

THE HOUSING BUBBLE

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There is little consensus as to the cause of the housing bubble that precipitated the financial crisis of 2008. Numerous explanations exist: misguided monetary policy; a global savings surplus; government policies encouraging affordable homeownership; irrational consumer expectations of rising housing prices; inelastic housing supply. None of these explanations, however, is capable of fully explaining the housing bubble.

This Article posits a new explanation for the housing bubble. First it demonstrates that the bubble was a supply-side phenomenon, attributable to an excess of mispriced mortgage finance: mortgage finance spreads declined and volume increased, even as risk increased, a confluence attributable only to an oversupply of mortgage finance.

Second, it explains the mortgage finance supply glut as resulting from markets failing to price risk correctly due to the complexity, opacity, and heterogeneity of the unregulated private-label mortgage-backed securities (PLS) that began to dominate the market in 2004. The rise of PLS exacerbated informational asymmetries between the financial institutions that intermediate mortgage finance and PLS investors. These intermediation agents exploited informational asymmetries to encourage overinvestment in PLS that boosted the financial intermediaries' volume-based profits and enabled borrowers to bid up housing prices.

The Article proposes the standardization of PLS as an information-forcing device. Reducing the complexity and heterogeneity of PLS would facilitate accurate risk pricing, which is necessary to rebuild a sustainable, stable housing finance market.

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INTRODUCTION

This Article explains the historic U.S. housing bubble. From 1997 to 2006, nominal U.S. housing prices rose 188%.¹ By mid-2009, however, housing prices had fallen by 33% from peak.² As the United States attempts to rebuild its housing finance system, it is of paramount importance to understand what caused the housing bubble. Until we understand how and why the housing bubble occurred, we cannot be certain that a reconstructed housing finance system will not again produce such a devastating bubble.

There is little consensus about what caused the bubble,³ or even on what part of the housing price appreciation between 1997 and 2006 was in fact a bubble.⁴ Some explanations, based on macroeconomics, posit that the bubble was caused by excessively easy monetary policy. Thus, some scholars have argued that the bubble was the result of the Federal Reserve holding interest rates too low for too long, resulting in artificially cheap mortgage credit and thereby stoking housing demand.⁵ Other scholars have pointed to the global savings glut that set pushed down interest rates.⁶ Several commentators have fingered federal government fair lending and affordable housing policies as encouraging mortgage lending to less-creditworthy consumers.⁷ Other scholars have emphasized the sharp deterioration in lending standards as contributing

¹ S&P/Case-Shiller Housing Price Index (Composite-10) (nominal prices). When adjusted for inflation, the increase in housing prices was still an astounding 135%.

² *Id.* On an inflation-adjusted basis, the peak-to-trough price decline was 38%.

³ See Edward L. Glaeser *et al.*, *Can Cheap Credit Explain the Housing Boom?*, NBER Working Paper, No. 16230, July 2010.

⁴ See *infra*, section II.B. See also generally, FINANCIAL CRISIS INQUIRY COMMISSION, FINAL REPORT, Jan. 2011.

⁵ JOHN B. TAYLOR, *GETTING OFF TRACK: HOW GOVERNMENT ACTIONS AND INTERVENTIONS CAUSED, PROLONGED, AND WORSENE THE FINANCIAL CRISIS* (2009).

⁶ Ben S. Bernanke *et al.*, *International Capital Flows and the Returns to Safe Assets in the United States, 2003-2007*, Feb. 2011, at <http://www.federalreserve.gov/pubs/ifdp/2011/1014/ifdp1014.htm> [hereinafter Bernanke, *International Capital Flows*]; Ricardo Caballero & Arvind Krishnamurthy, *Global Imbalances and Financial Fragility*, 99 AM. ECON. REV. PAPERS & PROCEEDINGS 584 (2009); Ben S. Bernanke, *Global Imbalances: Recent Developments and Prospects*, the Bundesbank Lecture, Berlin, Germany, Sept. 11, 2007 [hereinafter Bernanke, *Global Imbalances*]; Ben S. Bernanke, *The Global Savings Glut and the U.S. Current Account Deficit*, the Sandridge Lecture, Va. Ass'n of Economists, Richmond, Va., Mar. 10, 2005 [hereinafter Bernanke, *Global Savings Glut*].

⁷ See, e.g., Peter Wallison, Dissenting Statement, FINANCIAL CRISIS INQUIRY COMMISSION FINAL REPORT, Jan. 2011, at 444 (“the sine qua non of the financial crisis was U.S. government housing policy, which led to the creation of 27 million subprime and other risky loans—half of all mortgages in the United States—which were ready to default as soon as the massive 1997-2007 housing bubble began to deflate. If the U.S. government had not chosen this policy path—fostering the growth of a bubble of unprecedented size and an equally unprecedented number of weak and high risk residential mortgages—the great financial crisis of 2008 would never have occurred.”); Edward Pinto, *Acorn and the Housing Bubble*, WALL ST. J., Nov. 12, 2009; Peter Wallison, *The True Origins of the Financial Crisis*, AM. SPECTATOR, Feb. 2009; Peter Wallison, *Cause and Effect: Government Policies and the Financial Crisis*, AEI ONLINE, Nov. 2008; THOMAS SOWELL, *THE HOUSING BOOM AND BUST* (2009).

to the rise in housing prices,⁸ as well as the importance of changes to the mortgage market institutional structure.⁹

Other explanations of the bubble have been demand-side explanations, meaning that the bubble was caused by excessive consumer demand for housing. One leading explanation argues that the bubble was the result of irrational demand encouraged by a belief that housing prices could only move upwards.¹⁰ Other research points to the fundamentals of housing markets, particularly population growth, placing upward pressures on housing prices in markets with inelastic housing supply, thereby explaining some of the geographic variation in the housing bubble.¹¹

⁸ Giovanni Dell'Ariccia *et al.* *Credit Booms and Lending Standards: Evidence from the Subprime Mortgage Market*, Int'l Monetary Fund Working Paper (2008) (noting that "lending standards declined more in areas with higher mortgage securitization rates"); Yuliya Demyanyk & Otto Van Hemert, *Understanding the Subprime Mortgage Crisis*, REV. FIN. STUDIES (2008). Geetesh Bhardwaj & Rajdeep Sengupta, *Where's the Smoking Gun? A Study of Under-writing Standards for U.S. Subprime Mortgages*, Fed. Reserve Bank of St. Louis Working Paper No. 2008-036A; Patricia A. McCoy *et al.*, *Systemic Risk through Securitization: The Result of Deregulation and Regulatory Failure*, 41 CONN. L. REV. 493 (2009) (arguing the ability to pass off risk allowed lenders who lowered standards to gain market share and crowd out competing lenders who did not weaken credit standards); Kurt Eggert, *The Great Collapse: How Securitization Caused the Subprime Meltdown*, 41 CONN. L. REV. 1257 (2008-2009) (arguing that securitization encouraged market participants to weaken underwriting standards); Christopher Peterson, *Predatory Structured Finance*, 28 CARDOZO L. REV. 2185 (2007).

⁹ Benjamin J. Keys *et al.*, *Financial Regulation and Securitization: Evidence from Subprime Mortgage Loans*, 56 J. MONETARY ECON. 700 (2009); Benjamin J. Keys *et al.*, *Did Securitization Lead to Lax Screening? Evidence from Subprime Loans*, 125 Q. J. ECON. 307 (2010); Atif Mian *et al.*, *The Political Economy of the US Mortgage Default Crisis*, NBER Working Paper No. 14468, November (2008) (finding correlation between increase in mortgage securitization and expansion of mortgage credit in subprime ZIP codes, unassociated with income growth); Atif Mian & Amir Sufi, *The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis*, 122 Q. J. ECON. 1449 (2009) (homeequity borrowing accounts for a large share of the rise in household leverage during the bubble as well as defaults); Atif Mian & Amir Sufi, *Household Leverage and the Recession of 2007 to 2009*, NBER Working Paper No. 15892, April 2010. *But see* Ryan Bubb & Alex Kaufman, *Securitization and Moral Hazard: Evidence from a Lender Cutoff Rule*, Fed. Reserve Bank of Boston Public Pol'y Discussion Paper, No. 09-5, Sept. 2009 (arguing that securitization did not result in riskier lending); Amir Khandani *et al.*, *Systemic Risk and the Refinancing Ratchet Effect*, NBER Working Paper No. 15362, Sept. 2009 (easy refinancing facilitated widespread home equity extraction resulted in an inadvertent coordination of leverage and default cycle among homeowners); Jack Favilukis *et al.*, *Macroeconomic Implications of Housing Wealth, Housing Finance, and Limited Risk-Sharing in General Equilibrium*, May 7, 2010, SSRN Working paper, available at <http://ssrn.com/abstract=1602163> (boom was a response to a relaxation of credit constraints and a decline in transaction costs for home purchases and refinancings).

¹⁰ ROBERT J. SHILLER, *IRRATIONAL EXUBERANCE* (2d ed. 2006). *But see* Christopher J. Mayer & Todd Sinai, "U.S. House Price Dynamics and Behavioral Finance," in *POLICY MAKING INSIGHTS FROM BEHAVIORAL ECONOMICS* 266, 290 (Christopher L. Foote *et al.*, eds.) (2009) (suggesting that fundamental factors like long-term interest rates, rather than psychological factors were dominant in the housing bubble of the 2000s). An alternative demand-side theory looks to behavioral economics and suggests that consumers' cognitive failure to disentangle real and nominal interest rates results in an overestimation of the value of real estate in times of falling inflation. Markus K. Brunnermeier & Christian Julliard, *Money Illusion and Housing Frenzies*, 21 REV. FIN. STUD. 135 (2008) (arguing that because consumers cannot disentangle real and nominal changes in interest rates and rents, consumers fail to recognize that when expected inflation falls, future price and rent appreciation, not just nominal interest rates, will also fall).

¹¹ Edward L. Glaeser *et al.*, *Housing Supply and Housing Bubbles*, 64 J. URBAN ECON. 198 (2008), available at <http://www.economics.harvard.edu/faculty/glaeser/files/bubbles10-jgedits-NBER version-July 16, 2008.pdf>. *See also* Thomas Davidoff, *Supply Elasticity and the Housing Cycle of the 2000s*, working paper, Mar. 2, 2010, at <http://ssrn.com/abstract=1562741>.

In this Article, we challenge the existing explanations of the housing bubble as at best incomplete. While we recognize the bubble as multi-causal, we set forth a new, and, we believe, more convincing explanation of what was the primary driver of the bubble. We argue that the bubble was, in fact, primarily a *supply-side* phenomenon, meaning that it was caused by excessive supply of housing finance. The supply-glut was not due to monetary policy or government affordable housing policy, however, although the former did play a role in the development of the bubble. Instead, the supply-glut was the result a fundamental shift in the structure of the mortgage finance market from regulated to unregulated securitization.

The unregulated, private securitization market is rife with information asymmetries between financial institutions and investors. These asymmetries were exploited by financial institutions at the expense of investors (which often included other units of the same institutions), who underpriced for risk and thus oversupplied mortgage credit, while the financial institutions siphoned out profit on every transaction. The shift from regulated, government-sponsored securitization to unregulated private securitization as the principal method of funding mortgage loans was the primary cause of the housing bubble.

We do not claim that the shift in the securitization market was the sole cause of the housing bubble; other factors undoubtedly contributed in important ways. We do, however, claim that this market shift from a regulated to unregulated financing market was the leading cause and that without it there would not have been a bubble. In other words, the explanation we present of the housing bubble is deregulation of housing finance. This was not primarily deregulation through legislation.¹² Instead, the critical deregulation was the failure to ensure that existing regulatory schemes applied to the mortgage products irrespective of their financing channel.

¹² Deregulatory legislation, such as the Commodities Futures Modernization Act of 2000, P.L. 106-554, 114 Stat. 2763, §§101(12) 105, 117, 407 (excluding covered bank swap agreements from Commodity Futures Trading Commission jurisdiction), *codified at* 7 U.S.C. §§1a(12) (definitions) 2(g) (exclusion of OTC swaps from federal regulation), 16(e)(2) (preemption of state law), and the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005, P.L. 109-8, 119 Stat. 23, §§ 901-907, *codified at* 11 U.S.C. *passim* (broadening financial contract safeharbors in bankruptcy), did contribute to the housing bubble, as did as the failure of the Federal Reserve to act on its existing authority under the Home Owners Equity Protection Act (HOEPA) to rein in predatory lending. *See* THE FINANCIAL CRISIS INQUIRY COMMISSION, *THE FINANCIAL CRISIS INQUIRY REPORT: FINAL REPORT OF THE NATIONAL COMMISSION ON THE CAUSES OF THE FINANCIAL AND ECONOMIC CRISIS IN THE UNITED STATES* 74-80 (2011). *See also* Donald P. Morgan *et al.*, *Subprime Foreclosures and the 2005 Bankruptcy Reform*, FED. RESERVE BANK OF N.Y. POL'Y REV. (forthcoming 2011), at <http://www.newyorkfed.org/research/epr/forthcoming/1102morg.pdf> (arguing that the 2005 BAPCPA made it more difficult for debtors to free up income to pay their mortgages by discharging unsecured debt and thereby contributed to subprime mortgage foreclosures).

From 1997, when housing prices began to rise, through 2003, the appreciation in the housing market can be explained by economic fundamental values—the cost of home purchase relative to renting and interest rates—meaning that houses prices were not overvalued. After 2003-2004, however, fundamentals cease to explain housing prices. A major change occurred in the market in 2003-2004. The market shifted from financing mortgages using regulated securitization to the use of unregulated securitization. The unregulated securitization market featured complex, opaque, and heterogeneous products with serious informational asymmetries between financial intermediaries and investors. Because of the nature of these products, investors underpriced risk, overvalued securities, and oversupplied mortgage finance. The oversupply of mortgage credit enabled borrowers to bid up housing prices, thereby fueling a bubble as higher housing prices enabled a greater supply of credit for refinanced mortgages by increasing the apparent value of the collateral. This cycle of higher home prices and refinancing boosted financial intermediaries' volume-based profits, which encouraged them to continue the cycle.

Securitization—the pooling of loans and issuance of securities backed by the cash flow from those loans—provides the financing for the vast majority of mortgages in the United States. Mortgage securitization involves a chain of financial institutions intermediating between the capital markets, which supply mortgage credit, and borrowers, who consume mortgage credit. The financial institutions that originate and securitize loans serve as economic (but not legal) agents for the end borrowers and lenders. 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 in mortgage loan transactions.

Prior to 2003-2004, most mortgage-backed securities (MBS) were issued by regulated government-sponsored entities¹³ (GSEs) Fannie Mae¹⁴ and Freddie Mac¹⁵ and the federal agency Ginnie Mae¹⁶ (collectively with the GSEs, the “Agencies”). In 2003-2004, the market shifted radically toward MBS issued by unregulated “private-label” securitization conduits, typically operated by investment banks. The shift from regulated Agency to unregulated private-label securitization

¹³ Historically, the GSEs were federal agencies, but since 1968, they have been privately-owned, but chartered by the federal government and subject to federal regulation.

¹⁴ Fannie Mae is a portmanteau for Federal National Mortgage Association.

¹⁵ Freddie Mac is a portmanteau for the Federal Home Loan Mortgage Corporation.

¹⁶ Ginnie Mae is a portmanteau for the Government National Mortgage Association.

created a “shadow GSE” sector, just as the highly regulated banking sector was displaced by an unregulated “shadow banking” sector.¹⁷

The shift in securitization channels occurred as financial institutions sought to maintain earnings levels that had been elevated during 2001-2003 by an unprecedented refinancing boom due to historically low interest rates. Earnings depended on volume, so maintaining elevated earnings levels necessitated expanding the borrower pool using lower underwriting standards and new products that the Agencies would not (initially) securitize. Thus, the shift from Agency securitization to private-label securitization also corresponded with a shift in mortgage product type, from traditional, amortizing, fixed-rate mortgages (FRMs) to nontraditional, structurally riskier, non-amortizing, adjustable-rate mortgages (ARMs), and in the start of a sharp deterioration in mortgage underwriting standards.

The growth of private-label securitization resulted in the oversupply of underpriced housing finance. As we demonstrate empirically, starting in 2003-2004, risk premiums for housing finance fell and the market expanded even as market risk was rapidly rising. This set of circumstances—a decrease in risk-adjusted price coupled by an increase in quantity—can occur only because of an increase in the supply of housing finance that outpaces any increase in demand. In other words, demand-side factors like irrational consumer demand and inelastic housing supply may have played a role in the bubble, but their total effect on increased consumer demand was less than the increase in the supply of housing finance.

Private-label mortgage-backed securities (PLS) facilitated overinvestment because they are informationally opaque.¹⁸ PLS and the nontraditional mortgages they finance are heterogeneous, complex products.¹⁹ The structure of these products made it very difficult to

¹⁷ Zoltan Poszar *et al.*, *Shadow Banking*, FED. RESERVE BANK OF N.Y. STAFF REP. NO. 458 (2010) (describing shadow banking as a financing system relying on short-term debt obligations other than insured deposits).

¹⁸ See generally Steven L. Schwarcz, *Rethinking the Disclosure Paradigm in a World of Complexity*, 2004 U. ILL. L. REV. 1, 19 (arguing that many securities transactions are “so complex that less than a critical mass of investors can understand them in a reasonable time period [so] the market will not reach a fully informed price equilibrium, and hence will not be efficient.”).

¹⁹ Joseph R. Mason & Joshua Rosner, *Where Did the Risk Go? How Misapplied Bond Ratings Cause Mortgage Backed Securities and Collateralized Debt Obligation Market Disruptions*, May 14, 2008, at <http://ssrn.com/abstract=1027475>, at 3, 5, 18 (noting that “change in origination and servicing practices, along with the existing complexity of RMBS, results in greater opacity in the RMBS market” and that “increased grading of risk induced increased complexity, and therefore increased opacity” and that “the lack of liquidity, transparency, history and available data coupled with unprecedented complexity has made it difficult for all but the most well funded, well staffed and most sophisticated to analyze the markets or assets.”); Gillian Tett, *Credit rating groups under microscope*, AUSTRALIAN, Apr. 10, 2007, available at <http://www.theaustralian.news.co.au/0,20867,21152895336375,00.html> (“structured products such as collateralized debt obligations and collateralized loan obligations are unusually opaque products and

accurately gauge and hence price their risk. The heterogeneity of the PLS made PLS illiquid and prevented price discovery through market trades. In the presence of such informational opacity, informational asymmetries between the financial institution sellers of PLS and PLS investors abound.

Financial institutions exploited these informational asymmetries to boost mortgage origination and securitization volume and thus their profits, which derive from fees taken at every stage of the origination and securitization process. In this fee-driven business model, increased volume meant increased profit, so financial institutions were incentivized to make and securitize as many mortgages as possible.

Increasing the mortgage product for securitization necessitated expanding the pool of mortgage borrowers. This required lowering underwriting standards and promoting nontraditional mortgage products with initially affordable payments. The easy mortgage credit that resulted from the growth of PLS enabled housing prices to be bid up, thereby creating a bubble that collapsed, like a pyramid scheme, once the market could no longer be expanded.

Correcting the informational failures in housing finance is critical for preventing future bubbles. Real estate is an area that is uniquely prone to bubbles because of lack of short pressure. For either markets or regulators to prevent bubbles, real time information about the cost of credit is required, as asset bubbles are built on the shoulders of leverage. The two components of the cost of credit are the interest rate and risk premium. The former is easily observable, but the latter—which includes underwriting standards—cannot currently be observed in real time. For markets and regulators to prevent bubbles, they must be able to observe the credit risks imbedded in financing.

Greater disclosure alone is insufficient to reveal the character of credit in the housing finance market because of the difficulties in modeling credit risk for heterogeneous, complex products with little track record. Correcting the informational failures in housing finance requires not only better disclosure about the mortgage loans backing MBS, but also substantive regulation, including standardization, of mortgage underwriting practices, mortgage forms, and MBS credit structures in order to make disclosures effective. Put differently, disclosure-based regulation in the housing finance market can only be effective when it is coupled with regulation of substantive terms in order

investors cannot see through to the credit quality of the underlying borrowers making interest and principal repayments on those securities...Because of the opacity and complexity of these debt instruments, investors such as pension schemes are more dependent on guidance from rating agencies.”).

to make risks salient and therefore priceable. Product standardization makes risks salient by focusing analysis on narrow parameters for variation.

Standardization of MBS would not mean that financial institutions could not make nontraditional mortgages, only that they could not sell them into capital markets. There are appropriate niches for nontraditional products, but the informational asymmetries and principal-agent problems endemic to securitization counsel for restricting these exotic products to banks' books. Instead, secondary market standardization facilitates the transparency of the character of credit and therefore is critical to the prevention of future real estate bubbles and ensuring a stable and sustainable housing finance system.

It bears emphasis that we are not propounding a monocausal explanation of the bubble. The bubble was the product of numerous factors. Rather, our claim is that the bubble was primarily a supply-side phenomenon, and the supply-side glut was driven by first and foremost by information failures resulting from the proliferation of PLS. Our explanation is consistent with arguments that there was an increase for demand in housing; we claim only that the supply grew faster than the demand and that this supply growth was fueled by the change in the financing channel. Moreover, explaining the oversupply of mortgage credit as deriving primarily from information failures does not deny the role of agency problems or even affordable housing policy. Without the shift in the securitization market and resulting over-supply of housing finance, however, there would never have been a bubble of anything like the magnitude of that of 2004-2007.

The Article proceeds as follows. Part I considers the changes in the securitization market that begat the housing bubble, particularly the rise of PLS and nontraditional mortgage products.

Part II of the Article presents a new explanation of the housing bubble. It demonstrates that the bubble was a supply-side phenomenon that began in 2003-2004, and that it corresponded with a shift in the mortgage securitization market from Agency securitization of traditional FRMs to private-label securitization of nontraditional ARMs. Part II.A. presents new data on PLS pricing that shows that risk-adjusted spreads on PLS over Treasuries declined even as PLS volume rose during the bubble. In other words, the price of mortgage finance decreased while the quantity was increasing. This phenomenon is only consistent with an outward (rightward) shift in the housing finance supply curve that outstripped any shift in the demand curve.

Part II.B turns to the timing of the bubble, a matter of some controversy, and a critical shibboleth for any theory of the bubble. We argue that the best evidence points to the bubble being a short-lived phenomenon that began in 2003-2004 and ended by 2007. The combination of the supply-side nature of the bubble and the timing of the bubble aligns with the timing of the change in financing channels from GSE securitization to PLS securitization.

Part III turns to a consideration of theories of the housing bubble—irrational exuberance, inability of consumers to distinguish real and nominal interest rates resulting in excess consumer demand, housing supply inelasticity, affordable housing policies, and monetary policy and global savings imbalances. It shows that they are at best incomplete, and, at worst, contrary to all evidence.

Part IV explains why the oversupply of mispriced mortgage finance was the result of the shift from regulated Agency securitization to unregulated private-label securitization. A shift in financing channels does not itself a bubble make, but the shift from GSE to PLS securitization enabled the financial institutions involved in PLS to exploit the informational asymmetries between securitizers and investors that exist in nontraditional mortgages and PLS. The result was investors mispricing risk and oversupplying mortgage capital, thereby boosting financial institution intermediaries' profits and encouraging further expansion of the PLS market.

Part IV also shows how, in the PLS market, the normal market constraints on declining mortgage and MBS underwriting quality—credit ratings, debt market discipline (including limited risk appetite from savvy subordinated debt investors), and short pressures—all failed, thereby enabling a bubble.

Part V concludes with a call for standardization of MBS as an information-forcing device and a proposal for restricting securitization to a limited set of proven traditional mortgage products.

Our Article makes five novel contributions to the literature on the housing bubble and the financial crisis. First, we present new empirical evidence that proves the bubble to have been a supply-side, rather than a demand-side phenomenon. Pinpointing the cause of the housing bubble is critical for evaluating whether and how future asset bubbles, particularly in housing, can be prevented.

