser and Gyourko 2008, 48-49), or to fear of urban proletariat unrest (Weiss, 1989: 109), there are good modern reasons to support homeownership as the preferred model of residency. For the homeowner, homeownership can act as a hedge against (Sinai and Souleles 2005) against rent increases and specifically against being priced out of a neighborhood because of neighborhood improvement, the way renters are priced out by gentrification (although property tax increases can have a similar effect on homeowners). Homeownership is also a major investment that homeowners want to protect. Homeowners thus have an incentive to care for their homes. As the famous

Larry Summers adage has it, “In the history of the world, no one has ever washed a rented car.” So too has no one ever put a new roof on a rental unit.

These benefits for the individual homeowner have important positive externalities. When homeowners take care of their homes, it improves the value of their neighbors’ homes. Homeowners also tend to move less frequently than renters, so homeownership makes for more stable communities, allowing for deeper community ties and civic engagement. Homeowners’ incentive to care for their homes also extends to caring for their neighborhood; the homeowners self-interest in protecting their property value extends to protecting the quality of the neighborhood and being concerned with issues like zoning, schools, traffic, and crime. In a community of homeowners, there is a rich set of positive cross-externalities. Homeownership thus has welfare enhancing effects for homeowners, communities, and the nation.

Homeownership comes with risks, though. Homes are expensive. Few individuals are able to purchase their homes outright. Most people need to borrow to purchase a home, typically with a mortgage. Mortgage finance has risks, just like any leveraged investment. The homeowner has the upside of the property’s appreciation, but also the downside of the property’s depreciation. Owning a home also typically involves committing a large portion of household wealth into a single, nondiversified asset that cannot be hedged.[i]

There is little point in policies that promote homeownership, unless the ownership is sustainable. The public benefits that come from homeownership only flow from long-term, sustainable homeownership. The form of financing matters for sustainable homeownership. Home mortgages divide, on the most generic level, into two types of products—fixed rate mortgages (FRMs) and adjustable rate mortgages (ARMs), depending on whether the interest

rate is fixed for the life of the mortgage or adjusts in reference to a public index like LIBOR or the Federal Funds rate.

Globally, ARMs dominate the mortgage world. In almost every country except the United States, Germany, and Denmark, almost all mortgages are ARMs. While the ARM has prevailed in much of the world, it has been able to do so in recent decades because of a very hospitable macroeconomic environment. For the better part of the past three decades, as mortgage markets have developed, global interest rates have been declining. To the extent that rates have gone up in this period, they have gone up relatively small amounts and slowly. When interest rates are declining, an ARM is a borrower-friendly product; mortgage payments decrease as interest rates decline. If interest rates go up sharply, however, monthly payments on an ARM can shoot up and quickly become unaffordable for the borrower.

Housing finance via ARMs thus always poses the risk of an asset-liability mismatch for homeowners. Homeowners' income tends to be fixed, but their mortgage expenses—often their largest single expense—is variable and can exceed income if rates go up. Therefore, while the ARM has been a vehicle for increasing homeownership in recent decades, it has the inherent potential to undermine the homeownership goal.

II. SECURITIZATION AS A SOLUTION TO ASSET-LIABILITY DURATION MISMATCHES

The Savings and Loan (S&L) crisis of the 1980s and early 1990s in the United States shows the danger of asset-liability mismatches due to adjustable rate obligations. Ever since the Depression, most mortgages in the United States have been long-term, fully-amortized FRMs. The Depression showed just how fragile a housing market constructed of short-term, ARMs (often interest only with a principal "bullet" due at the end) could be, and subsequent federal

housing policy strongly encouraged the use of the long-term, fully-amortized FRM as a means of ensuring both affordability and systemic stability.

Most of S&Ls' assets were such FRM loans. This meant that S&Ls had a fixed income stream. S&Ls' main liabilities—and source of operating funds—were deposits, which could be withdrawn with little notice. In the 1970s, S&Ls were restricted in the interest rates they could pay on savings accounts. As interest rates rose in the late 1970s, S&Ls quickly lost deposits to money market mutual funds, which did not have regulated returns. Congress responded to this disintermediation in 1980 by phasing out the savings account interest rate restriction, but this only meant that in order to compete with money market funds, S&Ls had to offer increasingly high interest rates on deposits. The result was that the cost of funds for S&Ls soared, but their income—from the FRMs—remained constant. The S&Ls were quickly decapitalized, and a drawn-out banking crisis ensued.[ii]

The asset-liability mismatch played out on the banks' balance sheets in the S&L crisis, but it could easily reoccur on the household balance sheet because of ARMs. The lesson from the S&L crisis was that depositaries could not hold long-term FRMs in their portfolios without assuming significant interest rate risk.

In the United States, in the wake of the S&L crisis, two solutions emerged to the asset-liability mismatch problem. Two solutions to this problem emerged. One was increased use of ARMs, which grew in popularity in the 1980s, as interest rates fell. Risk-averse consumer tastes, however generally prefer FRMs, limiting ARM market share when competitive FRMs are available.

FRMs remained widely available even after the S&L crisis because of the second solution—using secondary markets to finance FRMs and shift the interest rate risk to parties

better suited to bear it. The secondary market consisted at the time of the GSEs.[iii] Fannie and Freddie were regulated entities and would purchase only mortgages that conformed to their underwriting standards, which generally required prime, amortizing mortgages. Moreover, statute limited the GSEs' exposure on any particular loan to the conforming loan limit and restricted the GSEs to purchasing only loans with LTV ratios under 80% absent private mortgage insurance or seller risk retention. (12 U.S.C. §§ 1454(a)(2)), 1717(b)(2)). Moreover, the GSEs were expected to operate nationally, creating geographic diversification in their underwriting.

The GSEs would securitize most of the mortgages they purchased, meaning that they would sell the mortgages to legally separate, specially created trusts, which would pay for the mortgages by issuing MBS. The GSE would guarantee timely payment of principal and interest on the MBS issued by the securitization trusts. Fannie and Freddie thus linked long-term FRM borrowers with capital market investors, such as insurance and pension funds, that were willing to assume long-term interest rate risk because they did not have the short-term liabilities of depositaries. Securitization thus ensured the continued widespread availability of the FRM in the wake of the S&L crisis as depositaries shied away from holding interest rate risk.

III. PRIVATE-LABEL SECURITIZATION

A. Growth of the Private Label MBS Market

By guarantying timely payment of interest and principal on their MBS, Fannie and Freddie assumed the credit risk on the underlying mortgages, while the purchasers of Fannie and Freddie MBS assumed the interest rate risk. Investors in GSE MBS assumed the credit risk of Fannie and Freddie, and only indirectly, the credit risk of mortgages the GSEs purchased. Because Fannie and Freddie were perceived as having an implicit guarantee from the federal government, investors were generally unconcerned about the credit risk on the Fannie and

Freddie, and hence on the MBS.[iv] This meant that investors did not need to worry about the quality of the GSE underwriting. Therefore, investors did not need good information about the default risk on the mortgages. Investors did, however, care about prepayment speeds so they could gauge convexity risk.[v] This was information that was fairly easy to obtain, particularly on standardized mortgage products.