Second, we present a failure-to-regulate theory of the housing bubble that explains the oversupply of underpriced mortgage credit. The bubble grew because housing finance was permitted to shift from a regulated to an unregulated space, where financial institutions were able

and incentivized to exploit informational asymmetries. The bubble was not the result of regulation, but of *lack* of regulation. Our theory explains why normal market constraints on excessive risk failed, why the bubble grew when it did, and why it collapsed when it did. Existing theories of the housing bubble have thus far been incapable of explaining the timing of the bubble or accounting for the dramatic shift in the mortgage market's structure.

Third, our Article represents the first foray of legal literature into a consideration of the institutional and regulatory structure for the secondary housing market. There is little written about the legal structure of the United States secondary housing finance market, despite mortgage-related securities being the largest single asset class in the United States economy. What limited literature there is on focuses on the regulation of certain segments of the market; we know of no prior work that addresses larger questions of institutional and market structure and the place for regulation.

Our focus on lack of regulation is in some ways a departure from the general mien of legal scholarship, which focuses on analysis of regulation, not the absence thereof. Lack of regulation, however, is itself a regulatory choice, making a study of lack of regulation squarely within the purview of legal analysis. In essence, then, our argument is one of the need for law throughout the secondary housing finance market. In our conclusion we argument for regulation of the housing finance market and explain how we think such regulation should proceed.

Fourth, our Article is the first to present a systematic analysis of the housing bubble that evaluates the competing theories and presents a coherent, empirically driven narrative of the bubble's development and collapse. The existing literature is comprised of expositions of various theories that largely ignore competing theories,²⁰ debunkings of theories that do not propound alternative theories,²¹ or empirical studies that attempt to establish micro-points, but do not attempt to present a larger theory of the housing bubble.²²

Finally, our Article presents a clear prescription for ensuring future stability in housing finance that has profound implications for the restructuring of the housing finance market and the fate of the government-sponsored entities Fannie Mae and Freddie Mac.

²⁰ See, e.g., Taylor, *supra* note 5; Pinto, *supra* note 7; Wallison, *supra* note 7.

²¹ See, e.g., Ben S. Bernanke, *Monetary Policy and the Housing Bubble*, 100 AM. ECON. REV. (forthcoming 2010), at <http://www.federalreserve.gov/newsevents/speech/bernanke20100103a.htm>; Glaeser *et al.*, *supra* note 3.

²² See, e.g., Atif & Sufi, *supra* note 9; Keys *et al.*, *supra* note 9.

I. THE U.S. HOUSING FINANCE MARKET

A. Agency Securitization

Most U.S. mortgages are financed through securitization.²³ Mortgage securitization involves the pooling of numerous mortgage loans, which are then sold to a special purpose vehicle, typically a trust. The trust pays for the loans by issuing debt securities. The debt service on these securities is paid for by the cash flow from the mortgages. Thus, the securities are called mortgage-backed securities (MBS).²⁴

Securitization, in its modern form, had been used for housing finance since 1971.²⁵ In the early 1990s, the secondary market at the time consisted primarily of the GSEs, Fannie Mae and Freddie Mac, and Ginnie Mae. The GSEs are privately-owned corporations, chartered and regulated by federal government.²⁶ Ginnie Mae is a US government agency involved in the securitization of mortgages insured by the Federal Housing Administration or guaranteed by the Veterans Administration.²⁷ Fannie and Freddie were regulated entities and would purchase only mortgages that conformed to their underwriting standards (until the bubble years), 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 loan-to-value (LTV) ratios—the ratio of the loan amount to the property's value—under 80% absent private mortgage insurance or seller risk retention.²⁸ Further, the GSEs were expected (although not mandated) to operate nationally, creating geographic diversification in their underwriting. Likewise, the FHA and VA mortgages that went into Ginnie Mae pools were required to conform to FHA and VA underwriting standards and were geographically diverse.

The GSEs securitize most of the mortgages they purchased, meaning that they sell the mortgages to legally separate, specially created

²³ Inside Mortgage Finance, Mortgage Market Statistical Annual. While by dollar amount around 60% of mortgages outstanding are securitized, the securitization rate in recent years has been around or above 90%. *Id.*

²⁴ For a more detailed explanation of mortgage securitization, see Anna Gelpern & Adam J. Levitin, *Rewriting Frankenstein Contracts: Workout Prohibitions in Residential Mortgage-Backed Securities*, 82 S. CAL. L. REV. 1075 (2009).

²⁵ Kenneth A. Snowden, *Mortgage Securitization in the United States: Twentieth Century Developments in Historical Perspective*, in *ANGLO-AMERICAN FINANCIAL SYSTEMS: INSTITUTIONS AND MARKETS IN THE TWENTIETH CENTURY*, MICHAEL D. BORDO & RICHARD SYLLA, EDS. 261 (1995). See also William N. Goetzmann & Frank Newman, *Securitization in the 1920s*, NBER Working Paper No. 15650 (Jan. 2010).

²⁶ The GSEs originated as part of the federal government, but were privatized in 1968.

²⁷ In addition to Fannie Mae and Freddie Mac, there were the 12 Federal Home Loan Banks, another smaller GSE system. See Mark J. Flannery & W. Scott Frame, *The Federal Home Loan Bank System: The "Other" Housing GSE*, FED. RESERVE BANK OF ATLANTA ECON. REV., 33 (QIII, 2006).

²⁸ 12 U.S.C. §§ 1454(a)(2), 1717(b)(2).

trusts, which pay for the mortgages by issuing MBS. The GSE guarantee timely payment of principal and interest to investors on the MBS issued by the securitization trusts. Similarly, Ginnie Mae guarantees the timely payment of principal and interest on MBS collateralized by FHA and VA mortgages.²⁹ Fannie, Freddie, and Ginnie MBS (“Agency MBS”) thus link mortgage borrowers with capital market investors.

For Agency MBS, investors assumed the interest rate risk on the underlying mortgages, while the GSEs or US government assumed the mortgages’ credit risk. Investors in Agency MBS did incur credit risk—that of the GSEs or the US government for Ginnie Mae MBS. For GSE MBS, investors also assumed indirectly the credit risk on the mortgages guaranteed by the GSEs, because the GSEs’ financial strength was heavily dependent upon the performance of the mortgages. Because the GSEs were perceived as having an implicit guarantee from the federal government,³⁰ investors were generally unconcerned about the credit risk on the GSEs, and hence on the MBS.³¹ This meant that investors did not need to worry about the quality of the GSE underwriting. Therefore, investors did not need information about the default risk on the mortgages; what they cared about was information that could help them anticipate prepayment speeds so they could gauge the MBS’ convexity risk—the risk of losses resulting from adverse changes in the market price of the MBS relative to their yield.³² This was information that was fairly easy to obtain, particularly on standardized mortgage products, and modeling and pricing the interest rate risk was a far simpler task than modeling the credit risk as well as the interest rate risk.

Historically, because the GSEs bore the credit risk on the mortgages, they were incentivized to insist on careful underwriting.³³

²⁹ FHA and VA guarantee repayment of principal and accrued interest, but not necessarily in a timely fashion. FHA and VA only pay out after foreclosure, which can mean that the insurance payments are considerably delayed.

³⁰ See Brent Ambrose & Arthur Warga, *Measuring Potential GSE Funding Advantages*, 25 J. REAL ESTATE FIN. & ECON. 129 (2002) (finding GSE to Treasuries spread was 25-29 basis points less than AA rated banking sector bonds); Frank Nothaft, *et al.*, *Debt Spreads Between GSEs and Other Corporations*, J. REAL ESTATE FIN. & ECON. 151 (2002) (finding 22-30 basis point funding advantage relative to AA rated bonds). The GSEs are now in federal conservatorship, and their obligations carry an “effective guarantee” from the federal government, but do not enjoy a full faith and credit backing. See 12 U.S.C. § 1719(e) (explicit statement that GSE debts are not government debts), *but see, e.g.*, Dawn Kopecki, *Fannie, Freddie Have “Effective Guarantee,” FHFA Says*, Bloomberg, Oct. 23, 2008, at <http://www.bloomberg.com/apps/news?pid=20601087&sid=aO5XSfgEISZA&refer=home>. The difference, if any, between the “effective guarantee” and “full faith and credit” is unclear.

³¹ Investors would be concerned only to the extent that defaults affected prepayment speeds.

³² 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.

³³ The possibility of a federal bailout by virtue of being too-big-to-fail raised moral hazard problems for the GSEs, and could have undermined their underwriting quality.

The GSEs only invested in highly-rated tranches of subprime and alt-A MBS, but these tranches were vulnerable to ratings downgrades. As AAA-subprime MBS were downgraded, the GSEs were forced

Moreover, the GSEs were subject to regulatory oversight and statutory constraints on underwriting. By statute, the GSEs were limited to purchasing only loans with less than 80% loan-to-value (LTV) ratios, unless there was private mortgage insurance on the loan.³⁴ The GSEs competition for market share was primarily with each other, and consistently applied regulatory standards ensured that neither could increase market share by lowering underwriting standards. Thus, 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.

B. Private-Label Securitization

Beginning in the 1990s, a new, unregulated form of securitization began to displace the standardized GSE securitization. This was private label securitization (PLS), was supported by a new class of specialized mortgage lenders and securitization sponsors.³⁵

Whereas the GSEs would purchase only loans that conformed to their underwriting guidelines, there were no such guidelines for the investment banks that served as PLS conduits. The only constraint was whether a buyer could profitably be found. Thus, PLS created a market for nonprime, nonconforming conventional loans.³⁶

As with GSE securitization, PLS involved the pooling of thousands of mortgage loans that were then sold to specially created trusts that 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. PLS investors, therefore,

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.

³⁴ 12 U.S.C. §§ 1454(a)(2) (Freddie Mac); 1717(b)(2) (Fannie Mae).

³⁵ Although PLS can trace their pedigree back to a 1977 deal by Bank of America, *see* 1977 SEC No-Act. LEXIS 1343, they remained a niche market for years because of their unproven risk profile.

We use the term PLS here to refer to residential mortgage-backed securities (RMBS) that lack a guarantee from the federal government or the GSEs.

³⁶ Financial institutions' ability to make nontraditional loans was facilitated by federal legislation and regulations. 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, Adam J. Levitin, *Hydraulic Regulation: Regulating Credit Markets Upstream*, 26 YALE J. ON REG. 143, 154 (2009), 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. *See also* McCoy *et al.*, *supra* note 8.

assumed both credit risk and interest rate risk on the MBS, in contrast to GSE MBS, where investors assumed only interest rate risk.

Investors in PLS were familiar with interest rate risk on mortgages, but not with credit risk. Thus, the PLS market initially developed with low credit risk products, particularly jumbo mortgages—loans that were larger than the GSEs' conforming loan limit. 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, in part because only high-quality jumbos were securitized, as credit rating agencies initially insisted that jumbo securitizations follow GSE underwriting guidelines in order to be rated.³⁷ Loss rates on jumbos have been less than .5% since 1992.³⁸

Credit risk for jumbos was mitigated on both the loan level, through high down payments (low LTVs) and private mortgage insurance, and at the MBS level 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.³⁹ Indeed, jumbo PLS became sufficiently standardized to trade in the To Be Announced (TBA) market, meaning that the mortgages are sold even before they are actually originated because it is sufficiently easy to find a mortgage that meets the sale delivery requirements.⁴⁰ 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 high investment grade-ratings for most securities because fixed-income

³⁷ See DAVID S. MURPHY, *UNRAVELLING THE CREDIT CRUNCH*, 133 (200?) (“the first private label MBS deals were backed by very high quality mortgages: it took some years for investors to become comfortable with lower quality pools.”).

³⁸ *MBS Basics*, Nomura Fixed Income Research 22, Mar. 31, 2006; GARY GORTON, *SLAPPED BY THE INVISIBLE HAND* 8 (2010).

³⁹ Nomura, *MBS Basics*, *supra* note 38, at 22-23.

⁴⁰ In the TBA market, a mortgage originator enters into a forward contract with a GSE or Ginnie Mae, in which the originator promises to deliver in the future a package of loans meeting the GSE's or Ginnie Mae's requirements in exchange for GSE or Ginnie Mae MBS to be identified in the future. See OFHEO, *A Primer on the Secondary Mortgage Market*, Mortgage Market Note 08-3, July 21, 2008 at 9-10.

Because the originator is able to resell the loan to the GSE or Ginnie Mae for a guaranteed rate before the closing of the loan, the originator is not exposed to interest rate fluctuations between the time it quotes a rate and closing. Without the TBA market, originators would have to bear the risk that the market value of the loan would change before closing due to fluctuations in market rates. The commodity nature of GSE and Ginnie Mae MBS means that they are sufficiently liquid to support a TBA market that allows originators to offer borrowers locked-in rates in advance of closing. Originators of non-conforming (non-GSE-eligible) loans, particularly prime jumbos, are able to piggyback on the TBA market to hedge their interest rate risk, by purchasing in the TBA market to offset the risks of the loans they originate.

investor demand is highest for high investment-grade products.⁴¹ For jumbos, it was relatively easy to achieve AAA-ratings because of the solid underlying collateral.⁴² As the PLS market later moved into nonprime mortgages, however, greater credit enhancements and structural creativity were necessary to obtain the credit ratings that made 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.⁴³ By 2007, the mean number of tranches for PLS had increased to over 14. Other types of internal and external credit enhancements were also much more common in nonprime PLS: overcollateralization,⁴⁴ excess spread,⁴⁵ shifting interest,⁴⁶ reserve accounts,⁴⁷ and pool and bond insurance.⁴⁸ Nonprime PLS thus involved

⁴¹ Ricardo J. Caballero, *The “Other” Imbalance and the Financial Crisis*, NBER Working Paper No. 15636, Jan. 2010.

⁴² 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>.

⁴³ Manuel Adelino, “Do Investors Rely Only on Ratings? The Case of Mortgage-Backed Securities” at 42 (2009), at http://web.mit.edu/%7Emadelino/www/research/adelino_jmp.pdf.

⁴⁴ Overcollateralization means that initial principal balance of the mortgages supporting the MBS is greater than the principal balance on the MBS. Richard Rosen, *The Role of Securitization in Mortgage Lending*, 244 CHIC. FED. LETTER, Nov. 2008 (61% of private label PLS issued in 2006 were overcollateralized). The cashflows generated by a larger pool balance are available to absorb losses due to defaults on the mortgage loans. Overcollateralization is an expensive form of credit enhancement because it ties up collateral that could otherwise be used for other deals, so PLS indentures sometimes provide for the periodic release of collateral if performance thresholds are met. Note that pool overcollateralization is in addition to the overcollateralization of mortgages with <100% LTV ratio.

⁴⁵ Excess spread is the difference between the income of the SPV in a given period and its payment obligations on the MBS in that period—essentially the SPV’s periodic profit. Excess spread is accumulated to supplement future shortfalls in the SPV’s cashflow, but is either periodically released to the residual tranche holder. Generally, excess spread cannot be released if certain triggers are tripped, such as a decline in the amount of excess spread trapped in a period beneath a particular threshold.

⁴⁶ Shifting interest involves the reallocation of subordinate tranches’ share of prepayments (both voluntary prepayments and the proceeds of involuntary liquidations) to senior tranches. Shifting interest arrangements are often stepped-down over time, with a decreasing percentage of prepayments shifted. Sunil Gangwani, *MBS Structuring: Concepts and Techniques*, 1 SECURITIZATION CONDUIT 26, 33 (1998). The affect is to make senior tranches share of a securitization larger at the beginning of the deal and smaller thereafter. Manus J. Clany & Michael Constantino III, *Understanding Shifting Interest Subordination*, in *THE HANDBOOK OF MORTGAGE-BACKED SECURITIES* (2D Ed.) (FRANK J. FABOZZI ET AL., EDS.) 39, 42 (2000).

⁴⁷ A reserve account is a segregated trust account, typically invested in highly liquid, investment grade investments (e.g., commercial paper). It provides a cushion for losses due to defaults on the underlying mortgage loans. Reserve accounts come in two types: pre-funded cash reserves and excess spread. Pre-funded reserve accounts are funded in full at the deal’s closing, typically by the deal’s arranger with a share of the deal’s proceeds. The reserve account thus amounts to a holdback or a discount on the SPV’s purchase price of the loans. This type of pre-funded reserve account is known as a cash collateral account. Reserve accounts are either required to be maintained at a specified level regardless of losses or permitted to be drained in accordance with losses. In the former case, the credit enhancement of the reserve account actually *increases* as the principal and interest due on the PLS decreases.

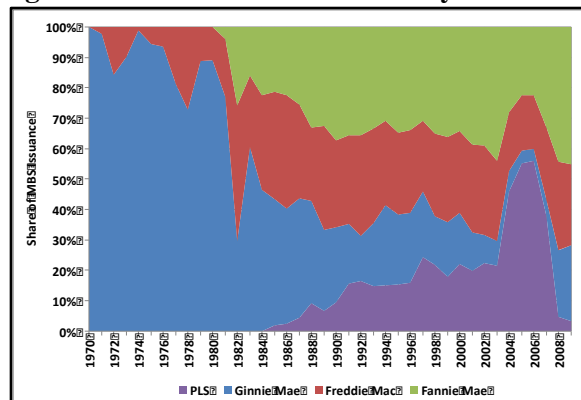
⁴⁸ Pool level insurance covers either losses or provides cash-flow maintenance up to specified levels for the entire pool owned by the SPV. Pool-level insurance is typically provided by private mortgage insurance companies. Bond-level insurance involves a monoline bond insurer guaranteeing the timely payment of principal and interest on a tranche of bonds. See Gangwani, *supra* note 46, at 35.

inevitably more complex and heterogeneous deal structures to compensate for the weaker quality of the underlying assets.⁴⁹

C. A Tale of Two Booms

Nonprime PLS remained a small share of the market from their origins in 1977 through the 1990s. Nonprime PLS did not take off in force until 2004, at which point they grew rapidly until the bursting of the housing bubble. (See Figure 1.) The inflection point came with the introduction and spiraling growth of nonprime mortgages in 2003-2004, as PLS jumped from being 22% of MBS issuance in 2003 to 46% in 2004. (See Figure 1.)

Figure 1. Share of MBS Issuance by Securitization Type⁵⁰



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. 2003 was a peak year for mortgage originations, 72 percent of which (by dollar volume) were refinancings.⁵¹ Virtually all of the refinancing activity from 2001-2003 was in prime, fixed-rate mortgages.⁵² The prime refinancing boom meant that mortgage originators and securitizers had several years of increased earnings.

By 2003, however, long-term interest rates had started to rise (short-term rates moved up starting in 2004), and the refinancing boom ended. This meant that the mortgage industry was hard-pressed to maintain its earnings levels from 2001-2003.⁵³ The solution post-2003

⁴⁹ GORTON, *SUPRA* note 38, at 87.

⁵⁰ Inside Mortgage Finance, 2010 Mortgage Market Statistical Annual.

⁵¹ *Id.*

⁵² *Id.*

⁵³ See William W. Bratton, Jr. & Michael L. Wachter, *The Case Against Shareholder*

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 to support origination volume levels. This meant a growth in subprime and alt-A (limited documentation) mortgages, as well as in second mortgages (termed “home equity loans”). (See Figure 2.) As a result, loan-to-value ratios increased and borrowers income was more poorly documented (if at all). (See Figure 3.)

Figure 2. Origination Volume by Mortgage Type, 1990-2009⁵⁴

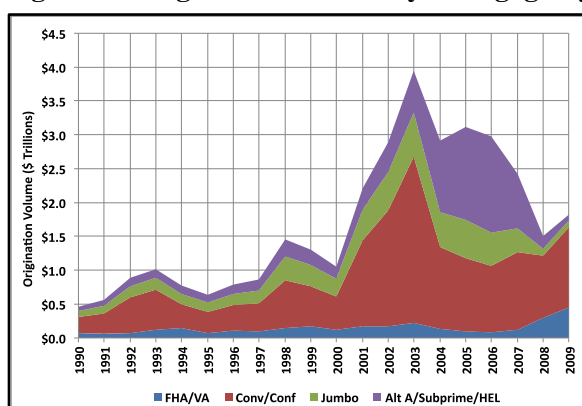
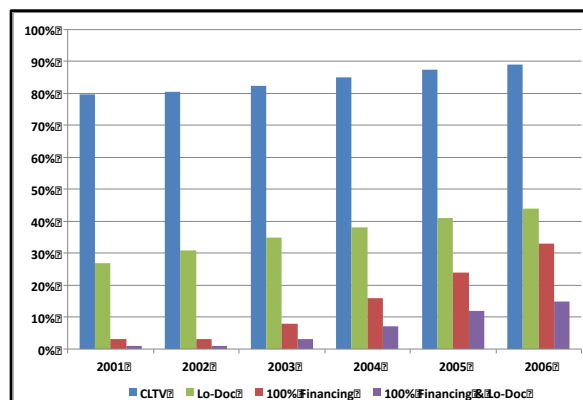


Figure 3. Erosion of Residential Mortgage Underwriting⁵⁵



Empowerment, 158 U. PA. L. REV. 653, 719 n.198 (2010).

⁵⁴ Inside Mortgage Finance, 2010 Mortgage Market Statistical Annual.

⁵⁵ T2 Partners LLC.

D. Fueling the PLS Boom: The Rise of Nontraditional Mortgages

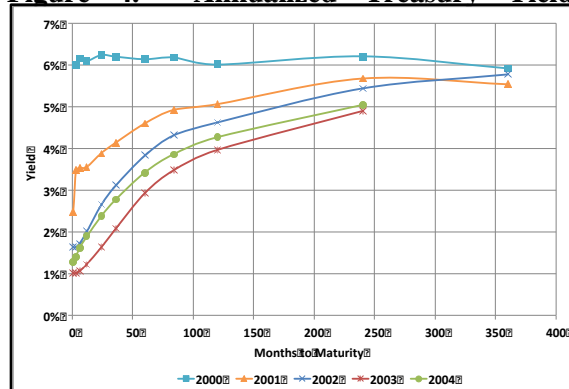
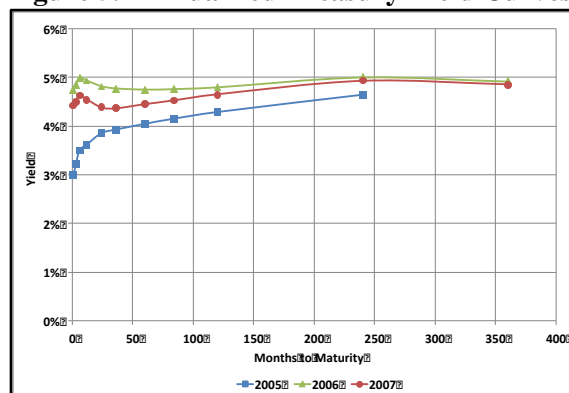
The decline in underwriting standards was also reflected in a shift in mortgage product type. Nontraditional mortgage products are generally structured for initial affordability; the costs are back-loaded, either with balloon payments or increasing interest rates. Table 1, below, illustrates the relative initial affordability of various mortgage products. It shows that various adjustable-rate mortgage (ARM) products, particularly nontraditional ARMs with balloon payments due to limited or extended amortization could drastically reduce initial monthly payments for borrowers.

Table 1. Relative Affordability of Mortgage Products⁵⁶

Mortgage Product	Monthly Payment	Payment as Percentage of Fixed Rate Mortgage (FRM) Payment
FRM	\$1,079.19	100%
ARM	\$903.50	83.7%
Extended Amortization ARM	\$799.98	74.1%
Interest Only ARM	\$663.00	61.4%
Negative Amortization ARM	\$150.00	13.9%
Payment Option ARM	<\$150.00	<13.9%

At the same time, in 2004-2005, the yield curve—the relationship between interest rates and loan maturities—was flattening. When the yield curve is upward sloping, meaning that the cost of long-term borrowing is greater than the cost of short-term borrowing, as reflected in initial rate, ARMs are rationally chosen by borrowers because it costs more to borrow with a fixed-rate mortgage (FRM). As Figure 4 shows, in 2000, the yield curve was flat, shifting to an upward slope from 2001-2003. As Figures 4 and 5 show, the yield curve began to flatten out in 2004-2005, and was then flat in 2006-2007.

⁵⁶ Bernanke, *supra* note 21, Fig. 7. These figures assume a prime borrower with a \$180,000 mortgage securing a \$225,000 property (20% down), 6% APR FRM and 4.42% APR.

Figure 4. Annualized Treasury Yield Curves, 2000-2004⁵⁷**Figure 5. Annualized Treasury Yield Curves, 2005-2007⁵⁸**

Prior to 2005, at every point in recent history when yield curves have flattened, borrowers have shifted from ARMs to FRMs in order to lock in lower long-term rates.⁵⁹ Despite the flat yield curve during the peak of the housing bubble, borrowers increasingly chose ARMs.

The explanation for the shift to ARMs cannot be found in the cost over the full term of the mortgage; rationally, borrowers considering the full term cost would have gravitated to FRMs. Instead, the explanation lies in the relatively low initial payments of the ARMs.

This means that there were two possible, nonexclusive reasons for the expansion of ARM market share. First, ARM market share growth could be explained by a drop in the price of the implicit put

⁵⁷ Curves were calculated by taking the average daily yield for each duration for each year.

⁵⁸ Curves were calculated by taking the average daily yield for each duration for each year.

⁵⁹ Michael Tucker, *Adjustable-Rate and Fixed-Rate Mortgage Choice: A Logit Analysis*, 4 J. R.E. FIN. 82, 86 (1989) ("High T-Bill Rates are associated with a decrease in the probability of borrowers selecting ARMs.").

option on nonrecourse mortgages. The implicit put option refers to homeowners' ability to walk away from a nonrecourse (or functionally nonrecourse) mortgage without personal liability, just by surrendering the house. If the cost of the put option—included in the cost of mortgage finance—was getting cheaper relative to renting, it would mean that consumers were more willing to speculate on rising housing prices with nonrecourse mortgages.⁶⁰ Thus, cheaper mortgage credit made it easier to gamble on housing. Second, ARM share growth could be because ARMs were affordability products, into which financial institutions were able to underwrite weaker borrowers.

There is reason to believe that both explanations are correct. The phenomenon of house flipping—treating houses as pure (or primarily) investment, rather than mixed investment/consumption assets—became pronounced during the bubble. A cheaper put option due to underpriced mortgages would have encouraged this sort of investment.

There also reason to believe that the growth in ARMs reflected their role as an affordability product that enabled market expansion, both in terms of number of borrowers and size of loans. Deterioration of underwriting standards and the shift in mortgage products had the same effect as falling interest rates—all of these factors reduced the initial cost of mortgage credit, thereby increasing the quantity of mortgage credit consumed.⁶¹ The annual price of housing finance has two components—a cost of funds and a risk premium. The cost of funds is a function of long-term interest rates, while the risk premium is a function of underwriting (including product type). A decline in either component reduces the cost of housing finance and thus allows borrowers to borrow more and bid up home prices.⁶²

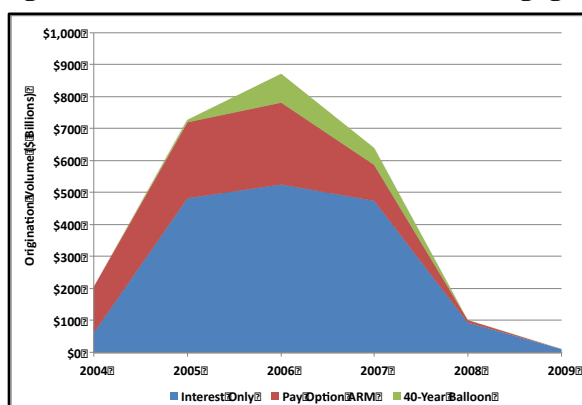
⁶⁰ See Andrey Pavlov & Susan M. Wachter, *Mortgage Put Options and Real Estate Markets*, 38 J. R.E. ECON. 89 (2009).

⁶¹ During 2004-2006, the Fed forced up the cost of short-term credit, but the effect on mortgage lending was offset by the shift in the product mix and the decline in underwriting standards. While the Fed could observe rates in real time, neither it, nor anyone else, could observe the decline in underwriting and the shift in product mix in real time. The deterioration in lending standards also left the housing finance system vulnerable to correlated shocks; any decline in housing prices would inevitably result in a market crash because of an increased reliance on housing price appreciation in the credit model.

⁶² While housing economists have noted that interest rate changes do not explain the bubble, see Glaeser *et al.*, *supra* note 3, they neglect to fully explore the impact of the decline in underwriting standards. (Glaeser *et al.* examine underwriting in a very cursory fashion; their finding that loan approval rates were constant during the bubble ignores the dramatic rise in loan application volume.) This problem can also be seen in Charles Himmelberg *et al.*, *Assessing High House Prices: Bubbles, Fundamentals and Misperceptions*, 19 J. ECON. PERSPECTIVES 67, 68 (2005), which argues that as of 2004 there was no housing bubble. While Himmelberg *et al.* note that housing prices are not the same as the annual cost of owning a house, they neglect to consider whether the shift in mortgage product mix was reducing the (initial) affordability of housing.

Much of the growth in ARMs (and in mortgages generally), particularly in nonprime mortgages, was in nontraditional products,⁶³ such as interest-only mortgages,⁶⁴ payment-option mortgages,⁶⁵ 40-year extended amortization balloons mortgages,⁶⁶ or hybrid ARMs.⁶⁷ (See Figure 6.) Borrowers were generally approved based on their ability to pay the initial below-market teaser rate, rather than their ability to pay for the product through its full term.

Figure 6. Growth of Nontraditional Mortgage Products⁶⁸



Nontraditional mortgages were gifts that kept giving. The back-loaded cost structure of these mortgages created an incentive for borrowers to refinance when monthly payments increased, thereby

⁶³ Christopher Mayer *et al.*, *The Rise in Mortgage Defaults*, 23 J. ECON. PERSP. 27 (2009).

⁶⁴ Interest-only mortgages have non-amortized periods during which the borrower pays only interest, and the principal balance is not reduced. The interest-only period can range from a few years to the full term of the loan. Once the interest only period expires, the principal is then amortized over the remaining (and shorter) period, meaning that monthly mortgage payments increase substantially upon the expiration of the interest-only period, including the possibility of a “bullet” payment of the entire principal balance at the end of the mortgage’s term.

⁶⁵ Payment-option mortgages permit borrowers to choose between a number of monthly payment options. Typically, the choices are payments based on 15-year and 30-year amortizations of the mortgage, a non-amortizing interest-only payment, and a negative amortization payment that does not even cover the interest that accrued in the past period. Because of the negative amortization option, the balance owed on a payment-option mortgage can actually increase. Payment-option mortgages generally have a negative amortization limit; once too much negative amortization has accrued, the loan resets to being fully amortized over the remaining term. Likewise, the pick-a-pay period is often restricted to a limited number of years, after which the loan resets to being fully amortized over the remaining term. Both types of resets can result in significant increases in monthly payments.

⁶⁶ A 40-year balloon mortgage or “40/30” is a 30-year loan that is amortized over 40 years, meaning that there is a balloon payment due at the end of the 30th year. The mismatch between term and amortization periods reduces monthly payments before the balloon payment.

⁶⁷ A hybrid ARM has an initial fixed-rate period, usually at a teaser rate that is lower than those available on standard FRMs. After the expiration of the fixed-rate teaser period, the loan resets to being adjustable-rate. Typically these loans were structured as 2/28s or 3/27s, with two or three year fixed-rate periods and 28- or 27-year adjustable-rate periods. The rate reset after the expiration of the teaser can result in substantial increases in monthly payments.

⁶⁸ Inside Mortgage Finance, 2010 Mortgage Market Statistical Annual.

generating future refinancing origination business. In essence, then the exotic products that marked the housing bubble were just the reincarnation of pre-New Deal bullet loans—non-amortizing products designed to be frequently refinanced.

Nontraditional products also fueled their own proliferation as part of a home buyers' "arms race." The expansion of the borrower base and borrower capacity because of loosened underwriting standards also increased demand for housing supply and drove real estate prices upwards. As housing prices rose, non-traditional "affordability" products became increasingly attractive to borrowers who saw their purchasing power diminish. Thus, nontraditional mortgage products generated additional purchase money origination business. The growth of nontraditional products supports an interpretation of the shift to ARMs as being driven by their use as initial affordability for market expansion.

Private-label securitization was the dominant funding mechanism for nontraditional mortgages.⁶⁹ PLS made the expansion in the nontraditional mortgage market possible, and nontraditional mortgages made the expansion of the PLS market possible. Without PLS, most nontraditional mortgages would not have been originated, as banks would simply have been unwilling to carry the risks from nontraditional mortgages on their balance sheets. Similarly, without nontraditional mortgages, PLS would have remained a market of under \$300 billion in issuance/year, rather than one that grew to nearly \$1.2 trillion in issuance at peak. The GSEs' economies of scale and implicit government guarantee gave them operating efficiencies that PLS could not match for traditional, conventional conforming loans, so but for the growth of nontraditional mortgages, the only market left for PLS would have been in financing conventional jumbo mortgages.⁷⁰

Ultimately, the expansion of PLS and nontraditional mortgages was its own undoing. PLS based on nontraditional mortgages enabled more mortgage credit, which bid up housing prices, and those increased housing prices then became part of the underwriting that enabled further expansion of mortgage credit. During the bubble, however, housing price appreciation, depended on the continued expansion of the borrower base, much like a pyramid scheme. Not all consumers are looking to purchase homes, and the increase in house prices eventually priced out other potential homeowners, even with loosened (or even fraudulent)

⁶⁹ Some non-traditional mortgages, especially payment-option ARMs, stayed on balance sheet.

⁷⁰ A "jumbo" mortgage is a loan that is larger than the "conforming loan limit"—the maximum size the GSEs are permitted by statute to purchase.

underwriting standards.⁷¹ The inability to keep expanding the borrower base made price 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. Moreover without the continued expected price appreciation, prices would not just level off, but would collapse, since part of the high prices was due to the expected future increase in prices.⁷² The recognition that this was so may also have played a part in the bubble's collapse, as mortgage credit supply tightened, becoming a self-fulfilling prophecy. The result was a cycle of declining housing prices and foreclosures: the bubble had burst.

II. A SUPPLY-SIDE EXPLANATION OF THE HOUSING BUBBLE

What caused the bubble? In this Part, we demonstrate two critical facts with which any explanation of the bubble must comport. First, in Part II.A., we show that the bubble was primarily a supply-side event, meaning that it was driven by an oversupply of housing finance, rather than an excess of demand for housing. Second, in Part II.B, we examine the timing of the bubble. We argue that the bubble was quite limited in duration and that it began in 2003-2004. Taken together, the supply-side explanation and the timing of the bubble are the key evidence that points to the change in the housing financing channel from GSE securitization to PLS securitization as the crucial event in the creation of the bubble.

A. Evidence from PLS Yield Spreads

We believe that the cause of the bubble is to be found in the changes in the structure of the housing finance market in 2003-2004, as the market moved from Agency securitization of traditional FRMs to private-label securitization of nontraditional ARMS. It is unquestioned that securitization was the funding mechanism for the housing bubble, but no previous work has examined its pricing in relation to the bubble. We examined the pricing of PLS deals from 2003-2007. Our examination reveals a remarkable trend: even as mortgage risk and PLS issuance volume *increased*, the spread on PLS over Treasuries that represents their additional risk premium *decreased*. (See Figures 7 & 8.)

⁷¹ This may be the reason that homeownership actually peaked early in the bubble, in 2004. See Paul Calem *et al.*, *Implications of the Housing Bubble for Sustainable Homeownership* in *THE AMERICAN MORTGAGE SYSTEM* (MARTY SMITH & SUSAN WACHTER, EDS.) (2011).

⁷² Himmelberg *et al.*, *supra* note 62.

Figures 7 and 8 only show the nominal spreads between PLS and Treasuries; they do not show the increase in risk on PLS. If one were to adjust for changes in credit risk on PLS, the risk-adjusted yield on PLS would have had to increase substantially. The movement in spreads is exactly opposite that which one would have expected in a perfect market.

Figure 7. PLS Issuance and Weighted Average Spreads, 2003-2007⁷³

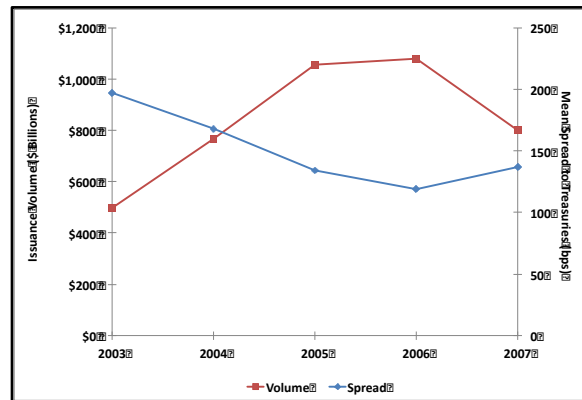
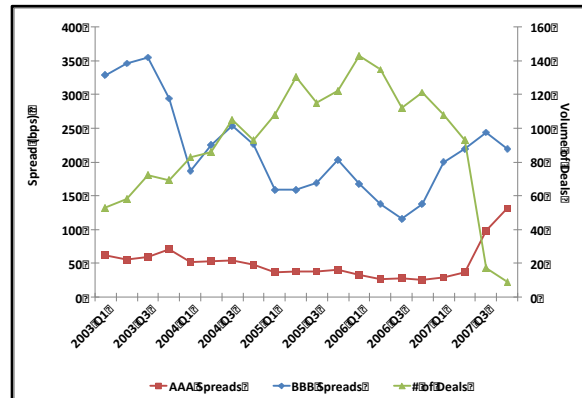


Figure 8. PLS Issuance and Spreads, 2003-2007, for AAA and BBB Rated Tranches⁷⁴



Normally, when the risk of an asset class increases, the yield on the asset class increases as well. Therefore, as mortgage underwriting standards deteriorated, the yield on PLS should have increased and thus the spread between PLS and Treasury yields should have increased. Instead, the spread decreased. Put differently, declining PLS spreads

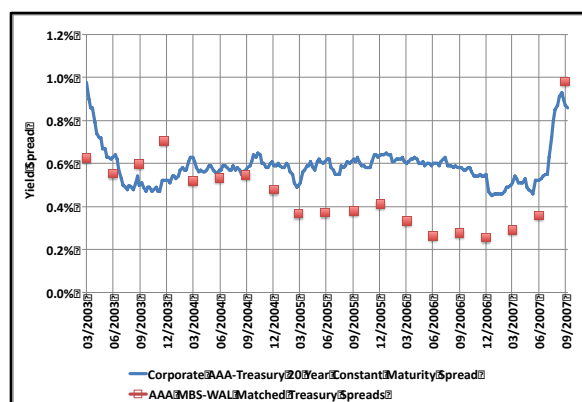
⁷³ Adelino, *supra* note 43, at 42. Adelino's data does not cover the entire universe of PLS issuance, so issuance numbers are necessarily lower than industry-wide figures from Inside Mortgage Finance's Mortgage Market Statistical Annual. The mean spread is to maturity-matched Treasuries.

⁷⁴ Data provided by Manuel Adelino from proprietary data set.

mean that investors were willing to accept more risk for lower returns. In other words, housing finance was becoming relatively cheaper and more abundant, even as it became riskier. This is strong evidence that PLS were being mispriced by the market during 2004-2007.

Figure 9 shows an even more remarkable market development. Figure 9 compares spreads over Treasuries for AAA-rated PLS and AAA-rated corporate bonds. This comparison lets us test whether movement in PLS spreads was unique to PLS or whether it merely reflected market-wide trends.

Figure 9. Comparison of AAA PLS and Corporate Yield Spreads Over Maturity-Matched Treasuries⁷⁵



Normally, one would expect there to be somewhat higher spreads on PLS than on equivalently-rated corporate bonds because PLS have an interest rate risk that does not exist for corporate bonds because of the negative convexity associated with mortgages. When interest rates fall, mortgages are likely to be refinanced, whereas corporate bonds are typically not prepayable. Thus, one would expect yield spreads to be *lower* on corporate bonds with the same credit risk as PLS.

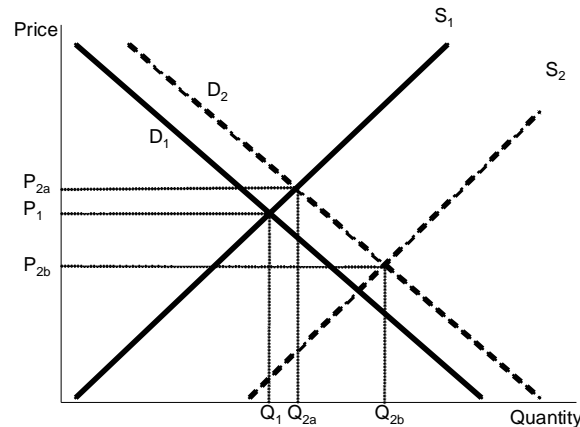
Figure 9, however, shows that during 2004-2007, (non-risk-adjusted) spreads on AAA-rated PLS fell, while spreads on AAA-rated corporate bonds held steady. Thus, starting in early 2004, spreads on AAA-rated PLS were actually “trading through” (less than) AAA-rated corporate bonds. This shows that the change in spreads was specific to PLS, and did not reflect a general movement in the AAA-rated bond market.

⁷⁵ Federal Reserve Board (corporate spreads); Manuel Adelino (MBS spreads).

The difference in movement in PLS and corporate bond spreads is all the more remarkable because the credit risk on virtually all PLS was increasing at an astonishing rate, while there was no such general increase in risk for corporate debt. In other words, if it were possible to calculate risk-adjusted spreads, the difference between PLS and corporate spreads would be more pronounced.

The movement in PLS spreads and volume—that spreads fell and volume increased even as risk increased, that the spreads fell below corporate bond spreads, and that PLS spread fell while corporate bonds spreads remained static—points to a supply-side explanation of the housing bubble, rather than a demand-side explanation. Simultaneously falling price (spreads) and increasing quantity (volume) means that there had to be an outward (rightward) shift in the housing finance supply curve (from S_1 to S_2 , in Figure 10).

Figure 10. Shifts in Housing Finance Supply and Demand Curves



There may also have been an outward (rightward) shift in the housing finance demand curve (from D_1 to D_2 , in Figure 10), as irrationally exuberant consumers sought ever more financing to cope with escalating prices. Such a shift 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 outwards (from S_1 to S_2) enough to offset any outward 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.⁷⁶ The reasons for this demand are explored in Parts III.B.2 and IV.B.2.

B. Timing the Bubble

Our supply-side explanation of the bubble is also consistent with evidence regarding the bubble's timing. Determining when the real estate bubble began is critical for evaluating competing explanations. There is little consensus among commentators. National housing prices marched upwards from 1997-2006. Thus, some commentators place the start of the bubble in 1997, when the period of unabated appreciation began.⁷⁷ Others place the start of the bubble in 2001-2002, when the Federal Reserve lowered short-term interest rates significantly.⁷⁸

We believe the actual bubble was much shorter: it began in 2004 (or possibly 2003) and burst in 2006. Housing prices might have been inflated during 2001-2003, but the period from 2004-2006 represents a distinct bubble from any that might have existed in 2001-2003. Irrespective of whether 2001-2003 was a bubble, it was undisputedly marked by a real estate boom in traditional prime mortgage refinancing, and the uptick in market volume in this period contributed to the 2004-2006 bubble by placing pressure on participants throughout the mortgage industry to maintain the elevated earnings of 2001-2003, which led to a decline in mortgage underwriting standards in order to boost volume.

The question remains, though, when did the bubble start? Simply defining a bubble is a challenge. From a classical economics perspective, the concept of a bubble is nonsensical: the value of an asset is simply its market price. This tautological valuation precludes the possibility of a bubble; there are only market fluctuations.

While classical economics does not contemplate bubbles, it is possible to posit a definition of a bubble a situation when asset prices deviate substantially upward from the consumption value—the

⁷⁶ See MICHAEL LEWIS, *THE BIG SHORT: INSIDE THE DOOMSDAY MACHINE* 143 (2010) ("There weren't enough Americans with shitty credit taking out loans to satisfy investors' appetite for the end product.").

⁷⁷ See, e.g., Wallison, Dissenting Statement, Financial Crisis Inquiry Commission Final Report, *supra* note 7, at 445; Edward Pinto, *Acorn and the Housing Bubble*, WALL ST. J., Nov. 12, 1999, *supra* note 7 ("Most agree that the housing bubble started in 1997."); Dean Baker, *East Asia's Economic Revenge*, MANCHESTER (UK) GUARDIAN, Mar. 9, 2009. Robert Shiller argues that there were regional housing bubbles as early as 1998, but how these regional bubbles would have become national bubbles is not clear. Robert J. Shiller, *Understanding Recent Trends in House Prices and Homeownership*, Proceedings, Fed. Reserve Bank of Kansas City 89, 89 (2007).

⁷⁸ See, e.g., Lawrence H. White, *Federal Reserve Policy and the Housing Bubble*, 29 CATO J. 115 (2009); Ironman [pseudonym], *A Better Method of Detecting Bubbles*, SEEKING ALPHA, Feb. 25, 2010, at <http://seekingalpha.com/article/190753-a-better-method-of-detecting-housing-bubbles> (dating bubble to 2001); James Hagerty, *Who's to Blame for the Housing Bubble?*, WALL ST. J., Nov. 16, 2009 (citing housing economist Tom Lawler, positing 2002 as the start of the bubble.).

fundamental value—of an asset. Thus, some economists define an asset bubble as when asset prices, driven by expectations of future prices, exceed the asset's fundamental value.⁷⁹ At what point did housing prices depart from fundamentals?

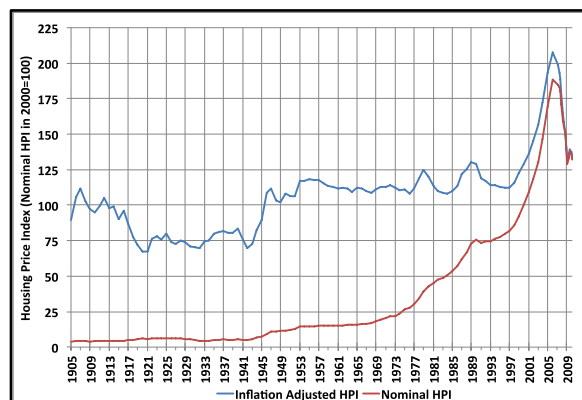
While there was significant housing price appreciation from 1997-2003, that appreciation can be explained relative to fundamentals—the cost of home ownership relative to renting and interest rates. Only starting in 2004 do fundamentals lose their explanatory power for housing prices.

1. 1997-2000

Although housing prices began to appreciate in 1997, that alone does not necessarily indicate a bubble. To get a true sense of the bubble, we need to examine inflation-adjusted housing prices, presented in Figure 11, rather than the nominal housing prices that are typically reported by housing price indices (also, see Figure 12, below). Figure 11 shows that while housing prices moved upwards from 1997 until 2007, inflation-adjusted housing prices did not pass their previous peak level until 2000. The increase in housing prices from 1997-2000 was within the regular historic range of inflation-adjusted housing price fluctuations, indicating that they were not necessarily part of a bubble.