Because the GSEs bore the credit risk on the mortgages, they had every incentive to insist on careful underwriting, and even if they did not, their regulators would.[vi] Thus, the GSEs, by statute, were limited to purchasing only loans with less than 80% loan-to-value (LTV) ratios, unless there was private mortgage insurance on the loan. As long as GSE securitization dominated the mortgage market, credit risk was kept in check through underwriting standards, and there was not much of a market for nonprime, nonconforming, conventional loans.

Beginning in the 1990s, however, a new, unregulated form of securitization began to displace the previously dominant regulated, standardized GSE securitization. This was private label securitization (PLS), which arose in a deregulated market supported by a new class of specialized mortgage lenders and securitization sponsors.

Whereas the GSEs would purchase only loans that conformed to their underwriting guidelines, the investment banks that served as PLS conduits did not have any such underwriting requirements. Thus, PLS created a market for nonprime, nonconforming conventional loans.

As with GSE securitization, PLS would involve the pooling of thousands of mortgage loans into trusts. The trusts would then issue MBS to pay for the mortgage loans. Unlike the GSEs, however, the PLS deal sponsors did not guarantee timely payment of interest and principal on the PLS. Therefore, PLS investors assumed both credit risk and interest rate risk on the MBS, in contrast to GSE MBS, where investors assumed only interest rate risk on the MBS.

Investors in PLS were familiar with rate risk on mortgages, but not with credit risk. Thus, the PLS market initially developed for jumbo mortgages—loans were larger than the GSEs' conforming loan limit, and for commercial mortgages. Jumbos were essentially prime, conventional mortgages, just for larger amounts than conforming loans. While PLS investors did face credit risk on jumbos, it was low. Loss rates on jumbos have been less than .5% since 1992. (Nomura Fixed Income Research 2006, 22).

Credit risk for jumbos was mitigated through high down payments (low LTVs) and private mortgage insurance, and also through credit enhancements, particularly credit tranching in a senior-subordinate structure. Jumbo PLS settled on a largely standardized form—the "six pack" structure, in which six subordinated tranches supported a senior, AAA-rated tranche that comprised well over 90 percent of the MBS in a deal by dollar amount. (Nomura Fixed Income Research 2006, 22-23). Indeed, jumbo PLS became sufficiently standardized that jumbo mortgages trade in the To Be Announced (TBA) market, meaning that the mortgages are sold even before they are actually originated. This is only possible when there is a liquid secondary market for the mortgages and necessitates mortgage standardization as well.

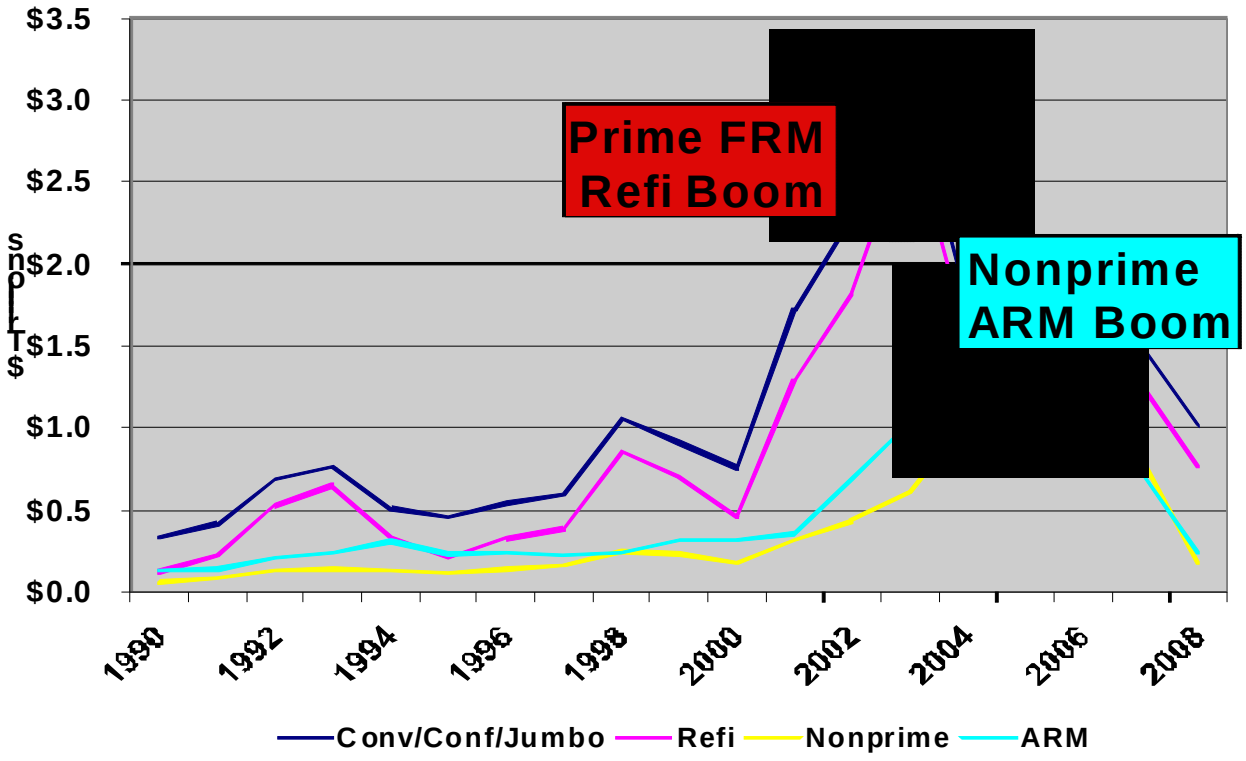
The success of PLS depended heavily on the ability to achieve AAA-ratings for most securities. The AAA-rating was critical for selling the PLS.[vii] For jumbos, it was relatively easy to achieve AAA-ratings because of the solid underlying collateral.[viii] As the PLS market later moved into nonprime mortgages, however, greater credit enhancements and structural creativity were necessary to obtain the credit ratings necessary to make the securities sufficiently marketable. For example, the mean number of tranches in nonprime PLS in 2003 was approximately 10, compared with 7 for jumbo six-packs, and by 2007, the mean number of tranches had increased to over 14. (Adelino 2009, 42). Other types of internal and external credit

enhancements were also much more common in nonprime PLS: overcollateralization, excess spread, shifting interest, reserve accounts, and pool and bond insurance. Nonprime PLS thus involved inevitably more complex and heterogeneous deal structures to compensate for the weaker quality of the underlying assets.

Nonprime PLS remained a small share of the market through the 1990s. Nonprime PLS did not take off in fact until 2004, at which point they grew rapidly until the bursting of the housing bubble. PLS grew from 22 percent of MBS issuance in 2003 to 56 percent in 2006 and from 9 percent to twenty-one percent of all mortgages outstanding and thirty-six percent of all MBS outstanding. (Inside Mortgage Finance 2010). The inflection point came with the introduction and spiraling growth of nonprime mortgages. The nonprime mortgage market (and nonprime PLS market) boomed as the consequence of the tapering off of a preceding prime refinancing boom. 2001-2003 was a period of historically low interest rates. These low rates brought on an orgy of refinancing. (See Figure 1.) 2003 in particular was a peak year for mortgage originations, and 72 percent of these originations by dollar volume were refinancings.[ix] Virtually all of the refinancing activity from 2001-2003 was in prime, fixed-rate mortgages. (See Figure 3.) The prime refinancing boom meant that mortgage originators and securitizers had several years of increased earnings.