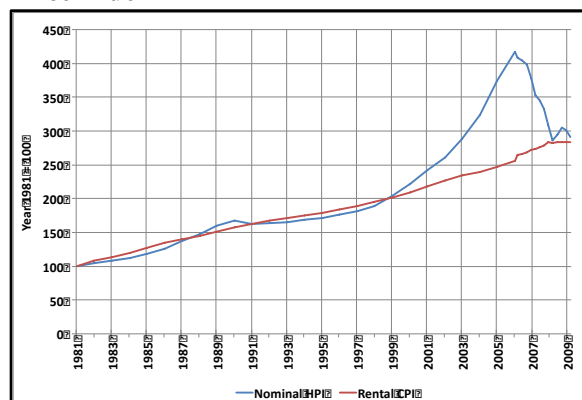
⁷⁹ Joseph E. Stiglitz, *Symposium on Bubbles*, 4 J. ECON. PERSPECTIVES 13 (1990) (“[I]f the reason that the price is high today is only because investors believe that the selling price is high tomorrow—when “fundamental” factors do not seem to justify such a price—then a bubble exists. At least in the short run, the high price of the asset is merited, because it yields a return (capital gain plus dividend [here, the housing price appreciation plus consumption value of housing]) equal to that on alternative assets.”). Stiglitz’s definition is not tautological, as it might appear at first glance, as fundamental value is based on expected discounted value of future cash flows from the asset.

Figure 11. U.S. Nominal and Inflation-Adjusted Housing Price Indexes⁸⁰



Housing prices also kept pace with rental prices during the period from 1997-2000, as Figure 12 shows. The rate of appreciation of both housing and rental costs remained basically identical, as they had since at least 1981, when the Bureau of Labor Statistics began to compile a rental price index. This indicates that into 2000, housing prices were not straying from fundamental values.

Figure 12. Nominal US Housing Price Index and Rental Consumer Price Index⁸¹



⁸⁰ Robert J. Shiller, *irrational exuberance.com*, <http://www.econ.yale.edu/~shiller/data/fig2-1.xls>. Inflation adjustment is based on the Consumer Price Index. Housing Price Index is a combination of the S&P/Case-Shiller HPI for 1987-present and four other sources for different historical data.

⁸¹ S&P/Case-Shiller Housing Price Index (HPI); Bureau of Labor Statistics, Rent of Primary Residence (Rental CPI).

2. 2001-2003

Starting in 2000, housing prices began to appreciate at a much faster rate than rental prices, as Figure 12, above, shows. This divergence in rates of appreciation does not, however, necessarily indicate the existence of a bubble. Instead, the years 2001-2003 were marked by historically low interest rates. Low interest rates explain the faster increase in housing prices than rental prices from 2001-2003.

With fully-amortized FRMs—the overwhelming bulk of the mortgage market prior to 2004—the cost of financing a home purchase is heavily dependent upon interest rates.⁸² With low mortgage interest rates during this period, the cost of homeownership fell relative to the cost of renting. Accordingly, it follows that housing prices would rise faster than rental prices. Indeed, real estate economists Charles Himmelberg, Chris Mayer and Todd Sinai have argued that the increase in housing prices through 2004 was not a bubble, but in fact reflected fundamentals, as shown by the imputed annual rental cost of owning a house.⁸³

It is possible that a bubble was already forming in 2001-2003; we cannot rule it out conclusively. To the extent that there was a bubble in 2001-2003, however, it was much smaller than what developed in 2004-2006, and its causes were fundamentally different; if there was a bubble in 2001-2003, it was driven by interest rates and monetary policy, which cannot explain the growth of housing prices in 2004-2006. Thus, while we are skeptical of there being a bubble in 2001-2003 in the sense of asset prices becoming untethered from fundamentals, we believe it there was a bubble, in 2001-2003 that it was distinct from the much more destructive bubble that followed.

3. 2004-2006

From 2004 onwards, real estate fundamentals did not support any further price increases, as interest rates rose, thereby reducing the attractiveness of homeownership relative to renting, yet these increases

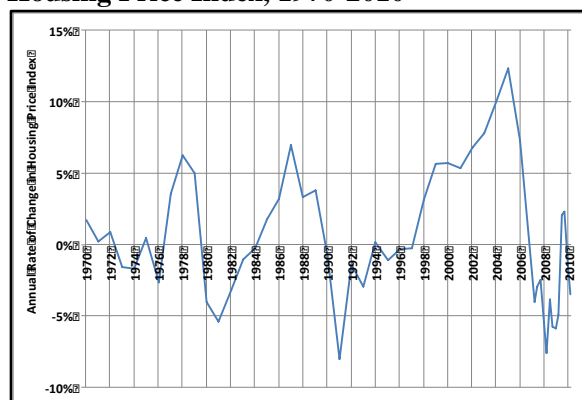
⁸² From 2000-2003, fixed-rate mortgages made up over 75% of conventional loans. Inside Mortgage Finance, 2010 Mortgage Market Statistical Annual. In 2004, fixed-rate mortgages dropped to a 66% market share. *Id.*

⁸³ Himmelberg *et al.*, *supra* note 62, at 68. While Himmelberg *et al.* were ultimately comparing imputed rental costs with ownership costs, which they acknowledge are not the same as the housing prices. *Id.* With a non-traditional mortgage, ownership costs of housing could be quite low, even with high housing prices. See also Chris Mayer & Todd Sinai, *Bubble Trouble? Not Likely*, WALL ST. J. Sept. 19, 2005. Himmelberg, Mayer, and Sinai's argument assumes continuation of housing price appreciation at historic rates. *Id.* In 2004, it was unlikely that prices would continue to appreciate at historic rates because they were at an all-time high relative to imputed rents, suggesting that a bubble might have already been forming in 2004. See also Kristopher S. Gerardi *et al.*, *Reasonable People Did Disagree: Optimism and Pessimism About the U.S. Housing Market Before the Crash*, in *THE AMERICAN MORTGAGE SYSTEM* (MARTY SMITH & SUSAN WACHTER, EDS.) (2011) (noting the assumptions in economics writing prior to the bubble).

occurred. Corresponding with this, Figure 9, above, shows PLS spreads diverging downward from corporate bond spreads as of late 2004, while Figure 1 shows a massive expansion of PLS occurring in 2004. This indicates that a supply glut was only forming as of 2004; before then, mortgage credit was properly priced in light of interest rates, and housing prices reflected fundamentals. It is possible, however, that the bubble actually started in 2003, as mortgage originations predate PLS issuance, and mortgage originations increased significantly in 2003-2004 in regions with heavy subprime concentration.⁸⁴

The annual rate of change in inflation-adjusted housing prices, displayed in Figure 13, also shows that 2003-2004 was an inflection point. While the rate of change of housing price appreciation jumps positive starting in 1997, it stayed steady at around 6% until 2001.⁸⁵ The years 2001-2002 saw slightly higher rates of housing price appreciation, but the extraordinary jump in appreciation rates occurred in 2003-2005. By 2005, the rate of appreciation more than doubled to over 12%, only falling negative again in 2007. The 2005 peak surpassed all levels of housing price appreciation since 1946, when housing prices soared as rapid demographic growth from GIs returning home to a baby boom ran up against a housing supply that had been frozen during WWII.

Figure 13. Annual Rate of Change in U.S. Inflation-Adjusted Housing Price Index, 1970-2010⁸⁶



Ultimately, a bubble is marked by a rise and then subsequent collapse in an asset price. The collapse of housing prices post-2006 might not yet be complete (or it might have overcorrected), but based on

⁸⁴ See Andrey Pavlov & Susan M. Wachter, *Subprime Lending and Real Estate Prices*, 39 R.E. ECON. (forthcoming 2010).

⁸⁵ In the recent historical context, this level of annual appreciation was unremarkable; it has occurred twice since 1970 and nine other times in the 20th century.

⁸⁶ Robert J. Shiller, *irrational exuberance.com*, <http://www.econ.yale.edu/~shiller/data/Fig2-1.xls>, and authors' calculations.

current market prices, it has returned not to 1997 levels or even 2000 levels, but to 2003 levels. (See Figures 11-12, above.) This too suggests that the housing bubble only began in 2003-2004.

The weight of the evidence shows that the housing bubble was a supply-side phenomenon that began in 2003-2004. The movement of yield spreads on PLS can only be explained if the bubble was supply-side driven, while fundamentals explain housing price increases until around 2004, thereby precluding the existence of a bubble. This timing is critical both because it helps rule out alternative explanations of the bubble, as discussed in Part III, below, and because it points to the factors behind the oversupply of mortgage credit, as explored in Part IV.

III. ALTERNATIVE THEORIES OF THE HOUSING BUBBLE

There are several existing theories on the cause of the housing bubble, but there is little consensus about their explanatory power.⁸⁷ Some theories are demand-side theories, meaning that the housing bubble was caused by a growth in consumer demand for housing, which pushed up housing prices. Others are supply-side theories, meaning that the housing bubble was caused by a growth in the supply of housing finance, thereby enabling consumers to make more heavily leveraged bids for housing and bid up home prices.

This section of the Article reviews the leading theories of the housing bubble and points out their deficiencies. It is important to underscore that we believe there were multiple contributing factors to the housing bubble. Monetary policy, irrational consumer behavior, inelastic housing supply, and regulatory policy all contributed in some way to the bubble. None of these factors alone, or even in combination, however, can provide a sufficient explanation for the bubble. At best, the previous explanations of the bubble are incomplete, and in the case of arguments about the Community Reinvestment Act, demonstrably wrong.

A. Demand-Side Theories

1. Mass Psychology and Irrational Exuberance

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.⁸⁸

⁸⁷ Glaeser *et al.*, *supra* note 3.

⁸⁸ SHILLER, *SUPRA* note 10. See also Glaeser *et al.*, *supra* note 3 (concluding that Shiller's explanation is the most convincing); Ernan Haruvy *et al.*, *Traders' Expectations in Asset Markets*:

We do not question the existence of irrational consumer expectations and behavior. There was undoubtedly a great deal of irrational or misguided consumer behavior in real estate investment. But this behavior required readily available financing. Shiller's demand-side theory cannot explain the movement in PLS yield spreads during the bubble and is, therefore, a necessarily incomplete explanation. Credit relationships are two-sided relationships, and the evidence from PLS spreads indicates that any increase in housing finance demand was outstripped by an increased in housing finance supply.⁸⁹

2. *Fundamentals of Housing Supply*

Another demand-side quasi-hypothesis for the housing bubble, presented by urban economists Edward Glaeser, Joseph Gyourko and Albert Saiz, emphasizes the geographic variation in the housing bubble.⁹⁰ There was considerable regional and local variance; some regions and even states, such as Texas, did not experience a bubble, while others experienced bubbles of greater or lesser size. With an increasing demand based on growth in population and income, house prices increase with inelastic supply, based on fundamentals.

Glaeser, Gyourko and Saiz explain the variation in house price outcomes based in part on variations in the elasticity of housing supply. In some parts of the country, local regulations and urban growth have been on a collision course for several decades. In these cases, with the inability of supply to expand, increased demand for real estate only resulted in higher prices. In other words, Glaeser, Gyourko and Saiz contend that in inelastic housing markets, the housing demand curve shifted rightwards. And because most consumers finance the purchase of their homes, the rightward shift in the housing demand curve would have also resulted in a rightward shift in the mortgage finance demand curve.

Experimental Evidence, 97 AM. ECON. REV. 1901 (2007) ("We find that individuals' beliefs about prices are adaptive, and primarily based on past trends in the current and previous markets in which they have participated. Most traders do not anticipate market downturns the first time they participate in a market, and, when experienced, they typically overestimate the time remaining before market peaks and downturns occur.").

⁸⁹ An alternative psychological theory has been presented by Markus Brunnermeier and Christian Julliard. Brunnermeier & Julliard, *supra* note 10. Brunnermeier and Julliard argue that consumers are incapable of sorting between real and nominal changes in interest rates and rents. Therefore, consumers account for low nominal rates when making mortgage decisions, but fail to account for future appreciation of prices and rents falling commensurately with anticipated inflation. The result is that consumers overestimate the value of real estate when inflation is declining.

Brunnermeier and Julliard's theory may well be correct, but it too cannot explain the movement in MBS yield spreads during the bubble. Therefore, their theory, like Shiller's, is at best an incomplete explanation of the bubble, as the yield spread movement shows that any growth in demand was exceeded by a growth in supply.

⁹⁰ Edward L. Glaeser *et al*, *Housing Supply and Housing Bubbles*, 64 J. URBAN ECON. 198 (2008), available at <http://www.economics.harvard.edu/faculty/glaeser/files/bubbles10-jgedits-NBER version-July 16, 2008.pdf>.

Glaeser, Gyourko and Saiz do not present supply constraints as the explanation for the bubble, although others do.⁹¹ At most, Glaeser, Gyourko and Saiz see supply inelasticity as affecting variations in how the bubble played out regionally. They argue that supply inelastic regions are more likely to experience greater price volatility and bubbles and that the extent of the bubble was determined to some degree by housing supply inelasticity.⁹²

B. Supply Side Theories

1. Government Fair Lending and Affordable Housing Policy

Several conservative commentators have pointed to federal fair lending and affordable housing policies as being critical in inflating the housing bubble by encouraging financial institutions to lend improvidently to low- or moderate-income consumers.⁹³ These commentators focus on both the Community Reinvestment Act of 1977 (the “CRA”) and the GSEs’ affordable housing goals. Generally, these two distinct policies are lumped together in arguments, but they merit separate consideration.

a. The Community Reinvestment Act

Claims about the CRA’s role in the bubble have been thoroughly considered elsewhere and largely debunked,⁹⁴ but because of the role of the CRA is such a politically charged issue, it is worthwhile presenting the evidence in a concise fashion.

⁹¹ Randall O’Toole, *How Urban Planners Cause the Housing Bubble*, Cato Institute Policy Analysis No. 646, Oct. 1, 2009.

⁹² Edward L. Glaeser & Joseph Gyourko, “Arbitrage in Housing Markets” in *HOUSING MARKETS AND THE ECONOMY: RISK, REGULATION, AND POLICY* (EDWARD L. GLAESER AND JOHN M. QUIGLEY, EDs.) (2009), 113, 124 (noting that home mortgage interest tax deduction pushes up housing prices in supply constrained markets). It is notable, though, that the bubble was more extreme in highly supply elastic markets like Phoenix and Las Vegas. Davidoff, *supra* note 3, at 2; Richard K. Green *et al.*, *Metropolitan-Specific Estimates of the Price Elasticity of Supply of Housing, and Their Sources*, 95 AM. ECON. REV. 334 (2005).

⁹³ See *supra* note 7.

⁹⁴ Financial Crisis Inquiry Commission, *The Community Reinvestment Act And The Mortgage Crisis, Preliminary Staff Report*, Apr. 7, 2010; Board of Governors of the Federal Reserve, Staff Analysis of the Relationship between the CRA and the Subprime Crisis (memo from Glenn Canner & Neil Bhutta to Sandra Braunstein), Nov. 21, 2008, [hereinafter Fed Staff Analysis] available at http://www.federalreserve.gov/newsevents/speech/20081203_analysis.pdf (HOEPA lending was less prevalent for CRA-subject institutions than for independent mortgage companies); Glenn B. Canner & Neil Bhutta, *Did the CRA Cause the Mortgage Meltdown*, COMMUNITY DIVIDEND, FED. RESERVE BANK OF MINNEA. Mar. 2009; Ellen Seidman, *No, Larry, CRA Didn’t Cause the Sub-Prime Mess*, THE LADDER, NEW AMERICA FOUNDATION, Apr. 15, 2008; Elizabeth Laderman & Carolina Reid, *CRA Lending During the Subprime Meltdown, REVISITING THE CRA: PERSPECTIVES ON THE FUTURE OF THE COMMUNITY REINVESTMENT ACT*, 115 (Fed. Reserve Banks of Boston & S.F. Feb. 2009) (finding that CRA-subject institutions were less likely to make subprime loans in California and that subprime loans made by CRA-subject institutions in CRA assessment areas outperformed these institutions’ subprime loans made outside CRA-assessment areas).

The CRA was passed in 1977 in response to concerns about the discriminatory lending practice known as “red-lining”—the practice of not offering financial services in minority or low-income neighborhoods, sometimes indicated with a red line on a map. The CRA “encourages federally insured banks and thrifts to meet the credit needs of the entire communities that they serve, including low- and moderate-income areas, consistent with safe and sound banking practices.”⁹⁵ The CRA does not require covered financial institutions to make loans. Rather, covered financial institutions are evaluated by regulators on how well they serve the needs of low-to-moderate income borrowers in their CRA geographic assessment area. The evaluations are used as a factor in determining whether to approve the institution’s mergers with and acquisitions of other depository institutions, as well as whether to approve the expansion of bank holding companies into other types of financial activities.⁹⁶ CRA evaluation methods have remained constant since 1995.⁹⁷

There is little evidence that the CRA contributed directly to the bubble. CRA subject institutions made a disproportionately small share of subprime mortgage loans.⁹⁸ Moreover, relatively few subprime loans even qualified for CRA credit either because they were made outside CRA assessment areas or were made to higher income borrowers.⁹⁹ Census tracts served disproportionately by CRA covered lenders had less risky loans and lower delinquency rates than those served by

⁹⁵ Michael S. Barr, *Credit Where It Counts: The Community Reinvestment Act and Its Critics*, 80 N.Y.U. L. REV. 513 (2006).

⁹⁶ 12 U.S.C. § 1831u(b)(3) (2006) (CRA requirement for interstate mergers); *see also* 12 U.S.C. § 1831y (CRA Sunshine Requirements); *Id.* § 1843(l)(2) (2006) (CRA requirement for financial subsidiaries engaging in expanded financial activities).

⁹⁷ Fed Staff Analysis, *supra* note 94 at 2.

⁹⁸ Robert B. Avery, *et al.*, *FFIEC; HMDA: The 2007 HMDA Data*, 94 FED. RESERVE BULL. A 07, A124, Table 11 (2008). Critically, not all financial institutions are subject to the CRA. Only federally insured banks and thrifts fall within its ambit. Depositories’ uninsured subsidiaries and affiliates are not subject to the CRA, but insured institutions are permitted to count their subsidiaries’ and affiliates’ activities toward CRA credit. Independent mortgage companies are not covered by CRA whatsoever.

The variation in CRA coverage enables a comparison of the mortgage lending of CRA-subject institutions with that of other institutions. Bank regulators do not specifically track subprime lending, but so-called HOEPA loans, high interest rate loans, as defined by the Owners Equity Protection Act of 1994, 15 U.S.C. § 1639(b); 12 CFR §§ 226.32, 226.34, that have to be reported separately under the Home Mortgage Disclosure Act, 12 U.S.C. §§ 2801-2811; 12 C.F.R. § 203, App. A, I.G.3. provide a strong proxy for subprime lending.

CRA-subject institutions made only a small percentage of HOEPA loans during the 2004-2006 period. Avery, *et al.*, *supra* note 98. While depositories made over 40% of loans, they made less than 30% of HOEPA loans. *Id.* When their subsidiaries and affiliates are included, market share of all loans was around 70%, but HOEPA loan share was only around 50%. *Id.* In comparison, independent mortgage companies made up about 30% of the mortgage lending market, but around 50% of the HOEPA market. HOEPA lending was concentrated in institutions not subject to the CRA. *Id.*

⁹⁹ Avery, *et al.*, *supra* note 98. Not all HOEPA loans even qualified for CRA credit. To qualify, a loan must be made to a low-to-moderate income borrower in the financial institution’s CRA geographic assessment area. In 2006, only 10% of all loans made by depositories and their affiliates qualified for CRA credit, and just 6% of HOEPA loans. Fed Staff Analysis, *supra* note 94, at 7.

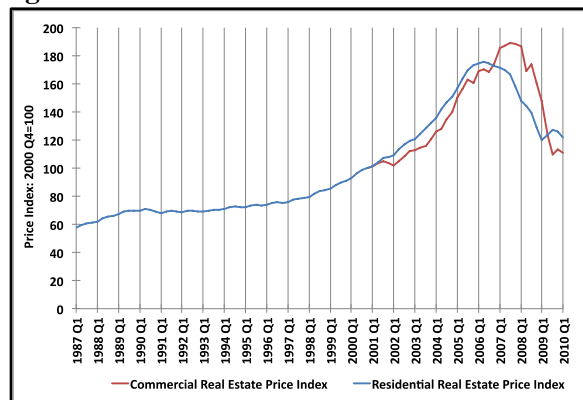
disproportionately by non-CRA lenders.¹⁰⁰ Similarly, there is no evidence of a change in riskiness of loans or loan performance at the discontinuity threshold for CRA (or GSE affordable housing goal) eligibility.¹⁰¹ It is possible, however, that depositories were driven to purchase a greater volume of loans originated by independent mortgage companies in order to gain CRA credit; sufficient data do not exist on this point.

Ultimately, though, blaming the housing bubble on the CRA suffers from two fundamental logical flaws. First, the residential housing bubble was mirrored almost exactly by a commercial real estate (CRE) bubble. (See Figure 14, below.) While there is some interlinkage between residential and commercial real estate prices, the CRE bubble cannot be attributed to the residential bubble. As the CRA does not apply to commercial real estate lending, it cannot explain the existence of the CRE bubble. Yet, the synchronous growth and collapse of the residential and commercial real estate bubbles cannot be coincidental. In sum, the case that the CRA drove banks to improvident lending is not tenable.¹⁰²

¹⁰⁰ Robert B. Avery & Kenneth P. Brevoort, *The Subprime Crisis: How Much Did Lender Regulation Matter?* Board of Governors of the Federal Reserve, Division of Research and Statistics, working paper, Aug. 2010, at <http://ssrn.com/abstract=1726192> at 14-16.

¹⁰¹ *Id.* at 21.

¹⁰² We believe that the strongest argument that can be made about the role of the CRA is an indirect and non-falsifiable one: government policy, including the CRA sent a clear signal to the financial services industry that increases in homeownership were valued. Financial institutions took this as cover to loosen their underwriting standards across the board and develop economies of scale in subprime lending, as they knew regulators were cheering on looser lending practices. This sort of role for the CRA in the housing bubble is quite different from the “government made banks lend to unqualified borrowers” sort of argument. In this argument, CRA provides the cover for activities that financial institutions wished to engage in themselves.

Figure 14. Commercial and Residential Real Estate Bubbles¹⁰³

Second, the timing of the bubble vitiates the CRA explanation. The CRA greatly predates the bubble, so it is difficult to attribute housing price rises in 2004-2007 to a 1977 statute with a regulatory implementation that was last revised in 1995.¹⁰⁴ While one would expect some time lag before seeing the result of the CRA, the time lag is simply too long to make the connection plausible.

b. GSE Affordable Housing Goals

In addition to the CRA, some commentators have argued that the GSEs' affordable housing goals also fueled imprudent provision of credit and thus drove the housing bubble.¹⁰⁵ Thus, Edward Pinto, has claimed that the affordable housing goals "signaled to the GSEs that they should accept down payments of 5% or less, ignore impaired credit if the blot was over one year old, and otherwise loosen their lending guidelines."¹⁰⁶

The GSEs have been subject to affordable housing goals since 1993.¹⁰⁷ These goals, set by the Department of Housing and Urban Development, are designed "to facilitate credit access and

¹⁰³ S&P/Case-Shiller Housing Price Index CS-10 (residential price index); Moody's/REAL Commercial Price Index (commercial price index); Mortgage Bankers Association, National Delinquency Surveys (residential delinquency rates); Commercial Mortgage Securities Association (CMBS delinquency rates); Federal Reserve (commercial bank delinquency rates).

¹⁰⁴ Proponents of a CRA-induced bubble must, therefore, date the bubble as of 1997, but this would attribute any housing price appreciation to CRA, and clearly not all housing price appreciation is a bubble.

¹⁰⁵ See, e.g., Edward Pinto, *ACORN and the Housing Bubble*, WALL ST. J., Nov. 12, 2009, at ???; Peter Wallison, *The Price for Fannie and Freddie Keeps Going Up*, WALL ST. J., Dec. 29, 2009, at ???. Peter Wallison, *Cause and Effect: Government Policies and the Financial Crisis*, AEI ONLINE, Nov. 2008.

¹⁰⁶ Pinto, *Acorn and the Housing Bubble*, *supra* note 7.