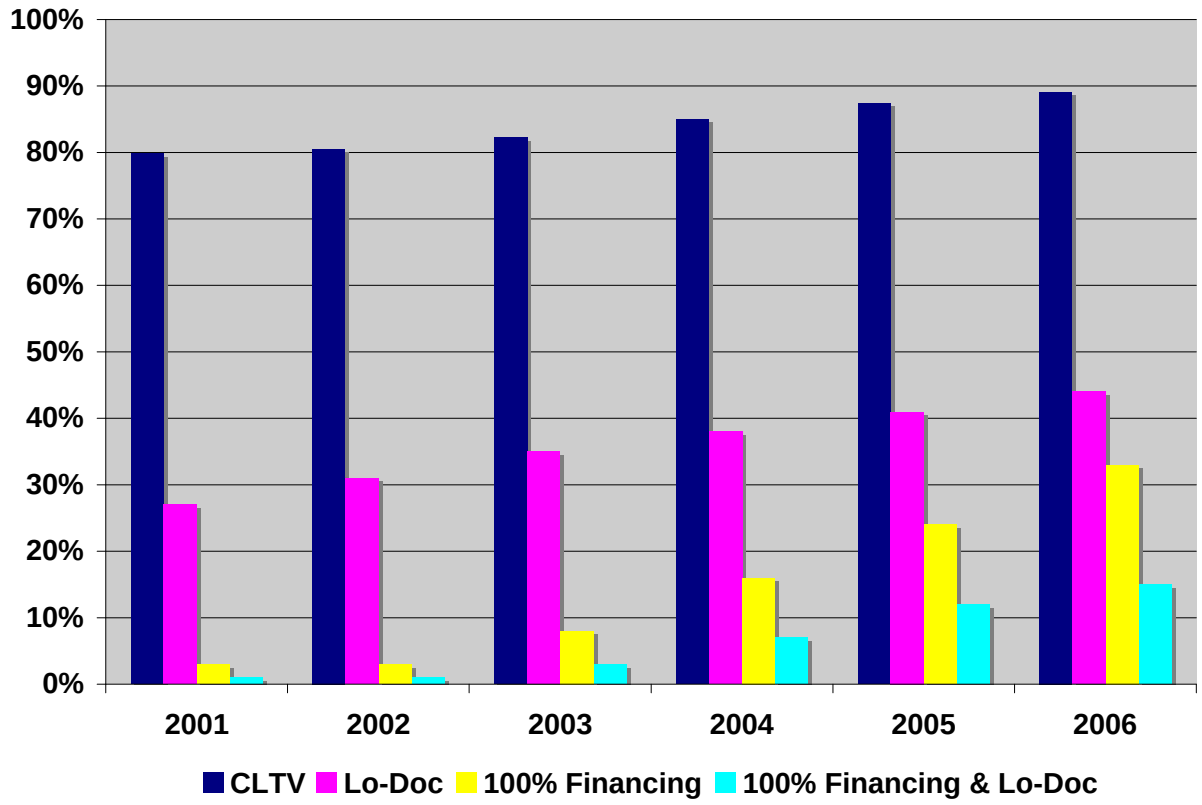
Figure 1. Refinancing and Purchase Money Originations

Source: Inside Mortgage Finance, 2010 Mortgage Market Statistical Annual



By 2004, however, rates had started to rise (albeit modestly), and the refinancing boom ended. This meant that the mortgage industry was hard pressed to maintain its earnings levels from 2001-2003. (Bratton and Wachter 2010). The solution was to find more "product" to move in order to maintain origination volumes and hence earnings. Because the prime borrowing pool was exhausted, it was necessary to lower underwriting standards and look to more marginal borrowers. (See Figure 2).

Figure 2. Erosion of Residential Mortgage Underwriting Standards



Part of the decline in underwriting standards was also a shift in product type. Nontraditional mortgage products are generally structured for initial affordability; the costs are back loaded, either with balloon or bullet payments, or with increasing interest rates. Thus, as Figure 1 shows, ARMs supplanted more expensive (non-option adjusted) FRMs, even at a time when rates were rising from historical lows, making an ARM a poor financing choice as rates were likely only to adjust upwards in the foreseeable future. Moreover, many of the nonprime mortgages the housing bubble were nontraditional structures, such as interest only, pay-option, 40-year balloons or hybrid ARMS (2/28s and 3/27s). (Mayer, Pence and Sherlund, 2009). Interest-only, pay-option and 40-year balloons expanded from $205 billion in 2004 to $871

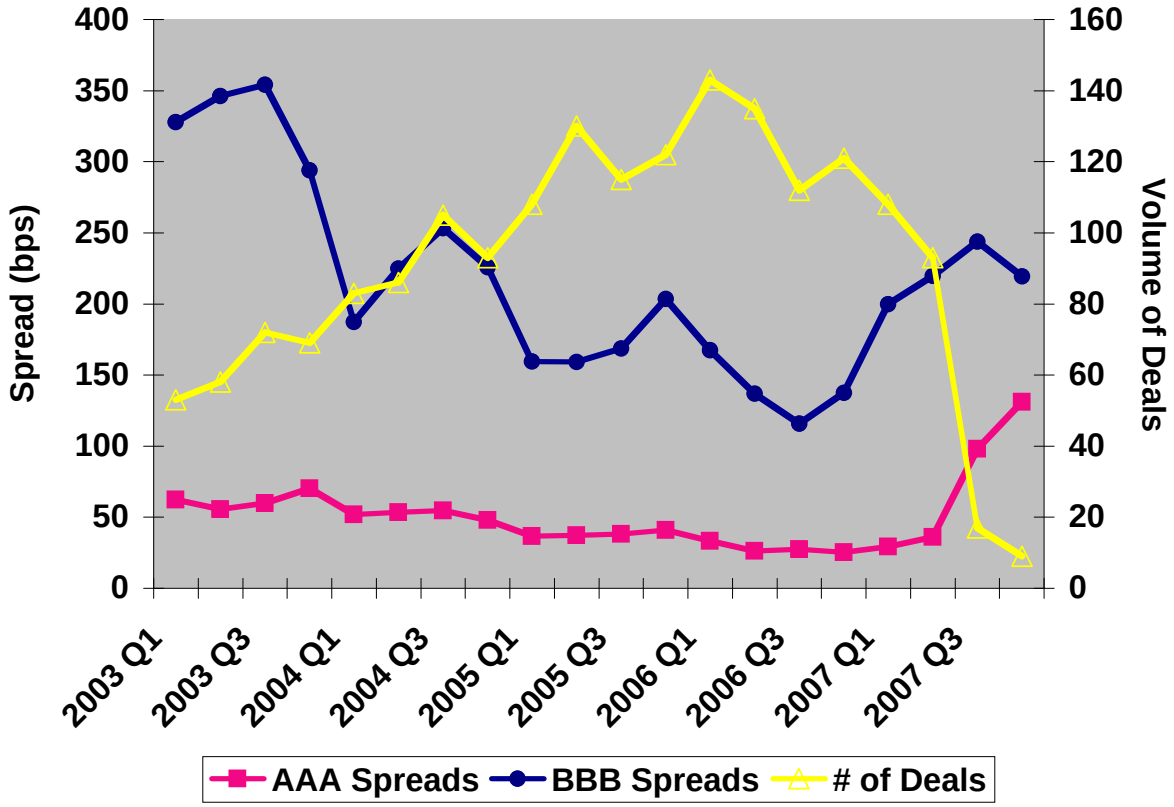
billion by 2006. (Inside Mortgage Finance, 2010). And, at the same time as these mortgage product mix was becoming riskier, credit support for AAA-tranches was shrinking.

B. A Supply-Side Explanation of the Housing Bubble

The expansion of these nontraditional products during the 2004-2006 can only be explained their function as short-term affordability products that enabled the mortgage market both to expand to less creditworthy borrowers and to finance larger mortgages for existing borrowers. Nontraditional mortgage products were also gifts that kept giving to the mortgage industry. Not only did they products help additional borrowers qualify for mortgages underwritten at the initial teaser rate, rather than the fully-amortized rate, but the backloading of costs created an incentive for borrowers to refinance as rates increased, thereby generating future mortgage business. And, as housing prices rose during the house bubble, these sorts of "affordability" product became increasingly attractive to borrowers who saw their purchasing power diminish. Nontraditional mortgage products generated additional mortgage origination business.

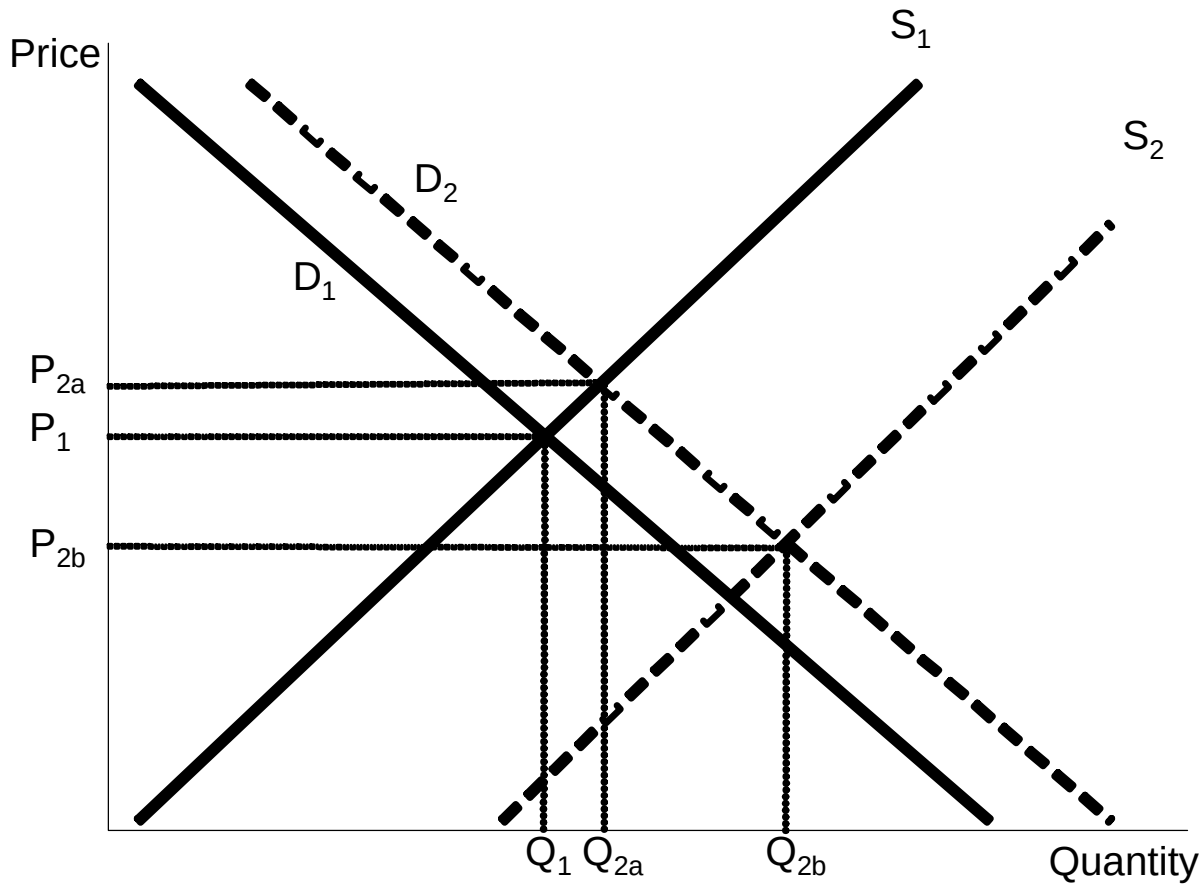
This supply-side explanation of the housing bubble is consistent with one of the bubble's most peculiar features: that even as mortgage risk and PLS issuance volume increased, the spread on PLS over Treasuries *decreased*. (See Figure 3). Declining PLS spreads meant that investors were willing to accept more risk for lower returns. In other words, housing finance was becoming relatively cheaper, even as it became riskier.

Figure 3. PLS Issuance and Spreads 2003-2007 for AAA and BBB Rated Tranches



That PLS spreads fell and PLS volume increased even as risk increased points to a supply-and-demand side explanation of the housing bubble, rather than demand-side explanations. There was likely a rightward shift in the housing finance demand curve (from D_1 to D_2, in Figure 4), as irrationally exuberant consumers sought ever more financing to cope with escalating prices, that would have resulted in both greater supply (Q_{2a}) *and* higher prices (P_{2a}), and thus larger PLS spreads. But PLS spreads decreased, even as supply increased. This means that the housing finance supply curve must have shifted rightwards (from S_1 to S_2) enough to offset any rightward shift of the demand curve in terms of an effect on price ($P_{2b}<P_{2a}$). Put differently, even if there was an increase in housing finance demand, there was a greater increase in housing finance supply. Investors demand for PLS was outstripping the supply of mortgages.

Figure 4. Shifts in Housing Finance Supply and Demand Curves



The dominant explanations of the housing bubble to date have been demand-side explanations. Robert Shiller has argued that the bubble was driven by consumers' irrational exuberance and belief that real estate prices would continue to appreciate, stoking the demand for housing finance. (Shiller 2009). Edward Glaeser, Joseph Gyourko, and Albert Saiz have argued that the bubble was spurred by population growth encountering a finite frontier of metropolitan-area real estate; real estate supply inelasticity drove up housing prices and thus demand for housing finance. (Glaeser, Gyourko, and Saiz 2009).

Our claim of a supply-driven bubble is consistent with these demand-side theories. Consumer demand for housing finance played a critical role in the development of the housing

bubble, but the behavior of MBS spreads indicates that the growth in housing finance supply surpassed the growth in housing finance demand.