¹⁰⁷ Federal Housing Enterprises Financial Safety and Soundness Act of 1992 (the "GSE Act"), 102 P.L. 550 § 1331, *codified at* 12 U.S.C. § 4561. From 1993 to 2008, the affordable housing goals were supervised by the HUD Secretary. Starting in 2009, they came under the supervision of the Federal Housing Finance Agency. Housing and Economic Recovery Act of 2008, July 30, 2008, P.L. 110-289, Div A, Title I, Subtitle B, § 1128(b), 122 Stat. 2700 (transferring authority from HUD to FHFA).

homeownership among lower-income and minority households.”¹⁰⁸ If a GSE fails to meet the affordable housing goals and does not present and pursue an acceptable remedial plan, monetary penalties and injunctive relief are available to the regulator.¹⁰⁹ The goals consist of three general measures: low-to-moderate income, special affordable, and underserved areas, as well as special subgoals for special affordable multifamily and home purchase (as opposed to refinancing).¹¹⁰ The goals are measured as the ratio of qualifying mortgages financed to total mortgages financed. High-priced “HOEPA” mortgages¹¹¹ are disqualified from counting toward affordable housing goals, as were mortgages for second residences, “mortgages with unacceptable terms,” defined as including those with excessive fees, prepayment penalties, credit life insurance, or that did not adequately consider the borrower’s ability to pay.¹¹²

The GSE affordable housing goals were raised in 1997, 2001, and 2005. The GSEs have generally met the goals.¹¹³ In order to do so, the GSEs increased their proportion of loans made to target populations,¹¹⁴ and expanded their underwriting criteria to enable the purchase of riskier loans.¹¹⁵ Yet there is little evidence that the GSE affordable housing goals increased the total amount of credit available to underserved communities.¹¹⁶

¹⁰⁸ Xudong An & Raphael W. Bostic, *GSE Activity, FHA Feedback, and Implications for the Efficacy of the Affordable Housing Goals*, 36 J. R.E. FIN. & ECON. 207, 207-208 (2008);

¹⁰⁹ 102 P.L. 550 §§1341, 1344, 1345, *codified at* 12 U.S.C. § 4566.

¹¹⁰ 12 U.S.C. §§ 4562-65.

¹¹¹ 15 U.S.C. §§ 1601-1606. A HOEPA loan is a closed-end, non-purchase money mortgages (excluding reverse mortgages) secured by a consumer’s principal residence that either have an APR of more than 800 bps above comparable maturity Treasury securities (for first liens) or 1000 basis bps above comparable maturity Treasury securities (for junior liens), or that have total points and fees payable by the consumer at or before closing that exceed the greater of 8% of the total loan amount or an annually adjusted dollar amount. 12 C.F.R. § 226.32(a) (Reg Z). HOEPA loans must be separately reported in Home Mortgage Disclosure Act data. 12 C.F.R. § 203.4(a)(13) (Reg C).

¹¹² 24 C.F.R. §§ 81.16(b)(8), 81.16(b)(12), 81.2 (defining “HOEPA mortgage” and “unacceptable terms”).

¹¹³ U.S. Dept. of Housing and Urban Development, *Overview of the GSEs’ Housing Goal Performance, 1996-2003* (2005).

¹¹⁴ H. L. Bunce, *The GSEs’ Funding of Affordable Loans: A 2000 Update*, U.S. Dept. of Housing and Urban Development, Housing Finance Working Paper Series HF-013 (2002), H.L. Bunce & M. Scheessele, *The GSEs’ Funding of Affordable Loans*, U.S. Dept. of Housing and Urban Development, Research report, No. HF-001 (1996); Paul B. Manchester, *Characteristics of Mortgages Purchased by Fannie Mae and Freddie Mac, 1996-97 Update*, U.S. Dept. of Housing and Urban Development, Housing Finance Working Paper Series HF-006 (1998).

¹¹⁵ Xudong An & Raphael W. Bostic, *Policy Incentives and the Extension of Mortgage Credit: Increasing Market Discipline for Subprime Lending*, 28 J. POL’Y ANALYSIS & MGMT. 340 (2009); David L. Listokin & Elvin K. Wyl, *Making New Mortgage Markets: Case Studies of Institutions, Home Buyers, and Communities*, 11 HOUSING POL’Y DEBATE 575 (2000); Kenneth et al. *The Impact of Secondary Mortgage Market Guidelines on Affordable and Fair Lending: A Reconnaissance from the Front Lines*, 28 REV. OF BLACK POL. ECON. 29 (2001).

¹¹⁶ Stuart A. Gabriel & Stuart S. Rosenthal, *Government-Sponsored Enterprises, the Community Reinvestment Act, and Home Ownership in Targeted Underserved Neighborhoods*, in HOUSING MARKETS AND THE ECONOMY: RISK, REGULATION, AND POLICY 202, 205 (EDWARD L. GLAESER & JOHN M. QUIGLEY,

One possible explanation of this is that GSE activity crowded out the FHA for lending to underserved borrowers. Economists Xudong An and Raphael Bostic argue that the GSEs' affordable lending merely substituted for FHA affordable lending.¹¹⁷ If so, the primary accomplishment of the GSE affordable housing goals was not to increase total mortgage credit, but to beggar the FHA.

The GSEs are permitted, however, to count their purchases of private-label MBS for affordable housing goals.¹¹⁸ If the underlying mortgages in a PLS would count for affordable housing goal credit, the PLS can also count. This raises the possibility that the GSEs' pursuit of affordable housing goals fueled the market for PLS driving down yields. The GSEs' enormous investment portfolios included sizeable holdings of subprime and alt-A MBS, and their holdings undoubtedly contributed to the bubble by adding to demand for MBS. But it is notable that the size of the subprime MBS in the GSEs' portfolios, as well as their portfolio's absolute share of the subprime PLS market decreased after 2004, as PLS yield spreads declined.¹¹⁹ This means that other investors were more than substituting for GSE demand of PLS.¹²⁰

c. Alternative Factors that May Explain GSE Behavior

The GSEs certainly contributed to the housing bubble, but we do not know how much, and their contribution may have been due to factors other than the affordable housings goals, most notably competition with PLS and an attempt to recapitalize themselves following losses incurred during the refinancing wave of 2001-2003.

As long as the securitization field consisted predominantly of the GSEs and Ginnie Mae, a race to the bottom in underwriting standards was avoided. The growth of PLS, however, forced the GSEs to lower their underwriting standards in an attempt to reclaim lost market share in order to please their private shareholders. Shareholder pressure pushed the GSEs into competition with PLS for market share, and the GSEs loosened their guarantee business underwriting standards in order to

EDS.) (2009) (finding "essentially no evidence" that GSE affordable housing goals increase lending or homeownership); An & Bostic, *supra* note 115; An & Bostic, *supra* note 108., at 207-208; Raphael W. Bostic & Stuart A. Gabriel, *Do the GSEs Matter to Low-income Housing Markets?* 59 J. URBAN ECON. 458 (2006); Brent W. Ambrose & Thomas G. Thibodeau, *Have the GSE Affordable Housing Goals Increased the Supply of Mortgage Credit?* 34 REGIONAL SCI. & URBAN ECON. 263-273 (2004).

¹¹⁷ An & Bostic, *supra* note 108, at 207-208.

¹¹⁸ 24 C.F.R. § 81.16(c)(2).

¹¹⁹ The reduction of PLS in the GSE portfolios is partially attributable to consent agreements with OFHEO after the revelation of GSE accounting irregularities. Financial Crisis Inquiry Commission, *Government Sponsored Enterprises and the Financial Crisis, Preliminary Staff Report*, Apr. 7, 2010 at 13.

¹²⁰ Therefore, the 2005 increase in GSE affordable housing goals did not result in an increase in the size of the GSEs' subprime MBS portfolio. Data is not available on GSE alt-A MBS holdings, but based on available evidence, affordable housing goals do not appear to have driven GSE investment strategy.

compete. In contrast, the wholly public FHA/Ginnie Mae maintained their underwriting standards and ceded market share.

This situation resembles the classic insurance regulation problem of a rate war for market share that results in all participants becoming insufficiently capitalized because they fail to charge adequate premiums for the risk they assume. The GSEs' guarantee business is nothing more than an insurance operation, yet it was not regulated like a classic insurer, with regulators approving rate schedules (to prevent rate wars) and mandatory reserving. Instead, the GSEs were free to set their guarantee fees as they wished and to be highly leveraged, dividending out their guarantee business income to shareholders, rather than holding it in reserve against losses.

With loosened underwriting standards, the GSEs ended up partially replicating the PLS market,¹²¹ and they paid dearly for it.¹²² The GSEs were insufficiently transparent for either their regulator, the Office of Federal Housing Enterprise Oversight (OFHEO, now rebranded as the Federal Housing Finance Agency, FHFA), or for their shareholders and creditors to monitor their activities and discipline them for these changes.¹²³ Moreover, the moral hazard from the implicit (and ultimately explicit) government guarantee of GSE debt meant that the GSEs' creditors had reduced incentive to monitor the GSEs' risk, although equity holders still did have this incentive.

Another possibility, itself consistent with the competition story, is that the GSEs weakened their underwriting standards in a "gamble on resurrection," as they attempted to recapitalize themselves after being devastated by the refinancing wave of 2001-2003. The GSEs have three lines of business. First, they operate as bond insurance companies, insuring MBS. While they generally insure only the MBS they package, Freddie Mac did experiment in its T-series with insuring privately pooled mortgages.¹²⁴ Second, the GSEs have enormous investment portfolios. And third, the GSEs invest in whole loan mortgages themselves,

¹²¹ Federal Housing Finance Agency, *supra* note 160.

¹²² The proximate cause of the GSEs' failure was not from poor underwriting on the guarantee business for 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. The GSEs were simply too highly leveraged to handle a major market downturn. The GSEs were already in conservatorship by the time losses began to mount from their guarantee business. Given the decline in GSE underwriting standards, however, losses from the guarantee business would have been sufficient to lead to conservatorship.

¹²³ Moreover, even if shareholders had been able to discipline the GSEs for lowering underwriting standards, that might have been offset by shareholder discipline for loss of market share.

¹²⁴ See Freddie Mac, Annual Report 2005, Consolidated Financial Statements, Note 3: Variable Interest Entities, at http://www.freddiemac.com/investors/ar/2005/05_11_06_03.htm.

retaining a sizeable portfolio. These loans plus general GSE operations are financed through the issuance of corporate debt. To make the corporate debt financing work, the GSEs must have a return on their portfolio mortgages that is greater than the rate paid on their corporate debt.

Prior to 2001, most GSE corporate debt was non-callable, meaning that the GSEs did not have the right to prepay the debt if interest rates fell. GSE mortgages, however, are prepayable. Thus, when interest rates plummeted in 2001, the GSEs found themselves facing an enormous problem. Their assets were refinanced to pay a lower rate, but they could not refinance their debt. The result was the decapitalization of the GSEs.

The GSEs' accounting scandals that emerged in 2004 prevent us from having the full picture of what happened, but if the GSEs were significantly decapitalized, they might have been tempted to "gamble on resurrection," meaning that they might have been tempted to assume greater risks in order to recapitalize themselves. If so, it would explain the GSEs' assuming more risk in all three of their lines of business. It would also have strong parallels to the savings and loan (S&L) crisis in the 1980s. In the late 1970s and early 1980s, interest rates rose dramatically. The result was that S&Ls had to offer ever higher interest rates to retain their deposit base, particularly in the face of new money market funds. The rate on the S&Ls' assets—long-term, fixed-rate mortgages—did not rise correspondingly. The result there was decapitalization of the S&Ls. S&L deregulation enabled the S&Ls to invest in new asset classes, and "zombie" S&Ls promptly chased after high-yielding—and riskier—assets, with the result that they were decapitalized further when the risks on these assets materialized. The increased risk profile of the GSEs' business during the bubble could have been the result of a "doubling down" of their bets in an attempt to recapitalize after the refinancing wave of 2001-2003.

The point here is not to prove what happened with the GSEs, but merely to demonstrate that even if the GSEs were assuming greater risks during the bubble years, it could well have been for reasons unrelated to government affordable housing policy. Regulation of GSE securitization failed to function during the housing bubble, and informational failures and moral hazard prevented market discipline from exerting itself. The GSEs' contribution to the bubble stemmed in part from regulatory and

information failures that existed irrespective of the role of affordable housing goals.¹²⁵

2. Monetary Policy and the Global Supply of Credit

Macroeconomist John B. Taylor, the inventor of the eponymous Taylor Rule for setting monetary policy,¹²⁶ has argued that the housing bubble was the inevitable consequence of mishandled monetary policy.¹²⁷ Taylor's contention is that after 2000, the Federal Reserve held interest rates too low for too long. Low rates produced artificially cheap mortgage credit, which led to excessive demand for mortgages. Because mortgages are the largest form of leverage for consumers, housing was the asset class where a bubble was most likely to form. Because consumers were able to incur greater leverage for lower cost, their purchasing power increased, and therefore housing prices were bid up.¹²⁸ Taylor's counterfactual regressions suggest that housing prices would have been far less inflated if the Fed had adhered more closely to the Taylor rule in the wake of the 2000 stock market crash and the 9/11 attacks.

Monetary policy played a role in the housing bubble, but it is an incomplete explanation for several reasons. First, short-term interest rates only have a weak effect on housing prices in a market predominated by fixed-rate mortgages.¹²⁹ The Federal Funds rate—the rate that the Fed controls—is a short-term rate, which differs from the long-term rate that is charged on mortgages.¹³⁰ Thus, previous declines in the Fed Funds rate have not produced housing bubbles. For example, between late 1990 and 1993, the effective Fed Funds rate fell from around 8% to 3%,

¹²⁵ The explanatory power of the affordable housing goals must also be questioned, as it cannot explain the commercial real estate bubble. There was a negligible amount of CRE in multifamily housing, which the GSE do purchase. See Adam J. Levitin & Susan M. Wachter, *The Commercial Real Estate Bubble*, working paper, October, 2011.

¹²⁶ John B. Taylor, *Discretion Versus Policy Rules in Practice*, 39 CARNEGIE-ROCHESTER CONFERENCE SERIES ON PUBLIC POL'Y 195 (1993).

¹²⁷ John B. Taylor, *Housing and Monetary Policy*, NBER Working Paper Series 13682 (2007); JOHN B. TAYLOR, *GETTING OFF TRACK: HOW GOVERNMENT ACTIONS AND INTERVENTIONS CAUSED, PROLONGED, AND WORSENEED THE FINANCIAL CRISIS* (2009).

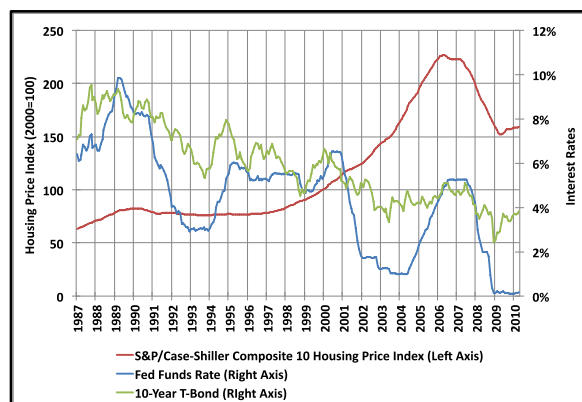
¹²⁸ *Id.* See also Pavlov & Wachter, *supra* note 84 (showing how housing price increases can result from either the removal of constraints on access to capital for borrowers via lower underwriting standards, the decline in the cost of credit via interest rates, or the decline in the cost of the mortgage put option—the availability of nonrecourse credit and demonstrating how these factors affected different geographic regions differently).

¹²⁹ Glaeser *et al.* *supra* note 3, at 2-6; Jane Dokko, *et al.*, *Monetary Policy and the Housing Bubble*, Finance and Economics Discussion Series, Federal Reserve Board, Dec. 22, 2009; Marek Jarocinski & Frank R. Smets, *House Prices and the Stance of Monetary Policy*, 90 FED. RESERVE BANK OF ST. LOUIS REV. 339 (2008); Marco Del Negro & Christopher Otrok, 99 *Lufiballons: Monetary Policy and the House Price Boom across U.S.*, 4 J. MONETARY ECON. 1962 (2007).

¹³⁰ Bernanke, *supra* note 21; Greenspan, *supra* note 33, at 38-40. Bernanke also contests Taylor's counterfactual regressions and argues that the Fed actually adhered closely to the Taylor rule as it should be applied, accounting for anticipated, rather than actual inflation. Bernanke, *supra* note 21.

a similar sized drop to that between late 2000 and 2003, when the rate declined from around 6% to 1%. Yet no housing bubble ensued in the early 1990s. Likewise, the timing of the bubble does not track with interest rates. The bubble continued to grow even once the Fed started to raise rates in 2005.¹³¹ (See Figure 15, below).

Figure 15. Housing Prices (Nominal) and Interest Rates, 1987-2010



Second, while long-term interest rates do have an effect on housing prices, the decline in long-term rates was insufficient to explain the entirety of the bubble.¹³² A one percent decline in the long-term rate results in roughly an eight percent increase in housing prices.¹³³ As 10-year Treasuries fell from a height of 6.66% in January 2000 to a low of 3.33% in June 2003, that would predict a 26% increase in housing prices, (the actual increase was 38%). And Taylor cannot explain the further 52% price increase that occurred once long-term rates started to rise (to 4.99% at the peak of the bubble).

Nor does a monetary policy explanation explain why underwriting standards deteriorated or the product mix changed. Monetary policy might have made mortgage credit cheap, but declines in underwriting standards and shifts to initial affordability products made it even cheaper.

Finally, monetary policy does not explain the occurrence of mortgage bubbles in some countries outside the United States, but not in others. Adherence to or divergence from the Taylor rule seems to have had little impact on which developed countries experienced bubbles and

¹³¹ Depending on the application of the Taylor rule, the Fed Funds rate was either too low or was more or less correct during this period. Bernanke, *supra* note 21.

¹³² Edward L. Glaeser, Joshua Gottlieb, and Joseph Gyourko, *Did Credit Market Policies Cause the Housing Bubble?* Harvard Kennedy School Pol'y Brief, May 2010, at 4.

¹³³ *Id.*

which did not.¹³⁴ Countries like Canada, with very similar monetary policy to the U.S. did not have bubbles,¹³⁵ while countries like Spain and Ireland that saw a decrease in lending controls similarly to the US also had significant bubbles.¹³⁶

Monetary policy helps explain the refinancing boom that occurred in 2001-2003 and why housing prices appreciation exceeded rental cost appreciation. But it comes up short in explaining the rest of the housing bubble.

A related macroeconomic explanation comes from Federal Reserve Chairman Ben Bernanke and endorsed by one of the dissents from the Financial Crisis Inquiry Commission's Final Report.¹³⁷ Bernanke has argued that an increase in the savings rate in many emerging market countries had led to a "global savings glut."¹³⁸ These foreign emerging market countries, particularly China, were running massive current account surpluses, and lacked sufficiently appealing domestic investment opportunities. As a result, savings flowed to the United States for investment, which held down long-term interest rates, thereby contributing to the housing bubble.¹³⁹

Bernanke argues that these foreign capital inflows were invested not only in U.S. Treasury and Agency securities (including GSE MBS), but also in AAA-rated PLS and commercial mortgage-backed securities (CMBS).¹⁴⁰ Bernanke also notes that other advanced economies—Europe and Japan—showed a similar appetite for "safe U.S. assets," despite running roughly balanced current accounts.¹⁴¹ Bernanke argues that "[i]nvestors were willing to reach for some additional yield by purchasing AAA-rated MBS rather than Agency debt (or sovereign bonds at home)...", which would explain the increased demand not only AAA-rated MBS.¹⁴² (See Figure 16.) For investors seeking AAA-rated assets, there were few options other than sovereign, Agency, and structured products. As Lloyd Blankfein, CEO of Goldman Sachs noted,

¹³⁴ Bernanke, *supra* note 21.

¹³⁵ Adam J. Levitin *et al.*, *North Star: Lessons for the U.S. from the Canadian Housing Finance System*, working paper, 2010.

¹³⁶ Richard Green *et al.* *Housing Finance in Developed Countries in a Time of Turmoil*, working paper, Aug. 2010 (examining why some developed countries experienced housing bubbles, but not others.).

¹³⁷ THE FINANCIAL CRISIS INQUIRY COMMISSION, *THE FINANCIAL CRISIS INQUIRY REPORT: FINAL REPORT OF THE NATIONAL COMMISSION ON THE CAUSES OF THE FINANCIAL AND ECONOMIC CRISIS IN THE UNITED STATES* 417, 419-20 (2011) (Hennessey, Holtz-Eakin & Thomas dissenting).

¹³⁸ Bernanke, *International Capital Flows*, *supra* note 6; Ben S. Bernanke, *Global Imbalances*, *supra* note 6; Bernanke, *The Global Saving Glut*, *supra* note 6.

¹³⁹ Bernanke, *International Capital Flows*, *supra* note 6; *see also* Caballero & Krishnamurthy, *supra* note 6.

¹⁴⁰ Bernanke, *International Capital Flows*, *supra* note 6.

¹⁴¹ *Id.*

¹⁴² *Id.*

“[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.”¹⁴³

Figure 16. PLS, CMBS, and ABS Share of Non-Sovereign AAA-Rated Securities Outstanding¹⁴⁴

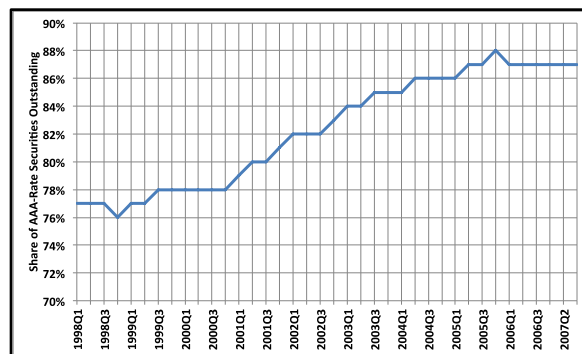
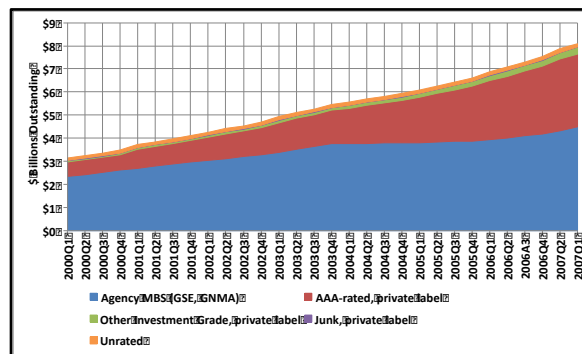


Figure 17. Volume of PLS, CMBS, and ABS Outstanding by Rating¹⁴⁵



Bernanke’s global savings glut explanation would explain part of the supply of mortgage credit; the overwhelming majority of MBS were AAA-rated. (See Figure 17, above.) But Bernanke’s explanation overlooks a critical detail: the only way that subprime mortgages could be converted into AAA-rated bonds was through structured finance. Structured finance did not eliminate risk; it merely concentrated it in the junior tranches in PLS deals. The creation of AAA-rate PLS necessitated the creation also of non-investment grade PLS. While vast the majority of the PLS were AAA-rated, the deal economics were simply not

¹⁴³ Lloyd Blankfein, *Do Not Destroy the Essential Catalyst of Risk*, FINANCIAL TIMES (London), Feb. 8, 2009, at 7.

¹⁴⁴ Bernanke, *International Capital Flows*, *supra* note 6.

¹⁴⁵ *Id.*

workable unless there were also buyers for the non-investment grade pieces at reasonable yields. As discussed *infra* in Part IV.B.2-3, the catalyst for the oversupply of underpriced mortgage credit was the demand for the non-investment grade PLS. Absent this demand, PLS would not have been economically viable and the global savings glut would have had to find a home in other asset classes.