The growth in housing finance supply required an increase in investment in housing finance. What led to the increase in investor demand for housing finance funding? Or, more precisely, given that most housing finance is done through securitization, and particularly PLS during the bubble, why was there such demand for PLS?

C. Exploiting Information Asymmetries

One factor behind investor demand for PLS was simply yield. Historically low rates on Treasuries, left investors with return hurdles hungry for yield, and PLS might have been more attractive than other investment options. Yet, declining spreads make this explanation unlikely. It was a mortgage bubble, after all. The alternative, and we believe more compelling, explanation is that investors as a whole failed to properly price mortgage risk because they lacked adequate information due to the complexity, novelty, and heterogeneity of PLS, which served to shroud the risks inherent in the product.

There are information failures in mortgage product and mortgage securities markets; both sides of the mortgage finance market are subject to information asymmetries and principal-agent problems. There are lender/broker information advantages over borrowers, and borrower information advantages over lenders. Information asymmetries occur both between the borrower and lender because the borrower lacks information on the loan product's risk, and the lender lacks information on the risk posed by the borrower. These asymmetries can feed on each other to result in borrowers receiving unsuitable loans. (Ashcraft and Schuermann 2008).

Additionally, both borrowers and lenders have information advantages over securitizers and ultimately investors, because information on mortgage risk is not imbedded in the securities'

disclosures. These securities are sold without having to reveal the full nature of the underlying mortgages. Disclosure for many PLS took the form of disclosing the *lack* of information on loans bundled in these securities, such as listing the percentage of low or no-document loans (often not even broken down separately). And there was no verification of the disclosures.[x]

Principal-agent conflicts are rife in these markets. Mortgage brokers, perceived by many borrowers as their legal agents or at least owing them duties, were compensated in part with "yield spread premiums," which incentivized brokers to steer borrowers toward more expensive (and ultimately riskier) loans. (Jackson and Burlingame 2007). Likewise, because securitization sponsors' income is from fees based on deal volume rather than loan performance. The more and larger deals, the more they earn, irrespective of long-term performance. (The bonus-driven incentives of employees at the entire spectrum of financial intermediaries, from mortgage brokers to securitization sponsors, to monoline insurance companies underwriting CDS all exacerbated this focus on short-term profits.) This creates a potential "lemons" problema as securitizers are tempted to push ever more questionable product on investors.[xi] In doing so, the information asymmetries between securitizers and investors serve the purposes of securitizers' short-run fee maximization. (To be sure, the long-term implications of a short-run fee maximization strategy were apparent, but preserving long-term reputation did little to address immediate earnings pressures and was ultimately going to be someone else's problem.)

The combination of information asymmetries on both sides of the housing finance market meant that borrowers were taking out riskier loans than they should, and investors were funding riskier loans than they should. The result was inevitably the growth of an unsustainable housing price bubble as increased mortgage demand pushed up prices. Directly, this meant that risk could not be tracked or priced. Therefore, mortgages were not priced to reflect their risk. If they had

been, they would not have been affordable. The immediacy of their risk was hidden as well by higher housing prices, which prevented, temporarily, defaults. Higher housing prices also had the effect of making PLS look like safer investments because it inflated the prices of the assets backing the PLS.

Complexity "pays" for the mortgage product producer. Complexity also "pays" for the securities producer because it allows the securities to be generated without the recognition of risk. Complexity precludes comparison shopping for consumers and risk monitoring for investors. Mortgage finance intermediaries are incentivized to maximize complexity to move more product with higher yields generating higher fees.

IV. Failure of Normal Market Constraints

There were several potential market constraints on the default risk imbedded in the PLS market. These constraints all failed due to PLS' complexity and market structure problems.

A. Credit Ratings

An initial constraint should have been credit ratings. Most investors looked to rating agencies to serve as information proxies regarding default and loss risk. Approximately 90 percent of PLS bore AAA-ratings, and investors in the AAA-rated securities market do not appear to have been informationally sensitive. (Adelino 2009, 31). Investors in AAA-rated PLS did not demand higher yields for what turned out to be riskier deals. (Adelino 2009, 22). Thus, rating agencies played a critical informational intermediary role for the PLS market.

As it turned out, the rating agencies were inadequate informational proxies; many AAA-rated PLS were subsequently downgraded. (Adelino 2009, 14-15, 43). Many factors contributed to the failure of the rating agencies. Many commentators have pointed to the rating agencies' lack of liability for misrating and lack of financial stake in any particular rating, beyond its long-

term reputational effect. Yet, this has long been the case with corporate bond ratings, where the ratings agencies have generally performed well.

PLS ratings, however, might have been different. The rating agencies became highly dependent on revenue from structured financing ratings, which commanded premium prices; by 2007, structured products accounted for 40% of their revenue and 50% of their ratings revenue. Because structured products issuers were looking to manufacture as much investment-grade paper as possible, the rating agencies were under pressure to give investment grade ratings, even if it meant making off-model adjustments. As Patrick Bolton *et al.* have theorized, it is much easier for a rating agency to inflate ratings in a boom market because there is less of a chance of a rating being wrong in the short term, while the benefits of new business generation are larger. Bolton, Freixas, and Shapiro 2009).

Rating agencies had problems beyond misaligned incentives. Ratings agencies' historical strength has been rating corporate bonds, which are largely homogeneous products for which the ratings agencies have time-tested models going back over a century. Not so with PLS. The ratings agencies, like everyone else, lacked multi-cycle experience with PLS. Moreover, PLS are heterogeneous products; no two deals are alike. The underlying collateral and borrower strength as well as credit enhancements vary across deals. The novelty, heterogeneity, and complexity of structured finance products made ratings much more speculative, and the ratings agencies' models did not account for the possibility of a national housing price decline. The ratings agencies' models for structured products proved inadequate.

Furthermore, the ratings agencies, just like investors, were not in a position to carefully analyze the underlying collateral of the PLS to identify the probability of default or price fluctuation. ((Grant 2008, 183). The assumption that housing prices adequately represented

fundamentals implicit in the use of appraised values, based on comparable properties, as collateral made it unnecessary for rating agencies to evaluate the market-specific pricing risk that directly determines default risk.

Moreover rating agencies had no capacity to undertake such analysis. The ratings agencies received pool-level rather than loan-level information. (Lewis 2010, 170). This meant that the rating agencies, just like investors, often lacked sufficient information to adequately assess the default risk on the mortgages. While PLS prospectuses disclose information about the underlying collateral—percentage make-ups, weighted averages, and ranges for items such as loan balances, loan-to-value ratios, FICO scores, loan interest rates, state-by-state location, fixed vs. adjustable rate structures, property types, loan purpose, amortization type, lien priority, completeness of loan documentation, term to maturity, presence of prepayment penalties, etc.,[xii] it is aggregate data, not individual loan data, and not verified by an independent source, and did not, arguably, include all material information for investors. While a great deal of information was being disclosed, rating agencies and PLS investors invariably knew less about the mortgage loan collateral backing the PLS than the financial institutions that originated the mortgages and sponsored the securitizations.