Moreover, neither the Bernanke explanation, nor the Taylor explanation for that matter, explains why lenders mispriced mortgage credit risk or why there was a compression of default risk premia for PLS, but not for corporate securities. The cost of credit is always the risk-free rate—which is set by the Fed for short-term rates—*plus* a risk premium. Even if the risk-free rate was historically low, the risk premium should not have changed. Why would yield spreads (the risk premium) drop even when risk was rising? Finally, neither Bernanke nor Taylor explains the concomitant explosion of this form of credit relative to GDP rather than that of corporate debt, which stayed in relative fixed proportion to output.¹⁴⁶

3. Market Relaxation of Underwriting Standards

A number of studies present what might be called a latent supply-side theory that emphasizes easier credit not because of monetary policy but because of changes in the mortgage market, particularly the growth of securitization. We call this a latent supply-side theory because it has yet to be fully articulated; it is often more implied than emphasized. Some of these studies merely point to relaxation of credit terms as critical in inflating the bubble, but they fail to explain *why* credit terms were relaxed.¹⁴⁷ A number of other studies have pointed to securitization as being critical to the relaxation of credit terms and emphasize the principal-agent problem inherent in securitization.¹⁴⁸ These studies, however, do not attempt to provide complete explanations of the housing bubble, but instead test more focused propositions about whether securitization facilitated laxer lending standards. Accordingly, they do not explain the timing of the bubble and do not integrate the institutional changes in the mortgage market. These studies also do not explain *why* securitization led to laxer lending standards or why normal market discipline failed.

Our supply-side theory extends the latent relaxation of underwriting standards argument into a patent formal explanation of the

¹⁴⁶ Susan M. Wachter, *The Ongoing Financial Upheaval: Understanding the Sources and the Way Out*, ILE Working Paper 09-30, Aug. 2009, at <http://ssrn.com/abstract=1464791>.

¹⁴⁷ See Khandani *et al.*, *supra* note 9; Favilukis *et al.*, *supra* note 9.

¹⁴⁸ See Keys *et al.*, *supra* note 9; Mian & Sufi, *supra* note 9; Mian *et al.*, *supra* note 9.

housing bubble. It does so by connecting the relaxation of underwriting standards to the change in mortgage products and the mortgage market's institutional shift from regulated agency securitization to unregulated PLS securitization, and explains, in the next section, why this shift in products and securitization channels resulted in a bubble.

IV. EXPLAINING THE OVERSUPPLY OF UNDERPRICED MORTGAGE CREDIT

A. Economic Agents Exploiting Information Asymmetries

Evidence from PLS spreads makes clear that the bubble was a supply-side bubble, as housing prices were bid up due to an oversupply of underpriced mortgage finance. It is also clear that there was only a bubble for a relatively short window, from 2003-2004 until 2006. But what led to the oversupply of underpriced mortgage credit?

The answer, we believe, is the shift in the securitization market from regulated Agency MBS to unregulated PLS. The housing bubble was marked by the extraordinary growth of two types interrelated of complex, heterogeneous products: nontraditional mortgages and PLS. The market share of both expanded dramatically in 2004 and continued to grow up to the height of the bubble in 2006. The growth of these products was inextricably linked, as PLS provided the funding for nontraditional mortgages. Nontraditional mortgages enabled the expansion of the mortgage borrower pool and thereby enabled more securitization.

PLS are unusually complex, heterogeneous products. Any particular securitization is supported by a unique pool of collateral and has its own set of credit enhancements and payment structure. Complexity and heterogeneity shrouded the risks inherent in PLS. Moreover, the heterogeneity of PLS meant that there was not a liquid secondary market in PLS, so no market pricing mechanism existed.¹⁴⁹

As a result, investors failed to properly price for risk, as they did not perceive the full extent of the risk involved. The structure of PLS (including the underlying mortgages) allowed investors to underestimate the risks involved and therefore underprice the PLS by demanding insufficiently large yield spreads. The housing bubble was fueled by mispriced mortgage finance, and the mispricing occurred because of information failures. Thus, at the core of the housing bubble was an information failure. Investors lacked adequate information about the risks involved with PLS.

¹⁴⁹ The development of the ABX index, considered in section IV.B.4, addressed this issue problematically.

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 are shrouded or blocked, prices do not reflect costs and risks, and resources are allocated inefficiently. Complexity and heterogeneity shroud information and thereby make it more difficult to evaluate investments. Complexity overwhelms the computational capacity of the human brain and even standard pricing models, while heterogeneity defeats cross-product comparisons, an inductive method upon which much of our pricing behavior relies.¹⁵⁰ Therefore, as complexity and heterogeneity increase, mispricing becomes increasingly likely. Moreover, informationally-shrouded markets also tend to create informational asymmetries that can be exploited by informationally-advantaged parties to take advantage of mispricing by informationally-disadvantaged parties.

Information failures exist in both the mortgage loan market and the MBS market. Both sides of the mortgage finance system are subject to informational asymmetries and principal-agent problems. In the mortgage loan market, there are lender/broker information advantages over borrowers, as well as borrower information advantages over lenders. Information asymmetries occur both between the borrower and broker/lender because the borrower lacks information on the loan product's risk as well as on the broker or lender's incentives to steer the borrower toward a riskier loan that will be more profitable because of the greater yield spread or servicing release premium paid upon the sale of the loan. At the same time, however, 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.¹⁵¹

Information asymmetries also exist in the MBS market. Both mortgage borrowers and mortgage lenders have informational advantages over securitizers, and they ultimately all have informational advantages over investors, because not all information on mortgage risk is imbedded in the disclosures to investors. PLS are sold without having to reveal the full nature of the underlying mortgages. Indeed, disclosure for many PLS took the form of disclosing the *lack* of information on

¹⁵⁰ See Xavier Gabaix and David Laibson, *Shrouded Attributes, Consumer Myopia, and Information Suppression In Competitive Markets*, 121 Q. J. ECON. 505 (2006); Xavier Gabaix & David Laibson, *Competition and Consumer Confusion*, Econometric Soc. 2004 N. Am. Summer Meetings, (2004) (arguing that firms with lower intrinsic quality utilize excess complexity to increase market share by confusing consumers); Marisa J. Mazzotta & James J. Opaluch, *Decision Making When Choices Are Complex: A Test of Heiner's Hypothesis*, 71 LAND ECON. 4, 513 (1995) (finding individuals resort to simplified decision-making rules when choices reach a certain level of complexity).

¹⁵¹ See Adam Ashcraft and Til Schuermann, *Understanding the Securitization of Subprime Mortgage Credit*, 2 FOUNDATIONS AND TRENDS IN FINANCE 191-309 (2008); Oren Bar-Gill, *The Law, Economics and Psychology of Subprime Mortgage Contracts*, 94 CORNELL L. REV. 1073 (2009).

loans bundled in these securities, such as listing the percentage of low or no-document loans (often not even broken down separately). On top of this, there is no independent verification of the disclosures.¹⁵²

Principal-agent conflicts are rife in these informationally-asymmetric markets. Mortgage brokers, perceived by many borrowers as their legal agents or at least owing them duties,¹⁵³ were compensated in part with “yield spread premiums”—payments made by the lender to the broker based on the difference between the yield on the mortgage the broker placed and the yield on the lowest rate mortgage for which the borrower qualified—which incentivized brokers to steer borrowers toward more expensive (and ultimately riskier) loans.¹⁵⁴

Likewise, securitization sponsors are incentivized to do more and larger deals because their income comes from fees based on deal volume and size, not the loan’s performance. As James Grant has written, the securitization process “is a wondrous kind of machine that spits out fees for its owners at every step of the manufacturing process.”¹⁵⁵ 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.

Securitization’s fee-based business model and its inherent information asymmetries create a potential “lemons” problem, as securitizers are tempted to push ever more questionable product on investors.¹⁵⁶ If investors underprice, they will overpurchase. Thus, the information asymmetries between securitizers and investors allow

¹⁵² Intentional falsification of information in disclosures would violate the securities laws, but the heightened pleading requirement of 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.

¹⁵³ Debbie Gruenstein Bocian *et al.*, *Unfair Lending: The Effect of Race and Ethnicity on the Price of Subprime Mortgages*, Center for Responsible Lending, May 31, 2006, at 21.

¹⁵⁴ Howell E. Jackson & Laurie Burlingame, *Kickbacks or Compensation: The Case of Yield Spread Premiums*, 12 STAN. J.L. BUS. & FIN. 289, 310-11 (2007). As of April 1, 201, yield spread premiums will be illegal under Regulation Z. [Fed. Reg. cite to be provided when available], *to be codified at* 12 C.F.R. § 226.36(e). The servicing release premiums paid to originators by secondary market institutions might also incentivize the steering of borrowers to riskier loans.

¹⁵⁵ JAMES GRANT, *MR. MARKET MISCALCULATES: THE BUBBLE YEARS AND BEYOND* 170 (2008).

¹⁵⁶ The potential for a “lemons” problem in securitization has long been noted. See Claire A. Hill, *Securitization: A Low-Cost Sweetener for Lemons*, 74 WASH. U. L.Q. 1061 (1996) (noting the potential for a “lemons” problem in securitization). The bubble and its aftermath play out George Akerlof’s lemon’s problem exactly as predicted. See George A. Akerlof, *The Market for “Lemons”: Quality, Uncertainty, and the Market Mechanism*, 84 Q. J. ECON. 488 (1970). 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.

securitizers to maximize volume and therefore fee income in the short-term. To be sure, the long-term implications of a short-run income maximization strategy were apparent, but preserving long-term reputation did little to address immediate earnings pressures, and was viewed by managements as their successors problem. Moreover, once one firm adopted this strategy, it placed competitive pressure on other firms to follow suit.¹⁵⁷

Increasing fee revenue necessitated more deals, which necessitated greater production of mortgages. Indeed, the need for mortgage product to securitize led the investment banks that served as securitization conduits to purchase mortgage originators in order to guarantee a supply of product for securitization.¹⁵⁸ As John Kriz of Moody's noted in 2006, "If you have a significant distribution platform, there are many things you can do to move those assets—through securitization and outright resale, among other things. *What you need is product to feed the machine.*"¹⁵⁹ The fee-based business model of private-label securitization encouraged greater supply of mortgage credit in order to generate mortgages for securitization to generate fee income for financial institution intermediaries.

Financial institutions played the role of economic (but not legal) agents in their intermediation between mortgage borrowers and capital market mortgage funders. Potential principal-agent problems exist both between mortgage borrowers and financial intermediaries and between mortgage investors and the intermediaries. Regulatory standards, so long as they were in place, kept both types of principal-agent problems in check for Agency securitization. In the PLS market, however, there were no such constraints, and the principal-agent problems resulted in a shift in mortgage products to unsustainable nontraditional products that boosted origination and securitization volume—and hence profits—in the short-term, albeit with disastrous longer-term effects. Insufficient regulation of the privately-owned GSEs meant that the GSEs found themselves under shareholder pressure to recapture market share lost to PLS, and they were only able to do this by lowering their underwriting standards and underpricing risk in their guarantee business.¹⁶⁰ Ginnie Mae was not under any such shareholder pressure and simply ceded market share rather than lower underwriting standards.

¹⁵⁷ Andrey D. Pavlov & Susan M. Wachter, *The Inevitability of Market-Wide Underpricing of Mortgage Default Risk*, 34 R.E. ECON. 479 (2006).

¹⁵⁸ Todd Davenport, *What's Behind Wall Street Players' Mortgage Deals*, AM. BANKER, Aug. 14, 2006.

¹⁵⁹ *Id.* (quoting John Kriz of Moody's) (emphasis added).

¹⁶⁰ See Federal Housing Finance Agency, *Conservator's Report on the Enterprises' Financial Performance, Second Quarter 2010*, Aug. 26, 2010, at 6, 12.

The combination of information asymmetries on both sides of the housing finance market meant that borrowers were entering into overly leveraged purchases, at rates that underpriced risk, while investors were making the leverage available too cheaply. The result was the growth of an unsustainable housing price bubble as artificially cheap credit from investors' mispricing increased mortgage demand, and increased mortgage quantity pushed up prices. Housing price appreciation concealed the risk in the lending by temporarily preventing defaults and deflating LTV ratios, which made PLS look like safer investments, fueling the cycle.

B. Failure of Normal Market Constraints

The "Fundamental Theorem of Asset Pricing" teaches that if an asset is overvalued, then investors will be against it, resulting in the asset's price falling.¹⁶¹ Why didn't investors recognize PLS as overvalued and why didn't they bet against them on a sufficiently wide scale to raise the yields on PLS and thus on mortgage credit?

Some investors certainly believed that PLS were overpriced. There were several potential market constraints on the level of default risk in PLS that could have assisted investors in ensuring proper valuation for PLS: credit ratings, subordinated debt investors, and short investors. As this section explains, these constraints all failed due to PLS' complexity and problems with market structures. In fact, rather than instilling market discipline, short investors became subordinated debt investors in order to push the market to take greater risks.

1. Credit Ratings

An initial constraint on default risk in PLS should have been credit ratings. Most investors looked to rating agencies to serve as information proxies regarding credit risk. Credit rating agencies rate individual securities, such as distinct PLS tranches. The rating is an indication of default risk or loss risk, depending on the agency.¹⁶² There are three major credit rating agencies, and most PLS were rated by at least one, if not two agencies.

¹⁶¹ See Stephen Ross, *The Arbitrage Theory of Capital Asset Pricing*, 13 J. ECON. THEORY 341 (1976).

¹⁶² Fitch and S&P ratings measure the likelihood of default: they evaluate a borrower's capacity to meet its financial obligation. Ratings range from AAA, which is given to companies that are "reliable and stable" to companies, to C and D ratings which go to companies that have defaulted or are "highly vulnerable." In contrast, Moody's ratings reflect the "expected loss," which is an assessment of default risk plus loss severity upon default. Ratings range from Aaa, which is given to companies with the "smallest degree of risk" to a C rating, which is given to a company "typically in default" and from which "potential recovery values are low."

Approximately 90 percent of PLS bore AAA-ratings, meaning that the risk of default or loss was negligible.¹⁶³ Investors in the AAA-rated securities market do not appear to have been informationally-sensitive.¹⁶⁴ A study by economist Manuel Adelino found that investors in AAA-rated PLS did not demand higher yields for what turned out to be riskier deals.¹⁶⁵ In other words, AAA-rated PLS investors were not themselves capable of sorting between deals and determining which ones were riskier within the AAA-rating. Instead, these investors were simply purchasing the rating as a proxy for credit risk. Rating agencies thus 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.¹⁶⁶ Several factors contributed to the failure of the rating agencies in the PLS market. 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.¹⁶⁷ While these factors surely contributed to the ratings problem, they are not unique to PLS. Lack of liability and financial stake in rated bonds' performance has long been the case with corporate bond ratings, where the ratings agencies have generally performed well. Similarly, issuers' ability to "shop" ratings by only providing business to the rating agencies that were willing to provide the highest ratings is a problem that also exists for corporate bonds.

PLS ratings, however, were different.¹⁶⁸ Corporate bonds are largely homogeneous products for which the ratings agencies have time-tested models going back over a century. PLS, however, lacked multi-cycle experience and are heterogeneous products; no two deals are alike. The underlying collateral, borrower strength, and credit enhancements

¹⁶³ Adelino, *supra* note 43, at 31. See also Figure 17, *supra*.

¹⁶⁴ Adelino, *supra* note 43, at 31. Even very sophisticated AAA-investors seemed to have purchased by rating, rather than by risk. In 2006, Daniel Mudd, the CEO of Fannie Mae, explained that Fannie, one of the most sophisticated entities in the entire mortgage investment world, could not price the risks involved in private-label securities. He noted that "the credit characteristics reflected in the layering of products - products that typically get distributed through the private-label securities market - have risks that are difficult to quantify." Paul Muolo, *Fannie's Mudd Is Wary of Exotics*, NAT'L MTG. NEWS, July 24, 2006. Mudd made this comment at a time when Fannie Mae held over \$85 billion in PLS, almost all of which were AAA-rated. Fannie Mae, Form 10-K, Aug. 16, 2007, at 120, Table 34.

¹⁶⁵ Adelino, *supra* note 43, at 22.

¹⁶⁶ *Id.* at 14-15, 43.

¹⁶⁷ See, e.g., Matthew Richardson & Lawrence J. White, *The Rating Agencies: Is Regulation the Answer?* 101-116 in VIRAL V. ACHARYA & MATTHEW RICHARDSON, *RESTORING FINANCIAL STABILITY: HOW TO REPAIR A FAILED SYSTEM* (2009); Joseph R. Mason, *The (Continuing) Information Problems in Structured Finance*, 14 J. STRUCTURED FIN. 7-11 (2008); Jerome S. Fons, *Rating Competition and Structured Finance*, 14 J. STRUCTURED FIN. 11-15 (2008); Joseph Mason & Joshua Rosner, *Where Did the Risk Go? How Misapplied Bond Ratings Cause Mortgage Backed Securities and Collateralized Debt Obligation Market Disruptions* working paper (2007).

¹⁶⁸ See generally Mason & Rosner, *supra* note 19.

vary across deals. The novelty, heterogeneity, and complexity of structured finance products made ratings much more speculative.

The rating agencies also played a different role in structured finance ratings than in corporate bond ratings. The rating agencies were not merely objective commentators on structured finance products. They were also intimately involved in the structuring of individual deals. As Professor Joseph Mason and analyst Joshua Rosner have explained, “in structured finance, the rating agency is an active part of the structuring of the deal.”¹⁶⁹ There is an “iterative and interactive” dialogue between the securitization arranger and the rating agency about how the issuer may attain the desired ratings.¹⁷⁰

This iterative and interactive rating process exists in structured finance because structured finance ratings are statistically, rather than empirically driven. The rating agencies’ statistical models, however, turned out to be deeply flawed. These models had never been tested in a period of sustained economic volatility or stress.¹⁷¹ The models failed to account for correlations between PLS and exogenous macro-economic conditions (rather than enterprise-specific conditions).¹⁷² The connections in particular between home prices, and defaults and availability of credit were not made, and the models did not account for the possibility of a national housing price decline.¹⁷³ The ratings agencies did not analyze the underlying collateral of the PLS to identify the probability of default or price fluctuation.¹⁷⁴ A basic assumption of the rating agencies was that housing prices represented fundamentals. This is implicit in the use of appraised values of collateral, which are based on comparable properties.

¹⁶⁹ *Id.* at 13.

¹⁷⁰ *Id.* The ratings agencies also made their models available to investment banks, which designed their products to game the ratings models. Gretchen Morgenson & Louise Story, *Rating Agency Data Aided Wall Street in Deals*, N.Y. TIMES, April 23, 2010, at A1.

¹⁷¹ Mason & Rosner, *supra* note 19, at 18. CDO ratings depended on “key-person” ratings of the CDO management; the rating agencies had no history with such ratings. *Id.* at 28.

¹⁷² Mason & Rosner, *supra* note 19, at 25. Another problem was that mortgage servicer ratings were included as a component of RMBS ratings, but servicer performance and RMBS performance are inexorably intertwined. The costs of servicing rise with defaults. Servicer performance also depends heavily on servicer liquidity, which may itself be tied to mortgage market performance. Many servicers have mortgage origination affiliates. If the origination business is in trouble, it can impact the liquidity of the servicing business and hence the performance of the servicer. This then impacts risks for other lenders whose loans are serviced by these servicers. Using servicer rating as part of the RMBS rating process has an endogeneity problem and effectively double counts servicer risks. *Id.* at 27.

¹⁷³ See, e.g., Gary Shorter & Michael V. Seitzinger, *Credit Rating Agencies and Their Regulation*, Cong. Research Service, Sept. 3, 2009 at 5, 11. Ratings methodology changed frequently for structured finance products, and wasn’t always consistent between existing and new issues. Mason & Rosner, *supra* note 19, at 19, 21, 22 n.75. These models also failed to incorporate much of the available mortgage data (or lack thereof), such as debt-to-income ratio, appraisal type, and lender identity. *Id.* at 23-24.

¹⁷⁴ GRANT, *SUPRA* note 155, at 183.

Finally, the ratings agencies, like other participants in the market, were heavily dependent on fees from structured finance. Structured finance ratings commanded premium prices. By 2007, structured products like PLS accounted for 40% of the rating agencies' total revenue and 50% of their ratings revenue.¹⁷⁵

The rating agencies' problems went beyond misaligned incentives and flawed models. PLS heterogeneity and complexity also enabled issuers to "shop" for ratings in a way that wasn't possible for corporate bonds. As economists Vasiliki Skreta and Laura Veldkamp have argued, increased complexity in products makes ratings more variable between agencies, and this encourages issuers to shop for the most favorable rating.¹⁷⁶ Given the iterative and interactive nature of structure finance ratings, such shopping was easy to do.

The ratings agencies were beset by a variety of problems that made them ineffective informational proxies for investors. While there were serious incentive problems for rating agencies, their involvement in the structuring of structured financial products and the inadequacy of their structured finance ratings models were key. Even if incentive alignment had been better, the rating agencies still would likely have failed in their PLS ratings.

2. Subordinated Debt Investors

Any consideration of an oversupply of mortgage finance raises the question of why investors were purchasing the assets in first place. As Bernanke *et al.* and the Financial Crisis Inquiry Commission Republican dissent rightly noted, there was a global savings glut that contributed to increased demand for all assets.¹⁷⁷ This analysis explains the heightened demand for AAA-rated PLS, and the problems with the ratings agencies explain why dubious investments received the AAA-seal of approval. Neither, however, explain the demand for the non-investment grade, junior tranches of PLS, which is indispensable for making the economics of structured finance work.

¹⁷⁵ Gretchen Morgenson, *Debt Watchdogs: Tamed or Caught Napping?* N.Y. TIMES, Dec. 7, 2008, at A1. Because the issuers of structured products were looking to manufacture as much investment-grade paper as possible, the rating agencies were under pressure to award investment grade ratings, even if it meant making "off-model" adjustments. Kia Dennis, *The Rating Game: Explaining Rating Agency Failures in the Buildup to the Financial Crisis*, 63 U. MIAMI L. REV. 1111, pin (2009) (discussing "off-model" adjustments). As Patrick Bolton, Xavier Freixas, and Jacob Shapiro 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. Patrick Bolton, *et al.*, *The Credit Ratings Game* 15 (SSRN, Working Paper No. 1342986, 2009), available at <http://www.researchgate.net/bitstream/2072/14564/1/1149.pdf>.

¹⁷⁶ Vasiliki Skreta & Laura L. Veldkamp, *Ratings Shopping and Asset Complexity* (SSRN Working Paper No. 1295503, 2009).

¹⁷⁷ YVES SMITH, *ECONOMY* 209-210 (2010).

Structured finance can generate AAA-rated securities out of lower quality assets via tranching and other credit enhancement devices, and the vast majority of PLS received an AAA-rating, at origination.¹⁷⁸ When turning a pool of subprime mortgages into AAA-rated securities, there is always a by-product of non-investment grade junior tranches. These tranches have higher yields because of their low rating, but they are not always easy to sell. Yet selling them is essential to make the economics of securitization work.

If the riskiest 5-10% of a deal could not be sold, the deal economics would not work for the securitization sponsor. Unless a buyer can be found for the junior tranches at a reasonable yield, PLS are not a viable asset. Put differently, without investors in the junior tranches of PLS, there would not be any AAA-rated PLS to meet the global savings glut's demand for safe investments. Understanding the demand for the *junior* tranches of PLS is thus critical for understanding why there was an oversupply of underpriced mortgage finance.¹⁷⁹

The traditional market for these non-investment grade tranches of structured finance products were a much more limited pool of subordinated debt investors.¹⁸⁰ These investors tended to be more circumspect about credit risk precisely because they are the most exposed to it by virtue of their subordination. Even with higher yields, it was not always easy for underwriters to place the junior tranches with investors. Economist Manuel Adelino has found that buyers of subordinated PLS often demanded a premium for investing in riskier deals based on ultimate performance.¹⁸¹ Subordinated debt investors' risk tolerance should have thus provided a limit on the expansion of PLS; as the junior tranches of PLS became riskier, investors would have demanded a higher yield (or would simply would not buy them). In order to support the higher yields, PLS issuances would have to contain higher yielding mortgages, meaning mortgages with higher interest rates.¹⁸² Higher interest rates on the mortgages would reduce consumer demand for mortgage finance and thus ability to purchase real estate. The end result would be for real estate prices to return to an equilibrium. Subordinated debt buyers should thus have provided a natural limitation

¹⁷⁸ Bernanke, *International Capital Flows*, *supra* note 6.