PLS heterogeneity and complexity also enabled issuers to "shop" for ratings. As Skreta and Veldkamp have argued, increased complexity in products makes ratings more variable between agencies, which encourages issuers to shop for the most favorable rating. (Skreta and Veldkamp, 2009). The ratings agencies also made their models available to investment banks, which designed their products to game the ratings models. (Morgenson and Story 2010: A1).

B. Subordinated Debt Investors and CDOs

While some investors purchased based entirely off the ratings given by the rating agencies, other investors did not. Instead, they understood a principle widely accepted in securities markets: ratings are a veil; markets in fact do price securities very differently from ratings. (Grant 2008, 181-83) If anything, ratings respond to market conditions as opposed to revealing market risk. Ratings downgrades are frequently reactive, not predictive.

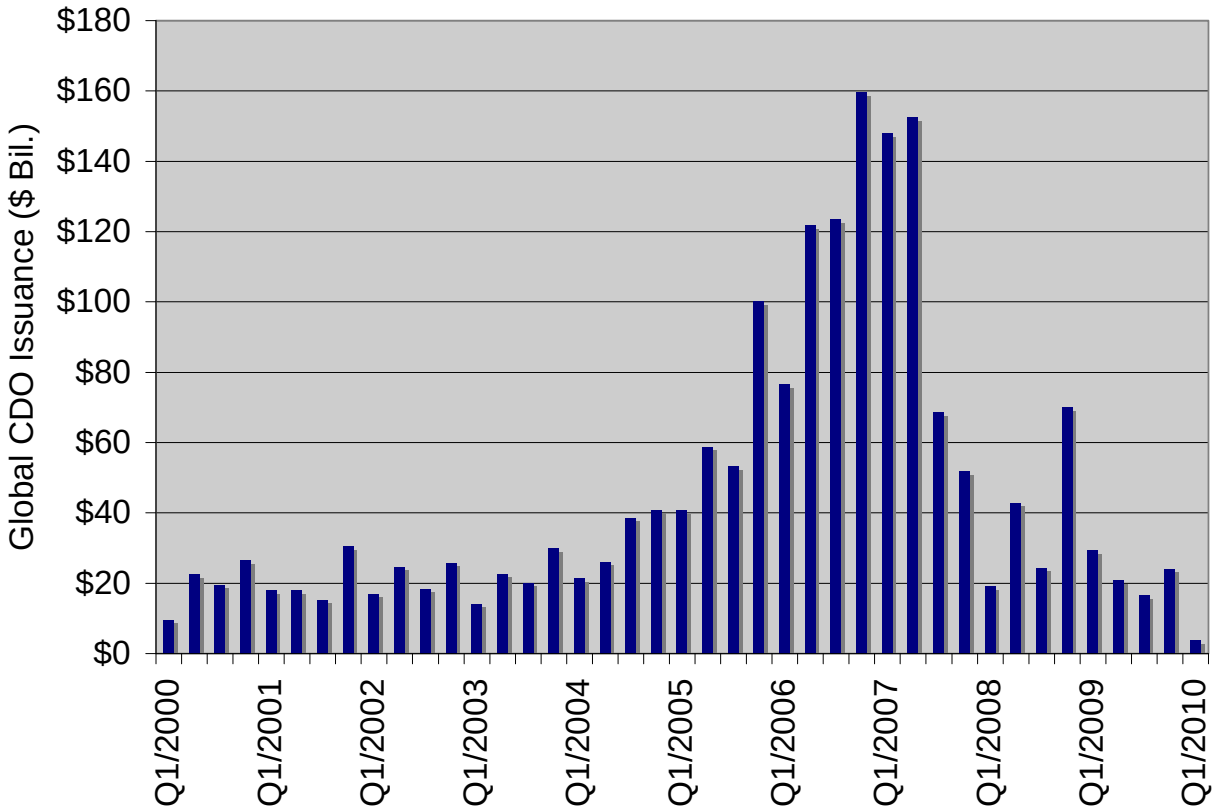
Indeed, some investors not only did not rely on the ratings, but they recognized the risks in PLS despite (or perhaps because of) PLS's complexity. Why didn't the risk premium demanded by these investors or short pressure cause a price correction? If the underlying real estate is overpriced, mortgages would be perceived as riskier and therefore, their costs would increase in the MBS market. In other words, their return would go up. The interest rate on the MBS would go up and that would of course dampen the rise of real estate prices because as interest rates increased, mortgage borrowers would have to pay higher interest and no longer would the mortgage be affordable.

Subordinated debt buyers often provide a natural limitation on risk. Subordinated debt investors tend to be more circumspect about credit risk precisely because they are the most exposed to it. Even with creative deal structuring not all tranches received AAA-ratings. While the lower-rated, junior tranches had higher yields, they were not always easy for underwriters to place with investors. Adelino has found that buyers of subordinated PLS often demanded a premium for investing in riskier deals. (Adelino 2009, 27). Subordinated debt investors' risk tolerance should have thus provided a limit on the expansion of PLS; if the junior tranches of PLS became too risky, investors simply would not buy.

The risk limitation on PLS provided by subordinated debt investors was largely (or at least temporarily) bypassed with the expansion of the collateralized debt obligation (CDO) market. (Adelson and Jacob 2008, 12). CDO is a generic term for securitizations, but deals referred to as CDOs typically involve a resecuritization of existing PLS. Resecuritization (with further tranching) transformed some of the junior (frequently called mezzanine) tranches of PLS into senior, investment-grade securities, albeit with a higher degree of implicit leverage. The junior tranches of the CDOs could then be resecuritized again as CDO^2s, again turning dross into investment-grade gold. By 2005, most subprime PLS were being resecuritized into CDOs. (Barnett-Hart 2009, 10-11). Resecuritization enabled investors to take on additional leverage, which meant that investors in resecuritizations were much more exposed to mortgage defaults than investors in MBS. (Grant, 2008). And because of the high correlation levels between real estate related assets in CDOs, a slight rise in mortgage default rates could have catastrophic results for CDO investors.

The rapid expansion of CDOs occurred in 2006-2007, during the middle and end of the bubble, as the drop in underwriting standards became apparent. (See Figure 5.) This was the period when subordinated debt investors would have begun to demand larger risk premiums and market appetite for direct investment in junior PLS tranches reached its limit. But, as noted in Figure 4, spreads were falling on PLS, and PLS issuance was expanding. (Deng, Gabriel, and Saunders 2008, 4, 28). This was only possible because CDOs thus enabled the PLS market to bypass the constraint of subordinated debt investors' limited risk appetite. CDOs thus likely lengthened the housing bubble by at least a third, making the decline all the more painful.

Figure 5. Growth of Collateralized Debt Obligations



C. Short Investors and CDS

Subordinated debt investors were not able to exert market pressure on PLS that would have controlled against the decline in underwriting standards, but what about short sellers? CDOs did not affect the ability of investors to take out short positions. As it turns out, PLS were uniquely immune to short pressure as well.

The real estate market presents particular problems for shorts. It is impossible to sell real estate itself short. The product is unique so the short seller cannot meet its delivery obligation. MBS can, in theory, be shorted directly, but given how illiquid they are, it is also a risky endeavor, and certainly not one that can be undertaken broadly across the market; the risk of

being unable to meet delivery obligations at some point would be too great. One illiquid asset, real estate, was augmented with another almost equally illiquid asset, OTC PLS.