¹⁷⁹ By junior we refer not just to the juniormost tranche, but also the "mezzanine" tranches.

¹⁸⁰ SMITH, *SUPRA* note 177, at 247 ("there was little appetite for the AA through BBB layers of a subprime mortgage bond, which accounted for nearly 20% of the total value. There was a cohort of sophisticated investors that were interested. But the small size of this group limited the amount of subprime that could be securitized, and consequently made these investors fairly powerful.").

¹⁸¹ Adelino, *supra* note 43, at 27.

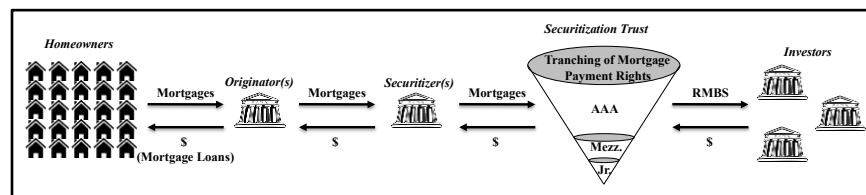
¹⁸² Conceivably overcollateralization of the PLS could also be used to produce higher yields without increasing the yields on individual mortgages, but this would make securitization less profitable.

on risk, and restore correct asset prices according to the Fundamental Theorem of Asset Pricing.

a. Collateralized Debt Obligations (CDOs)

The expansion of the collateralized debt obligation (CDO) market largely (or at least temporarily) bypassed the risk limitation on PLS otherwise provided by subordinated debt investors.¹⁸³ CDO is a generic term for securitizations, but deals referred to as CDOs typically involve a securitization of existing PLS—that is a resecuritization. Resecuritization (with further tranching) transformed some of the junior (frequently called mezzanine) tranches of PLS into senior, investment-grade CDO securities, albeit with a higher degree of implicit leverage. As Yves Smith has explained, “CDOs were originally devised as a way to dress up these junior layers and make them palatable to a wider range of investors, just as unwanted piggy bits get ground up with a little bit of the better cuts and a lot of spices and turned into sausage.”¹⁸⁴ Resecuritization turned high-yield dross into investment-grade gold.¹⁸⁵ (See Figures 18 and 19.)

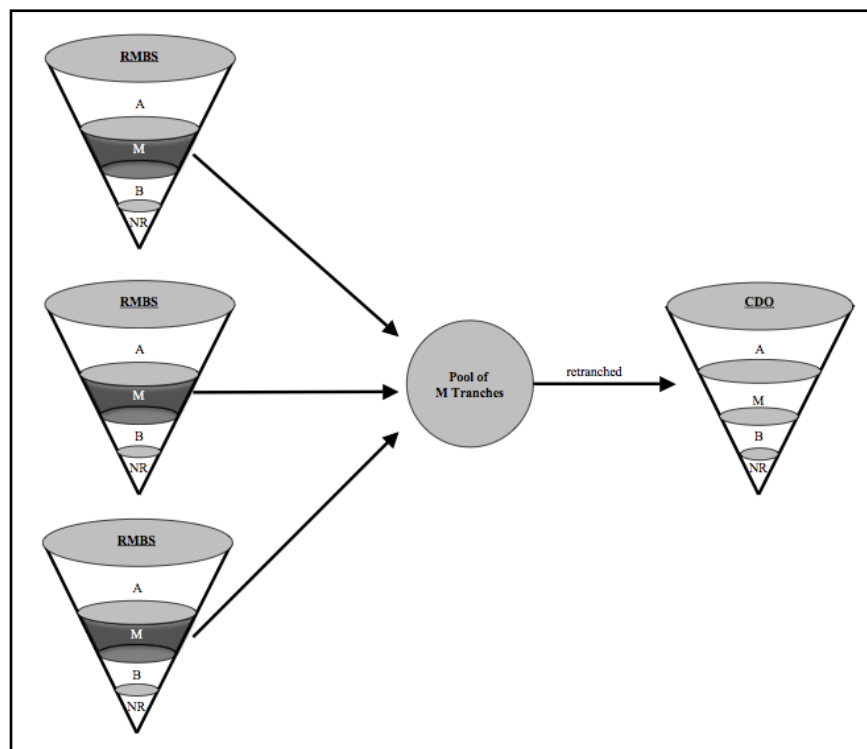
Figure 18. PLS Securitization



¹⁸³ Mark H. Adelson & David P. Jacob, *The Subprime Problem: Causes and Lessons*, 14 J. OF STRUCTURED FIN. 12 (2008).

¹⁸⁴ SMITH, *SUPRA* note 177, at 247.

¹⁸⁵ To extend Smith’s porcine metaphor, a CDO is a swine that is fed pork products.

Figure 19. Resecuritization of PLS into a CDO

By 2005, most subprime PLS were being res securitized into CDOs,¹⁸⁶ and structured finance products accounted for over half of global CDO assets between 2004 and 2007.¹⁸⁷ Resecuritization enabled investors to take on additional leverage, which meant that investors in res securitizations were much more exposed to mortgage defaults than investors in MBS.¹⁸⁸

The rapid expansion of the CDO market occurred in 2006-2007, during the middle and end of the bubble, as the drop in underwriting standards became apparent. (See Figure 20.) The expansion of the CDO market occurred when subordinated debt investors would have demanded larger risk premiums and market appetite for direct investment in junior PLS tranches would have reached its limit. But, as noted in Figures 7, 8, and 9, at this very time, spreads were falling on PLS, and PLS issuance

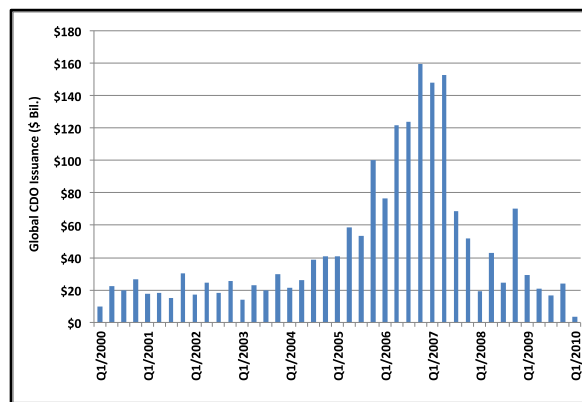
¹⁸⁶ Anna Katherina Barnett-Hart, *The Story of the CDO Market Meltdown: An Empirical Analysis* 10-11 (Mar. 19, 2009) (unpublished B.A. thesis, Harvard College), available at <http://www.hks.harvard.edu/m-rcbg/students/dunlop/2009-CDOMeltdown.pdf>.

¹⁸⁷ SIFMA, Global CDO Issuance.

¹⁸⁸ GRANT, *SUPRA* note 155, at 171, 182.

was expanding.¹⁸⁹ This was possible only because CDOs thus enabled the PLS market to bypass the constraint of subordinated debt investors' limited risk appetite.¹⁹⁰ CDOs simply outbid traditional subordinated investors for lower-rated MBS tranches, as they were willing to accept lower risk-adjusted yields. CDOs likely lengthened the housing bubble by at least a third, making the decline all the more painful.

Figure 20. Growth of Collateralized Debt Obligations¹⁹¹



CDOs themselves, however, needed buyers. Again, the investment-grade senior positions in the CDOs were relatively easy to sell, but the junior positions posed a challenge, and unless the junior tranches could be sold, the economics of resecuritization would not work. Some junior tranches of the CDOs were resecuritized again as CDO²s, and so on. But there was a limit to resecuritization; real purchasers were required for CDOs to be issued in volume. As it turned out, the demand for the bottom tranches of the CDOs came from an unlikely source: short investors. These short investors were the investors who were convinced in 2004-2005 that mortgage lending was becoming too risky.¹⁹² As it turned out, their short demand actually exacerbated the risk in the mortgage market by increasing the supply of mortgage finance.

¹⁸⁹ Yongheng Deng *et al.* *CDO Market Implosion and the Pricing of CMBS and Sub-Prime ABS*, April, 2008, at 4, 28, available at http://www.reri.org/research/article_pdf/wp150.pdf.

¹⁹⁰ See generally LEWIS, *SUPRA* note 76, at 140 ("All by himself, [CDO manager Wing] Chau generated vast demand for the riskiest slices of subprime mortgages bonds, for which there had previously been essentially no demand.").

¹⁹¹ Asset Backed Alert. 75% of global CDO issuance between 2001 and 2007 was U.S. dollar denominated. See SIFMA, Global CDO Issuance.

¹⁹² See generally LEWIS, *SUPRA* note 76.

b. Credit Default Swaps (CDS)

To understand how short investors actually drove the supply of mortgage credit, it is necessary to understand the difficulties involved with shorting real estate and the particular solution that short investors devised. To short an asset involves selling the asset without owning it and then purchasing it in time to meet the delivery obligation. The short-seller's hope is that the asset price will decline between the time it enters into the sales contract and the time of the delivery obligation.

It is impossible to sell real estate itself short.¹⁹³ Every parcel of real estate is unique, so the short seller cannot meet its delivery obligation.¹⁹⁴ Thus, to short New York real estate, one would have to sell the Empire State Building, the Chrysler Building, and Rockefeller Center, without actually owning them, and then manage to buy them at a lower price before the closing of the first sale! The difficulty in shorting real estate is one reason it has historically been so prone to price bubbles.

PLS can, in theory, be shorted directly,¹⁹⁵ but because they are relatively illiquid, shorting is a risky endeavor; the short seller might not be able to find PLS to purchase that meet its delivery obligation. Markets with short sale constraints are particularly susceptible to asset bubbles.¹⁹⁶

It is possible, however, to short mortgages indirectly, through credit default swaps (CDS). A CDS is a form of credit insurance¹⁹⁷ in

¹⁹³ See Richard Herring & Susan Wachter, *Bubbles in Real Estate Markets*, University of Pennsylvania, Zell/Lurie Real Estate Center Working Paper #402, Mar. 2002, at <http://realestate.wharton.upenn.edu/newsletter/bubbles.pdf>. Shorting real estate should not be confused with a "short sale" in which a mortgage lender agrees to let the borrower sell the property for less than the full amount due on the mortgage, which due on sale, and forgives the deficiency.

¹⁹⁴ Similarly, the uniqueness of real estate is a reason that specific performance is generally available as a remedy for breach of real estate sales contracts. Restatement (Third) of Property (Servitudes) § 8.2 (1998) (noting that specific performance is usually available as a remedy for a breach of a land conveyance contract)

¹⁹⁵ It is also possible to short housing-related stocks, such as those of major home builders or banks with large real estate portfolios, but this applies only indirect market pressure and is an expensive and risky strategy because of the indirect connection with real estate prices.

¹⁹⁶ See, e.g., José A. Scheinkman & Wei Xiong, *Overconfidence and Speculative Bubbles*, 111 J. POL. ECON. 1183 (2003) (arguing that if short sales are prohibited and some investors are over-confident regarding asset appreciation, then asset prices will rise above their fundamental values); Charles M. Jones & Owen A. Lamont, *Short-sale constraints and stock returns*, 66 J. FIN. ECON. 207 (2002) (finding that stocks that are more expensive to short have higher valuations and low subsequent returns); J. Michael Harrison & David M. Kreps, *Speculative investor behavior in a stock market with heterogeneous expectations*, 92 Q. J. ECON. 323 (1978) (arguing that differences in investor opinions combined with short sale constraints can create a "speculative premium"); Edward M. Miller, *Risk, Uncertainty, and Divergence of Opinion*, 32 J. FIN. 1151 (1977) (arguing that in a market with where short selling is limited and investors hold a divergence of opinions, asset prices may rise above fundamental levels because the price only reflects the view of optimistic investors).

¹⁹⁷ Insurance would have conceivably been another avenue of market discipline. If private mortgage insurance were required on all high LTV loans, as is the case in Canada, see Levitin *et al.*, *supra* note 135, then insurance premiums could have maintained discipline on underwriting standards. See Susan M. Wachter, *Procyclicality and Lending Standards Through-the-Cycle*, working paper, Aug., 2010. The

which one party (the protection buyer) agrees to pay regular premia to its counterparty (the protection seller) until and unless a defined credit event occurs on a reference asset.¹⁹⁸ Upon the occurrence of a credit event, the payment flow reverses, and the protection seller pays the protection buyer the agreed upon level of insurance coverage. Thus, the protection buyer is short and the protection seller is long on the reference asset, without either having to own the reference asset.

A CDS is generally written on a particular bond, meaning that a single CDS is written on a single PLS tranche, not on an entire MBS deal.¹⁹⁹ CDS, however, are not an effective means of shorting an individual PLS tranche because it is difficult to find a counterparty that will take the long position as CDS protection seller. If the counterparty merely wants to be long on the PLS tranche, it is possible to buy the PLS tranche directly.²⁰⁰ Moreover, the counterparty will likely be suspicious that an informational asymmetry exists between it and the short CDS protection buyer: what does the protection buyer know that makes it want to be short on this particular bond?

One reason that a CDS protection seller would not be as concerned about an informational asymmetry favoring the protection buyer was that there was an informationally-neutral explanation for many short positions. Frequently CDS protection was being purchased as part of a “negative basis” trade, meaning that CDS protection was used to create a matched hedge on long positions where the cost basis for CDS protection was less than the yield from the long position.²⁰¹ The investor would thus be hedged to a neutral position in terms of credit risk, but would still be collecting net yield. In many instances, accounting rules permitted investors to immediately book as revenue the net present value of the excess yield on the PLS tranche over the protection payment on the CDS in negative basis trades.²⁰² Thus, if an investor purchased a \$10M PLS tranche that yielded 1000 basis points

collapse of the GSEs itself was arguably an insurance failure, as the GSEs failed to reserve countercyclically for losses on their guarantee business and found themselves in a rate war (for risk-adjusted rates) with PLS credit enhancements, including monoline bond insurers.

¹⁹⁸ See, e.g., VINOD KOTHARI, *SECURITIZATION: THE FINANCIAL INSTRUMENT OF THE FUTURE* ____ (2006); Richard Stanton & Nancy Wallace, *ABX.HE Indexed Credit Default Swaps and the Valuation of Subprime MBS*, Feb. 15, 2008; David Mingle, *Credit Derivatives: An Overview*, FED. RESERVE BANK OF ATLANTA, ECON. REV. 1 (QIV, 2007).

¹⁹⁹ CDS can in theory be written on a collection or “bucket” of assets, but more often this takes the form of a CDS on a CDO, rather than a CDS on a bucket of individually selected assets.

²⁰⁰ There are reasons for a protection seller to choose to enter into a CDS rather than buy the reference asset. The counterparty might want to receive the protection premium cash flow without having to invest in an asset.

²⁰¹ SMITH, *SUPRA* note 177, at 194.

²⁰² GORTON, *SUPRA* note 38, at 100-100; SMITH, *SUPRA* note 177, at 194-95 (noting that immediate booking of profits for negative basis trades was a particular problem under the Basel II capital rules that applied to European banks).

and had an average term of 5 years, and CDS protection on that tranche cost 200 basis points, the investor could book the discounted present value of 800 basis points for 5 years on \$10M. Negative basis trades thus let future profits be recognized immediately, thereby increasing current bonus pools.²⁰³

The use of CDS for shorting helped mask the extent of short pressure because the CDS market is primarily a dealer market, which made the level of short demand opaque. This means that most CDS are technically done as two sets of swaps: a CDS between the ultimate short and the dealer as long and then a second CDS between the dealer as short and the ultimate long. The dealer will ideally make perfectly matched swaps (and thus have no exposure on the swaps other than the counterparty risk) and take a spread between the deals as well as fees.²⁰⁴ The result is that the ultimate protection seller (the long) never knows who the ultimate protection buyer (the short) is or the real price the short is paying (or vice versa); the price transparency for CDS was not readily apparent for much of the bubble. This meant that the longs could not gauge the level of short demand or changes in that level. By virtue of being a dealer market, CDS limited the information available to long investors about short pressures.

c. Synthetic CDOs

As it turned out, most of the long counterparties on CDS on PLS were not the ultimate economic parties in interest, but themselves CDOs. Because of the difficulty in using CDS to short individual MBS, short investors (or more technically CDS dealers) generally utilized CDOs as their long counterparties, rather than direct investors.²⁰⁵ The use of CDOs as the long parties in CDS on PLS played a critical role in expanding the mortgage bubble.

²⁰³ SMITH, *SUPRA* note 177, at 255.

²⁰⁴ Technically, in Goldman Sachs Abacus 2007-AC1 CDO, John Paulson entered into a set of swaps with Goldman Sachs, which as a dealer in turn entered into a set of swaps with Abacus 2007-AC1, so Paulson was never in contractual privity with Abacus 2007-AC1. The Abacus 2007-AC1 deal shows that in practice, not all swaps were perfectly matched. Thus, Goldman Sachs was unable to find a perfectly matched swap in the Abacus 2007-AC1 CDO and was left holding some of the long exposure on the deal itself.

²⁰⁵ In theory, the CDO managers, should have been just as worried as any other counterparty underwriting bespoke CDS. CDO manager incentives, however, might have reduced their diligence. CDO managers received fee-based compensation based on assets under management. See LEWIS, *SUPRA* note 76, at 142. While CDO managers generally held the first loss piece of the CDO, the managers' fees were paid periodically, off the top and the bottom, so that even if the CDO performed poorly in the end, the managers could still make substantial income initially, and the more assets under management, the larger the fees. CDO manager fees are divided into a senior and junior component. The senior is at the top of the cashflow waterfall. KOTHARI, *SUPRA* note 198, at 433. CDO managers were eager for the revenue streams and to increase assets under management.

Despite the oversupply of mortgage credit, the housing finance market could not produce a sufficient volume of mortgage notes for PLS and thus for “cash CDOs”—CDOs whose assets were PLS and other securities. As Gillian Tett noted, during 2005-2006, “The big, dirty secret of the securitization world was that there was such a frenetic appetite for more and more subprime loans to package into CDOs that the supply of mortgage loans had started lagging behind demand.”²⁰⁶

The solution to this shortage of PLS for cash CDOs was to produce synthetic CDOs (or, more typically, hybrid cash-synthetic CDOs) whose assets consisted of credit default swaps. The synthetic CDOs sold credit default protection, meaning that they were long on the reference assets (PLS or CDOs). Synthetic CDOs were able to produce lots of AAA-rated tranches to satisfy the insatiable demand for AAA-rated assets due in part to the global supply glut. But unlike creating a cash CDO, a synthetic CDO requires both long *and* short demand. In order to create the CDS that will go into the CDO, there have to be parties that want to go short on the reference assets (PLS).

This meant that rather than divorcing the CDO market from actual mortgage credit supply, synthetic CDOs themselves contributed to the oversupply of underpriced mortgage credit. Synthetic CDOs contributed to the oversupply of mortgage credit in three ways. First, synthetic CDOs greatly increased the supply of CDS protection available and therefore reduced CDS spreads (the price of CDS protection). Lower CDS spreads made the credit arbitrage between CDS and CDOs more attractive. Whereas there was a limited number of institutions that would sell CDS protection on PLS directly—AIG and the monoline bond insurers primarily—synthetic CDOs effectively made a much broader range of institutional investors—all CDO investors—effectively sellers of CDS protection, thereby pushing down CDS spreads.

Second, synthetic CDOs compressed PLS credit spreads themselves, which thereby lowered mortgage interest rates. CDS spreads (the price of CDS protection) are linked to PLS spreads (the yield on PLS) via arbitrage. When CDS spreads tighten, it is cheaper to insure against PLS, which increases demand for PLS, thereby pushing down the yield on the PLS, which lowers cost of borrowing.²⁰⁷ Conversely, if CDS spreads widen, then it’s more attractive for long investors to go into synthetic CDOs than into PLS (or cash CDOs). The result is that to compete, PLS and cash CDOs have to increase their yields, which translates into an increase in mortgage interest rates. Widening spreads

²⁰⁶ GILLIAN TETT, *FOOLS’ GOLD* 124-25 (2009).

²⁰⁷ SMITH, *SUPRA* note 177, at 262.

would have made it costlier for the short to take out its CDS position and would also have constrained the supply of mortgage credit, thereby squelching the housing bubble that the shorts wanted to see build up and the collapse. Using synthetic CDOs as the vehicle for shorting the housing market hid short investors' negative view of the market, which allowed them to do more deals and low premiums.

Some short investors, like John Paulson in the infamous Goldman Sachs Abacus 2007-AC1 CDO deal, simply shorted the market by taking out naked CDS positions on PLS via a synthetic CDO.²⁰⁸ But other shorts, like the Magnetar hedge fund, devised a more sophisticated "long-short" strategy.²⁰⁹ These investors purchased long positions in the equity tranches of CDOs and then used the high coupons on these equity tranches to fund much larger short positions on the mezzanine tranches of the CDOs using CDS.²¹⁰

To illustrate, consider a hedge fund that wants to go short on the mortgage market. The hedge fund invests in a \$200M CDO. The hedge fund purchases the juniormost "equity" tranche, that represents 5% of the deal for \$10M. The equity tranche yields 20% or \$2M per year as long as it is in the money. This \$2M would cover the CDS premium of 125bps on \$160M worth of *mezzanine* pieces in the CDO. The hedge fund would be betting that the loss severity for the CDO would not only wipe out the equity tranche, but also the mezzanine. If so, the hedge fund would be paid \$160M for a \$10M investment. If, on the other hand, the CDO performed perfectly, the short would be cashflow neutral. Only if the CDO performed such that the equity tranche was wiped out, but not the mezzanine would the hedge fund lose. Given that even a marginal increase in losses on the underlying mortgages would wipe out both the CDO equity tranche and the CDO mezzanine tranches, this was a reasonable bet to make.

To make this long-short strategy work, the hedge fund would need for there to be \$190M in outside investment in the CDOs' cash bonds, and by putting up the money for the equity tranche, the short made possible the AAA-rated tranches that were easy to place. In other words the \$10M of investment from the short hedge fund was effectively leveraged into \$200M of CDO finance. If the CDO held the bottom 5% of an PLS deal, it would then be leveraged again into \$4B in mortgage funding. Thus, a small investment in a CDO equity tranche as part of a self-funding "long-short" position could be the catalyst of a significantly

²⁰⁸ *Id.*

²⁰⁹ See also Jesse Eisinger & Jake Bernstein, *The Magnetar Trade: How One Hedge Fund Helped Keep the Bubble Going*, PROPUBLICA, Apr. 9, 2010.

²¹⁰ SMITH, *SUPRA* note 177, at 257-261.

greater amount of mortgage funding, which in turn meant lower underwriting standards and a greater chance of the short part of the long-short position paying off.

The CDO market meant that every dollar of investment in the equity tranche of a CDO was effectively leveraged into a much greater supply of mortgage finance. As Yves Smith explains, “every dollar in mezz ABS CDO equity that funded cash bonds created \$533 dollars of subprime demand.”²¹¹ Thus, it is estimated that Magnetar alone was responsible for between 35% and 60% of the subprime PLS issued in 2006, all based on perhaps \$30 billion in equity positions in CDOs.²¹² By purchasing the “equity” layer of CDOs, it made all the senior positions (which Magnetar shorted) possible.²¹³

Moreover, by controlling the equity position in a CDO, the short hedge fund would have a veto over what PLS the CDO purchased. And because of its net short position on the CDO, the hedge fund would want the CDO to purchase the riskiest assets possible, as these would have a higher chance of defaulting and triggering a payment to the hedge fund on the CDS and, in the meantime, would yield a higher coupon, thereby enabling the hedge fund to purchase even more CDS protection.²¹⁴

The result was that this short demand increased the risk in the mortgage market by increasing the supply of mortgage finance. This finance was priced not based on the risk on the mortgages, but based on the existence of an arbitrage in credit pricing between credit default swap protection on assets and the assets themselves. As long as CDS spreads remained low, shorts to stake out CDS positions without causing a contraction in mortgage credit.