It is possible, however, to short mortgages indirectly, by taking out derivative short positions on MBS using credit default swaps (CDS). A CDS is a form of credit insurance in which one party (the protection buyer) agrees to pay regular premia to the other party (the protection seller) until and unless a defined credit event occurs. Upon the occurrence of the credit event, the protection seller pays the protection buyer the agreed upon level of insurance coverage. A CDS is written on a particular bond, meaning that a single CDS is written on a single MBS tranche, not on an entire MBS deal.

The problem with using a CDS on an individual MBS tranche, is that it is difficult to find a counterparty who will take the long position as CDS protection seller. If the counterparty merely wants to be long on the MBS tranche, it is possible to buy the MBS tranche directly. Moreover, the counterparty will necessarily be suspicious that some sort of informational asymmetry exists between it and the short CDS protection buyer. Indeed, it is precisely because of this problem that investors like John Paulson (the short investor in the Goldman Sachs Abacus CDO scandal) and Magnetar (a hedge fund that executed a major shorting strategy on the housing market) had to use CDOs as their counterparties, rather than direct investors. While there is no data on the percentage of CDS protection sold by CDOs, it appears to have been a significant portion, if only because of the tremendous growth of synthetic and hybrid CDOs during 2006-2007.

The widespread use of CDS as a means of shorting MBS led to the development in 2006 of the ABX, a series of indices for tracking CDS pricing on MBS. While some have argued that the ABX was responsible for the bursting of the mortgage bubble (Genakpolous 2010), the ABX

has two severe limitations as a market discipline tool on mortgage finance. First, the ABX is an index. Indexes are only useful in tracking overall market movements, but do not impose meaningful market discipline on individual assets. For example, the performance of the S&P 500 index does not indicate anything about the particular performance of one of the five hundred individual underlying stocks tracked by the index.

The ABX suffers further from being a very narrowly based index. ABX series track the weighted average price of 20 CDS on particular MBS tranches of (primarily subprime) PLS. Thus, even assuming that CDS are priced accurately (and given that they are relatively illiquid and traded OTC, this is doubtful), the ABX does not reflect the risk in most deals, or even in all tranches of the deals in tracks. This means riskier tranches can free-ride off of less risky ones in terms of ABX discipline, and riskier deals can free-ride off of less-risky ones included in the ABX. Given the heterogeneity of MBS deals, the pricing of CDS on one deal might not mean much relative to another deal. The usefulness of the ABX as a market discipline tool is severely limited because it is an index.

The second limitation of the ABX is that it reflects not only the default risk on the particular MBS tranches, but also counterparty risk. For example, the ABX for BBB-rated MBS originated in the first half of 2006 started running up in 2008 and then spiked suddenly in the fall of 2008, right around the time of Lehman Brother's bankruptcy filing, after which it promptly fell back to historical levels. The risk level of MBS originated in 2006 MBS did not change come 2008; the underwriting of the mortgages was what it had been all along, and housing prices had already peaked at this point. Nor did these mortgages abruptly become riskier and then around the time of Lehman's bankruptcy filing. Instead, of displaying mortgage risk, the ABX was

displaying counterparty risk. The inability to sort out MBS credit and CDS counterparty risk limits the usefulness of the ABX as a market discipline device.

Smart money shorts were unable to impose market discipline on housing finance markets, as did credit ratings. The expansion of resecuritization via CDOs removed the natural risk appetite limitation on mortgages, and regulation was non-existent in the PLS market, and largely absent in the mortgage origination market.[xiii] The result was that informationally limited investors failed to accurately price for risk and overinvested in MBS.

CONCLUSION

When there is a return on heterogeneity and complexity for originators and securitizers, one can, in the absence of effective regulatory oversight, expect heterogeneity and complexity to prevail. This suggests a critical role for regulation as the housing finance system is redesigned and rebuilt. Regulation must concentrate on correcting the informational failures in the housing finance market, and the starting point for this is standardization of MBS.

GSE securitization functioned well up through the housing bubble. The GSEs' failure did not stem from poor underwriting on their securitizations, but rather from downgrades on PLS in their investment portfolios that left the GSE undercapitalized and therefore unable to carry on their MBS guaranty business.

Historically, in the United States and Europe, securitization has succeeded only when credit risk has been borne implicitly or explicitly by the government. (Snowden 1995, 270). Shifting credit risk to the government is but a form of standardization that alleviates the need for investors to analyze credit risk. GSE securitization standardized credit risk by having the GSEs guaranty all of their MBS, and having the implicit backing of the United States government behind that guaranty. A government-backed mortgage finance market poses its own problems,

however, such as the socialization of risk and the politicization of underwriting standards. It may well be that lesser forms of standardization—of mortgages and MBS, rather than of credit risk—are sufficient to enable adequate risk pricing without forcing a trade off between market stability and risk socialization.

To standardize MBS, it is necessary not only to standardize deal structure features, such as tranching structures and other credit enhancements, but also the underlying mortgages and origination procedures, including documentation requirements. Borrower risk is stochastic, but the risk from particular mortgage products is not.

Standardizing MBS does not mean eliminating consumer choice for mortgages. The US has historically always had niche products, and there will always be borrowers for whom these products are appropriate. But niche products should not be securitized. They involve distinct risks and require more careful underwriting and should remain on banks books. If securitization were restricted to a limited menu of mortgage forms—the "plain vanilla" 30-year fixed, the "plain chocolate" 15-year fixed, and the "strawberry" 5/1 or 7/1 adjustable-rate mortgages—investors would not be taking on mortgage product risk.

Moreover, by limiting securitization to "Neapolitan" mortgages, certain underwriting standards would be hard-wired into securitization. There is a limit to how weak borrower credit can be with a fully-amortized product. Interest-only, pay-option, hybrid-ARM, and 30/40 balloon mortgages and other such short-term affordability products present markets with a "Rocky Road," because they enable weaker or aspirational borrower to get financing that has a high likelihood of failure and that encourages cyclical expansions of credit and housing price increases.

Standardization would restrict investor choices, but we do not believe this to be a critical cost. Investors have far more investment options than homeowners have mortgage product options, and the marginal loss in choice for investors is minimal. And while structured finance has long prided itself on offering securities that are bespoke to particular investors' needs, most PLS deals (unlike CDOs), were not designed for particular investors. Thus, standardization of PLS offerings is unlikely to restrict choice for investors in a detrimental way; it is hard to believe that investors want prime jumbos to be largely standardized, but not nonprime PLS. Indeed, standardization arguably benefits investors by increasing liquidity, which increases the value of securities.

In this paper we take no position as to the form of the future secondary housing finance market—whether it is completely privatized, run through cooperatives, run as a public utility, run through GSEs, or even completely nationalized. Instead, our point to emphasize that regardless what form the secondary housing finance market takes, it is necessary that the same regulatory standards apply across the board, and that these regulatory standards include product standardization.