The greater the short demand for junior tranches of CDOs, the greater the overall need and effort to place for the senior tranches of the CDOs. Greater supply of CDOs lowered the yield that CDOs had to offer to sell, which in turn meant less pressure for yield on the CDOs’ underlying PLS assets, which in turn kept down the cost of mortgages. This phenomenon might in fact explain why AAA-rated PLS were trading through AAA-rated corporates during the bubble, as shown in Figure 9. The huge demand for junior CDO tranches to fund short positions had fueled the underpriced supply of mortgage credit.

It was possible (at least starting in mid-2006) for investors to simply go short on the mortgages by taking a position on the ABX, a

²¹¹ *Id.* at 261.

²¹² *Id.* at 260. See also Jesse Eisinger & Jake Bernstein, *The Magnetar Trade: How One Hedge Fund Helped Keep the Bubble Going*, PROPUBLICA, Apr. 9, 2010.

²¹³ SMITH, *SUPRA* note 177, at 261.

²¹⁴ *Id.* at 255.

series of indices that track CDS pricing on PLS.²¹⁵ The ABX, however, had the serious disadvantage of making demand and pricing for CDS on particular PLS transparent. With transparency of demand, the spreads on the ABX grew as demand for CDS protection grew. Not so with synthetic CDOs. Using bespoke CDS with synthetic CDOs rather than a standardized bucket of CDS like the ABX index had the effect of hiding demand. Because the demand was diffused over the market, rather than concentrated on an index and because it was in an OTC dealer market, the demand for CDS protection was never fully apparent.

Synthetic CDOs made it cheaper for short investors to gain CDS protection on PLS (and CDOs) and enabled a “long-short” strategy of purchasing the junior tranches in order to get the cashflow to fund the CDS protection on the mezzanine tranches (and in the case of CDOs, to have control over what assets went into the CDO). Synthetic CDOs thus increased short investors’ demand for subordinated pieces of PLS and CDOs, which, in the short-term increased the supply of capital in the mortgage market.

By 2005-2006, the oversupply for underpriced mortgage credit was being driven heavily by short investors in CDOs. Put differently, the supply of mortgage credit was not being based on the risk on mortgages themselves, but on the price arbitrage between two different forms of complex mortgage derivative products, CDS and CDOs. When the price of CDS protection rose in 2007, in part because of widening spreads on the ABX indices,²¹⁶ the arbitrage opportunity ended, and the system collapsed as the funding evaporated.

d. The ABX Indices

While the ABX would seem to provide a story of effective market discipline on the mortgage market, there is reason to question whether it could be relied upon to perform such a function going

²¹⁵ Ingo Fender & Martin Scheicher, *The ABX: how do the markets price subprime mortgage risk?*, BIS Q. REV. 67, 68 (Sept. 2008). The ABX was launched on January 19, 2006. Press release, *CDS IndexCo and Markit Announce Roll of the ABX.HE Indices*, BUSINESS WIRE, Jan. 19, 2007. (A similar set of indices, the CMBX, exist for CMBS. Alan Tood & Yurkol Iwai, *An Introduction to the CMBX.NA Index and Single-Name CMBS CDS*, Commercial Mortgage Securities Association, 2006, at 29; Nomura Fixed Income Research, *The CMBX: the Future is Here*, Mar. 4, 2006, at http://www.securitization.net/pdf/Nomura/CMBX_23Mar06.pdf. See also *CMBX Index Draws Fire for Lack of Transparency*, COMM. MRG. ALERT, Mar. 14, 2008 (lack of trading volume information on CMBX contributes to concerns that prices are manipulated by short traders driving up spreads); *Trade Group Urges More CMBX Disclosure*, COMM. MRG. ALERT, Mar. 28, 2008. For details on the ABX index methodology, see MarkIt, *Index Methodology for the ABX.HE Index for the Sub-Prime Home Equity Sector* (“ABX.HE Index Rules”) (Sept. 5, 2008) at 1, 3.

²¹⁶ John Geanakoplos, *Solving the Present Crisis and Managing the Leverage Cycle*, Cowles Foundation Discussion Paper No. 1751, Jan. 2010, available at <http://dido.econ.yale.edu/P/cd/d17b/d1751.pdf>.

forward. First, the ABX is an index. Indices are only useful in tracking overall market movements, but cannot impose meaningful market discipline on individual assets. Thus, the performance of the S&P 500 index does not indicate anything about the performance of any one of the five hundred individual underlying stocks it tracks. The ABX does not reflect the risk in most deals, or even in all tranches of the deals in tracks. This means riskier tranches 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 does not necessarily reflect on other deals. Moreover, given its public methodology, it can easily be gamed by financial institutions that wish to make the market appear less risky.

Second, the ABX issues new indices on CDS semiannually. This means that there can be a significant time lag between changes in mortgage origination risk and their reflection in the ABX. There is a time lag between origination and securitization and a time lag between securitization and CDS on the PLS being reflected in the ABX. Moreover, rising housing markets can reduce default levels because of the ability to refinance or sell properties. At best, then, the ABX can deflate housing bubbles, but not prevent them.

Third, and most important, the ABX might be driven by factors other than default risk on the mortgages underlying the RBMS referenced by the CDS tracked by the index. As former Moody's managing director Jerome Fons has observed, the ABX diverges significantly from the values of the actual PLS its CDS reference.²¹⁷ Instead, the ABX could be reflecting arbitrage and hedging strategies or counterparty risk. If so, the ABX would be inherently of limited use as a market discipline mechanism on mortgage and PLS underwriting.

Prices in indexed derivatives markets that reference an illiquid underlying asset markets can be driven by arbitrage imbalances. This is because when the index strays from the fundamental value of the underlying assets, it is difficult for investors to take advantage of arbitrage opportunities in the underlying asset market.²¹⁸ Economists Richard Stanton and Nancy Wallace note that arbitrage imbalances may be a particular problem for the ABX "because it was specifically designed to allow for large positions that would otherwise be impossible due to the relative scarcity of trading sub-prime mortgage backed

²¹⁷ Jerome S. Fons, *Shedding Light on Subprime RMBS*, Feb. 23, 2009.

²¹⁸ Karl Case *et al.*, *Indexed-based futures and options markets in real estate*, J. PORTFOLIO MGMT. (1993); Mark J. Powers, *Does Futures Trading Reduce Price Fluctuations in the Cash Market?*, AM. ECON. REV. 460 (1976); Michael C. Lovell & Robert C. Vogel, *A CPI-Futures Market*, 81 J. POL. ECON. 1009 (1973).

securities.”²¹⁹ Thus, Stanton and Wallace have found that the credit performance of the ABX’s referenced subprime PLS is uncorrelated with fluctuations in the ABX.²²⁰ Instead, they find that the ABX correlates with short-sale demand imbalances in the option and equity markets of publicly traded builders, commercial banks, investment banks, and GSEs.²²¹

The ABX might also reflect excessive demand for hedging due to the illiquid nature of PLS, rather than credit risk on the PLS. Financial economist Gary Gorton has argued that in 2007, the ABX might not have reflected actual risk because it is heavily used by banks to hedge their illiquid positions, which led to demand for CDS protection overwhelming the market and causing index prices to stray from the risk implied by real estate fundamentals.²²²

The ABX also reflects counterparty risk on the CDS it tracks. CDS protection substitutes the credit risk on the protection seller for the protection risk on the reference asset. Even if the CDS is collateralized and underwritten by a sound counterparty, credit risk still exists. Thus, all ABX sub-indices register a noticeable drop and then a rebound February-March of 2008, before and after Bear Stearns’ collapse. The credit risk on the PLS did not suddenly change; Bear Stearns’ collapse had no effect on the soundness of the mortgages backing the PLS. Likewise, the spreads for the ABX—the difference in cost between purchasing CDS protection and purchasing a risk-free investment—spiked during the height of the financial crisis in September-October 2008, and then fell dramatically on October 28, when Treasury’s capital injection into the nation’s largest financial institutions was announced.

Likewise, Gary Gorton argues that there is a high correlation between the ABX and the sale and repurchase (repo) market used for short-term secured funding by many financing institutions, so the ABX might have been reflecting counterparty risk, rather than PLS risk.²²³ In a repo transaction, one financial institution sells another a security and simultaneously agrees to repurchase it in a short time at a higher price.²²⁴ Economically, this is equivalent to a secured loan with the security as the collateral, and the difference in sale and repurchase price as the interest.

²¹⁹ Richard Stanton & Nancy Wallace, *ABX.HE Indexed Credit Default Swaps and the Valuation of Subprime MBS*, Feb. 15, 2008 at 5.

²²⁰ *Id.* at 24.

²²¹ *Id.*

²²² Gary Gorton, *Information, Liquidity, and the (Ongoing) Panic of 2007*, 99 AM. ECON. REV. 567 (2009).

²²³ *Id.*

²²⁴ See Gary Gorton & Andrew Merton, *The Run on Repo and the Panic of 2007-2008*, working paper at 8, available at <http://econ-www.mit.edu/files/3918>.

If the repo obligor defaults, its counterparty keeps the collateral security. PLS were frequently used as repo collateral, and repo collateral was frequently rehypothecated, meaning that the repo seller would use the collateral that was posted to it as collateral for its own repo borrowing.²²⁵

Accordingly, the increase in ABX prices might have reflected increased counterparty risk, particularly in the repo market, where defaults would lead to financial institutions being stuck with illiquid PLS. And because of rehypothecation—the pledging of collateral from one’s own extension of credit against one’s borrowings—the number of financial institutions seeking CDS protection would exceed the actual exposure to PLS that existed in the system, thereby further spurring demand for CDS protection and pushing up CDS prices.²²⁶ The inability to sort out MBS credit risk and CDS counterparty risk limits the usefulness of the ABX as a market discipline device.

PLS proved impervious to normal market discipline methods. Credit ratings were compromised in terms of incentives as well as in terms of analysis capability in rating heterogeneous, complex PLS products that lacked a performance history. The expansion of resecuritization via CDOs removed the natural risk appetite limitation on mortgages. Smart money short investors understood the decline in mortgage underwriting standards, but their investment instrument of choice was incapable of imposing much market discipline on housing finance markets. Regulation was non-existent in the PLS market, and largely absent in the mortgage origination market. The result, of course, was that other informationally-limited investors failed to accurately price for risk and overinvested in MBS.

V. STANDARDIZATION AS AN INFORMATIONAL PROXY

In any market, as long as there is a return on heterogeneity and complexity, one can, in the absence of effective regulatory oversight, expect heterogeneity and complexity to prevail. If market participants can benefit from shrouded information, they will attempt to shroud the information. This holds true for securitization markets, as well as for any other market, and 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.

²²⁵ *Id.*

²²⁶ See Gary B. Gorton & Andrew Metrick, *Securitized Banking and the Run on Repo*, Yale ICF Working Paper No. 09-14, July 14, 2010, at 11, n.13, available at <http://ssrn.com/abstract=1440752> (discussing rehypothecation as a multiplier).

Standardization implies the prohibition of non-standardized products. While there has been standardization in segments of the U.S. housing finance market, we are proposing market-wide standards, meaning that non-standard products would be eliminated from the market, not simply shifted to a different part of the market.

Historically, in the United States and Europe, securitization as a vehicle for housing finance has succeeded when credit risk has been borne, implicitly or explicitly, by the government and regulated accordingly.²²⁷ Government assumption of credit risk is a form of product 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 the GSEs' guaranty. Proposals for some form of government-guaranty in the housing finance market going forward are themselves, thus proposals for at least some measure of standardization.

A government-backed mortgage finance market poses its own problems, particularly the socialization of risk and the politicization of underwriting standards. Lesser forms of standardization—of mortgage and MBS credit risk structures, rather than of credit risk—might be sufficient to facilitate adequate risk pricing without forcing a trade-off between market stability and risk socialization.²²⁸

Irrespective, whatever the outcome of housing finance reform, market discipline—be it by regulators or by investors—requires easily analyzable information that is available in real time, and this will require standardization. As Lewis Ranieri, the “godfather” of mortgage securitization (and reputed creator of the term “securitization”)²²⁹ has noted, unless PLS investors rely on ratings, they need to reverse engineer deals as part of their investment analysis.²³⁰ Reverse engineering a PLS is an incredibly expensive process.²³¹ Because deals are not standardized, each deal must be reverse engineered on its own in order to

²²⁷ Snowden, *supra* note 25, at 270.

²²⁸ In this Article 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. *But see* Levitin & Wachter, *Rebuilding Housing Finance*, working paper, 2010, for our views on potential forms for the U.S. housing finance market.

²²⁹ Mike McNamee, *Lewis S. Ranieri: Your Mortgage Was His Bond*, NEWSWEEK, Nov. 29, 2004.

²³⁰ Lewis Ranieri, Comments at Dept. of Treasury & Dept. of Housing and Urban Development, Conference on the Future of Housing Finance, Aug. 17, 2010, Washington, D.C. (on file with the authors).

²³¹ Mason & Rosner, *supra* note 19, at 18 (“the lack of liquidity, transparency, history and available data coupled with unprecedented complexity has made it difficult for all but the most well funded, well staffed and most sophisticated to analyze the markets or assets.”).

identify the best investment, adding to the expense of the analysis. As a result, most investors resort to relying on ratings.²³²

Standardization allows for more investors to be able to reverse engineer deals in a cost-effective manner and thereby have more effective market discipline. Moreover, standardization adds to market stability. Standardization helps confine the parameters of market experience, and as economists Reshmaan Hussam, David Porter, and Vernon Smith have shown, bubbles are less likely to occur in “experienced” markets with bounded parameters.²³³

Standardization also enables more effective discipline by regulators and the market. The housing bubble evaded regulatory and market discipline in part because only one of the two components in the cost of housing—interest rates—were observable in real time. The other component—the credit risk premium—was not observable in real time. It was only observable after the fact, and even then perhaps not fully. (Low/no-doc loans frustrate analysis of underwriting). The inability to observe in real time the change in underwriting standards underwriting standards prevented the systemic scope of the housing bubble from being manifest until it was too late.²³⁴ Only if regulators or the market have information about lending practices and their pervasiveness can they make a judgment about their sustainability and thereby determine if there is a bubble forming.

To monitor against housing bubbles, then, it is necessary to have data not just on interest rates, but also on the character of credit. It is insufficient, however, to simply require greater data disclosure about the collateral and borrowers supporting MBS, as the SEC’s proposed amendments to Regulation AB would do.²³⁵ Instead, investors need to

²³² *Id.*

²³³ Reshmaan N. Hussam *et al.*, *Thar She Blows: Can Bubbles Be Rekindled with Experienced Subjects?*, 98 AM. ECON. REV. 924 (2008) (“[I]n order for price bubbles to be extinguished, the environment in which the participants engage in exchange must be stationary and bounded by a range of parameters. Experience, including possible “error” elimination, is not robust to major new environment changes in determining the characteristics of a price bubble.”).

²³⁴ PLS investors could access loan-level pre-sale data, if they were willing to pay for it, and they could also request that particular mortgages be eliminated from the securitization pool, much like “B piece” buyers in commercial mortgage securitization. Interview with Bill Frey, Greenwich Financial Services. Most PLS investors were unaware of the option of reviewing loan-level data pre-sale. *Id.* Whether they would or could have successfully analyzed this data had they accessed it, is uncertain.

²³⁵ Asset-Backed Securities, 75 Fed. Reg. 23328-23476 (proposed May 3, 2010) (to be codified at 17 C.F.R. pt. 200, 229, 230, 232, 239, 240, 243, 249). In recognition of informational failures in structured finance, the SEC has proposed a major revision to Regulation AB, which governs asset-backed securities. The SEC proposal is entirely disclosure focused. It would require loan-level data disclosures to be made in XML (eXtensible Markup Language) format as part of the issuance process as well as on-going reporting. For residential mortgages, 137 data points would be collected for each mortgage on origination (although many would be non-applicable for many mortgages) and 151 data points for on-going reporting. 75 Fed. Reg. 23361, 23368.

have access to meaningful data that can be analyzed effectively in real time. Disclosure alone does not make data meaningful.

Disclosure of hundreds of loan-level data elements is useless, unless the relationships among those elements are 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.²³⁶ It is possible, however, to facilitate mortgage risk-modeling and real time analysis of changes in underwriting standards by reducing the number of potential variables affecting a loan's risk profile through product standardization. Product standardization facilitates underwriting discipline by both regulators and the market.

The problems heterogeneity poses for investors have been recognized by property law scholars. In a seminal paper, Professors Thomas Merrill and Henry Smith noted that idiosyncratic forms of property impose information costs on potential purchasers; the mere potentiality of idiosyncratic property forms itself imposes diligence costs on purchasers, who must ascertain that what they are purchasing is not in fact idiosyncratic.²³⁷ Thus, idiosyncratic property forms create "an externality involving measurement costs: Parties who create new property rights will not take into account the full magnitude of the measurement costs they impose on strangers to the title."²³⁸ "Free customization of property forms would create an information-cost externality; mandatory standardization is the legal system's way of reducing these external costs to an acceptable level."²³⁹ Similarly, applying Merrill and Smith's insights to contract law, Joshua Fairfield has argued that standardization reduces information costs in contracting.²⁴⁰ Standardization reduces informational costs for investors by simplifying both information acquisition and analysis.

²³⁶ The Reg AB revisions could also have the unintended consequence of making housing finance markets locally, rather than nationally, based, as detailed geographic data on borrowers will be available. While this could impose some discipline of localities' policy choices, it could also increase the price volatility of local housing markets, undermining the stability necessary for social gains.

²³⁷ Thomas W. Merrill & Henry E. Smith, *The Property/Contract Interface*, 101 COLUM. L. REV. 773, 776-777 (2001).

²³⁸ Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property: The Numerus Clausus Principle*, 110 YALE L.J. 1, 26-27 (2000).

²³⁹ Merrill & Smith, *supra* note 237, at 776-777. See also Merrill & Smith, *supra* note 238, at 33 ("One way to control the external costs of measurement to third parties is through compulsory standardization of property rights.").

²⁴⁰ Joshua Fairfield, *The Cost Of Consent: Optimal Standardization in the Law of Contract*, 58 EMORY L.J. 1401, 1404 (2009) (arguing that standardization of contracts reduces information costs of contracting); Joshua A.T. Fairfield, *The Search Interest in Contract*, 92 IOWA L. REV. 1237, 1256-1257 (2007) (arguing that standardization of contracts reduces information costs of contracting).

PLS are quintessentially idiosyncratic property forms. The underlying assets are themselves heterogeneous between deals, even within an asset class such as RMBS (residential mortgage-backed securities) or CMBS (commercial mortgage-backed securities). Factors such as geographic dispersion, occupancy status, underwriting and appraisal methods, and property types all affect the risks assumed. But even if the underlying assets of the trust were all the same, credit and interest rate tranching and credit enhancements mean that the ownership interest of any particular PLS certificate is not equivalent to another. Thus, one could create two synthetic PLS based on one real PLS, and have different capital structures—really ownership interests—in each one. This is not simply a matter of credit subordination; shifting allocation of principal and interest payments based on deal performance triggers are common in PLS.²⁴¹ There is no standard PLS, which means that investors must analyze each deal on its own for numerous characteristics, making PLS analysis an extremely costly endeavor.

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

The GSEs have already brought significant standardization to the mortgage market, in terms of standard notes and security instruments, automated underwriting, MBS forms, and servicing procedures. While there are differences in practice between the GSEs, they have moved the market from multiple standards to their two standards. The emergence of the PLS market resulted in a destandardization.²⁴²

Standardizing MBS does not mean eliminating consumer choice for mortgages. There have always been niche mortgage products, and there are 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' balance sheets. If a bank wants to incur the risk of underwriting an exotic mortgage product it should, but it should put its own risk capital at stake.

²⁴¹ GORTON, *SUPRA* note 38, at 87-90.

²⁴² The principle of standardization in the mortgage market is not itself a novel or radical one, and has worked well in the past, creating a deep, liquid market and enabling mortgages to be sold on the To Be Announced (TBA) market, meaning that they are sold to the GSEs before they are actually closed. The existence of the TBA market allows borrowers to lock in their mortgage rates months before their closing.

We, therefore, propose restricting securitization to proven, sustainable mortgage products for which there is well-established consumer demand and performance history.²⁴³ If securitization were restricted to a limited menu of mortgage forms—for example, the “plain vanilla” 30-year fixed, the “plain chocolate” 15-year fixed, and perhaps “strawberry” 5/1 or 7/1 adjustable-rate mortgages—investors would not be taking on mortgage product risk. We term this menu of mortgage products the “Neapolitan” mortgages, a term we find especially fitting given the etymology of term, Neapolitan: of the new city.

“Neapolitan” mortgages products have long satisfied the vast majority of the consumer borrowers, and there is no reason to think they will not in the future. Combined with the availability of niche products from balance sheet lenders, consumers should still be able to choose from a wide array of mortgage products and find the product that best fits their needs and financial ability.

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 because the highest payment burden is at the beginning of them mortgage’s term. Speculative future income and expenses are less of a concern. 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 borrowers to get financing that has a high likelihood of failure. Enabling aspirational borrowing encourages cyclical expansions of credit and housing price volatility, which are destabilizing for communities and the economy.

Standardization would also restrict investor choices, but we do not believe this to be a critical cost. Investors have far more investment

²⁴³ We note that the Dodd-Frank Wall Street Reform and Consumer Protection Act, P.L. 111-203, opens the door to moving the mortgage securitization market substantially in this direction. Dodd-Frank imposes risk retention requirements for securitizations other than of “qualifying residential mortgage.” H.R. 4173 § 941(a), *codified at* 15 U.S.C. §78o-9. (Section 15G(c) of the ‘34 Act). “Qualified residential mortgage” is to be defined jointly by various financial regulators “taking into consideration underwriting and product features that historical loan performance data indicate result in a lower risk of default,” including loan documentation, underwriting (front-end and back-end debt ratios), “the potential for payment shock on adjustable rate mortgages through product features and underwriting standards,” the existence of private mortgage insurance, and “prohibiting or restricting the use of balloon payments, negative amortization, prepayment penalties, interest-only payments, and other features that have been demonstrated to exhibit a higher risk of borrower default.” H.R. 4173 § 941(a), *codified at* 15 U.S.C. §78o-9. (Section 15G(e)(3)(B) of the ‘34 Act). The result of Dodd-Frank is that it will be more expensive to securitize non-qualified residential mortgages. This might result in these products being retained on balance sheet or simply not being originated in the first place. The definition of “qualified residential mortgage” will result in some measure of standardization, but at this point, however, it is not clear what products will be treated as “qualified residential mortgages.”

options than homeowners have mortgage product options, and the marginal loss in choice for investors is minimal. While structured finance has long prided itself on offering securities bespoke to particular investors' needs, most PLS deals (unlike CDOs), were not designed for individual investors, and we do not see standardization as precluding collateralized mortgage obligation (CMO) structures that allow for individualized tailoring of maturities in order to match investors' interest rate risk preferences. Thus, standardization of PLS offerings is unlikely to restrict choice for investors in a detrimental way. Indeed, it is hard to believe that investors want prime jumbos to be largely standardized, but do not want standardization for not nonprime PLS. Ultimately standardization benefits investors by increasing liquidity, which increases the value of securities.

Requiring standardization of securitization around well-tested, seasoned products is the only sure method of addressing the investor-securitizer principal-agent problem endemic to securitization and ensuring that securitization is a means of enhancing consumer and investor welfare and systemic stability rather than a source of systemic risk and instability.