Securitization is necessary to guarantee the widespread availability of the 30-year fixed rate mortgage, which has been the cornerstone of American homeownership since the Depression. The 30-year fixed is uniquely consumer-friendly product, but also one that promotes housing market stability. Requiring standardization of securitization around well-tested, seasoned products is the only sure method of addressing the principal-agent problem endemic to securitization and ensuring that securitization is a means of enhancing consumer welfare and systemic stability rather than a source of systemic risk.

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[i] Robert J. Shiller has suggested that housing derivatives could be used to hedge home price fluctuations (Shiller 2009, 17). Shiller has suggested that housing futures are not used as a hedging device by homeowners either because the do not want to face the fact that they might lose money or because the consumption value of housing is itself a hedge against its market value. (Shiller 2009, 27-30). While both of these factors may be at play, we believe there is a simpler one: housing derivatives are poor hedges against home price decline. Housing derivates only exist for metropolitan statistical areas (MSA), not for particular neighborhoods or blocks. There is only weak correlation between price changes in a MSA and for a particular house. For example, housing prices in Chevy Chase, Maryland bear little if any correlation to those in Loudon County, Virginia, Prince George’s County, Maryland, Frederick, Maryland, or Southeast Washington, D.C., although all are with in the same MSA. In theory, there could be housing futures on a particular neighborhood or block, but such narrowly focused futures would be very thin, illiquid markets and thus poor hedges, as the derivative’s value might not move in time with housing values.

[ii] The S&L crisis was subsequently exacerbated by regulatory forbearance, as regulators allowed insolvent S&Ls to continue operating by letting them count "regulatory goodwill" toward their capital. Insolvent S&Ls were attracted to high risk investment strategies because there was no risk capital at stake. Accordingly, S&Ls successfully lobbied to be allowed to invest in commercial real estate and moved aggressively into that market, where their losses were exacerbated, as the decapitalized S&LS made risky, double-down bets because equity, which chose management, was out of the money and gambling with creditors' funds.

[iii] In additional to Fannie Mae and Freddie Mac, there were the 12 Federal Home Loan Banks, another smaller GSE system.

[iv] Investors would be concerned only to the extent that defaults affected prepayment speeds.

[v] Admittedly, defaults affect prepayment speed, but in GSE securitized pools, the GSEs replace defaulted loans with performing ones, so prepayment speed should be largely unaffected.

[vi] The possibility of a federal bailout by being too-big-to-fail did raise potential moral hazard problems for the GSEs, which could have undermined their underwriting quality. It is notable, however, that the GSEs' failure was not due to shoddy underwriting on the mortgages they purchased, but to losses in their investment portfolio. The GSEs were major purchasers of PLS. Robert Stowe England, *The Rise of Private Label*, Mortgage Banking, Oct. 1, 2006 ("In the subprime RMBS category, for example, Fannie Mae and Freddie Mac are big buyers of AAA-rated floating-rate securities. Indeed, Fannie and Freddie are by far the biggest purchasers of subprime RMBS.") At the end of 2006, they held about 11% of the outstanding subprime MBS, James B. Lockhart III, "GSE Challenges: Reform and Regulatory Oversight. Speech at MBA's National Secondary Market Conference and Expo, May 21, 2007, *at*

http://www.mortgagebankers.org/files/CREF/docs/2007/RegulatoryandLegislativeRoundup-JamesB.LockhartIII.pdf, but they appear to have increased their marketshare subsequently. By June 2008, 29% of MBS in the GSEs' investment portfolios were PLS. While some of these were jumbos, there was still a substantial component of alt-A and subprime PLS in the portfolios.

Although the GSEs only invested in highly-rated tranches of subprime MBS, but these tranches were vulnerable to ratings downgrades. As AAA-subprime MBS were downgraded, the GSEs were forced to recognize large losses in their trading portfolios. Because the GSEs were highly leveraged, these losses ate heavily into the GSEs' capital, which undermined their MBS guaranty business; the GSEs' guaranty is only valuable to the extent that the GSEs are solvent.

[vii] PLS investors are almost entirely institutional investors. Many institutional investors want to purchase AAA-rated securities. Sometimes this is just because these securities are perceived as being very safe investments, albeit with a higher yield than Treasuries. Often, though, institutional investors are either restricted to purchasing investment grade or AAA-securities (by contract or regulation) or received favorable regulatory capital treatment for AAA-rated assets. Only a handful of corporate securities issuers have a AAA-rating, so structured products were the major source of supply for the AAA-securities demand. As Lloyd Blankfein, CEO of Goldman Sachs noted, "[i]n January 2008, there were 12 triple A–rated companies in the world. At the same time, there were 64,000 structured finance instruments...rated triple A." (Blankfein 2009, 7).

[viii] For example, for Wells Fargo Mortgage-Backed Securities 2003-2 Trust, jumbo deal consisting of mainly prime or near prime (alt-A) jumbos, 98.7% of the securities by dollar

amount were rated AAA. *See* Prospectus, dated Feb. 27, 2003, *at* http://www.secinfo.com/dsVsn.2h2.htm.

[ix] Inside Mortgage Finance, 2010 Mortgage Market Statistical Annual.

[x] Intentional falsification of information in disclosures would violate the securities laws, but the Private Securities Litigation Reform Act of 1996 makes it very difficult for investors to bring suit over such a problem. Investors would have to plead fraud with specific factual allegations, but it would be hard for investors to obtain such facts absent discovery, which they could only get if their pleading were sufficient. PLS trustees could, in theory, bring suit, and they would have greater access to information, but PLS trustees have no incentive to bring suit, and without the ability to plead specific facts, it is unlikely that PLS investors could force the trustee to bring suit. Tort reform has thus created a Catch-22 for PLS investors.

[xi] The potential for a "lemons" problem in securitization has long been noted. (Hill, 1996). The bubble and its aftermath play out Akerlof's lemon's problem exactly has predicted. Once a market becomes a market for lemons, it contracts, which is just what happened starting in the fall of 2007, as the weakness of the mortgage market became apparent.

[xii] *See, e.g.,* Prospectus Supplement dated August 23, 2005 (to Prospectus dated June 23, 2005), Ace Securities Corp. Home Equity Loan Trust, Series 2005-HE5, S-21-S-33, *at* http://www.secinfo.com/dScj2.z5Tk.htm#1kbi.

[xiii] Congressional legislation began the deregulation of mortgages in the 1980s with two key federal statutes, the Depository Institutions Deregulation and Monetary Control Act of 1980, Pub. L. No. 96-221, 94 Stat. 161 (codified at 12 U.S.C. §§ 1735f-7(a)-1735f-7a(f) (2006)) and the Alternative Mortgage Transaction Parity Act of 1982, Pub. L. No. 97-320, 96 Stat. 1545 (codified at 12 U.S.C. § 3803(a)(3)). These statutes preempted state usury laws for first-lien

mortgages and state regulation of nontraditional mortgages. The statutes did not replace the state regulation with alternative federal regulation. Federal regulatory agencies expanded the scope of federal preemption of state regulations again without substituting federal regulation, (Levitin, 2009: 124), and the Federal Reserve failed to act on its regulatory authority under the Home Ownership and Equity Protection Act (HOEPA) to regulate high-cost mortgages.