

EXPLAINING THE HOUSING BUBBLE

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SUSAN M. WACHTER[‡]

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; 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, much less the parallel commercial real estate bubble.

This Article posits a new explanation for the housing bubble. 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.

The mortgage finance supply glut occurred because markets failed to price risk correctly due to the complexity and heterogeneity of the private-label mortgage-backed securities (MBS) that began to dominate the market in 2004. The rise of private-label MBS exacerbated informational asymmetries between the financial institutions that intermediate mortgage finance and MBS investors. The result was overinvestment in MBS that boosted the financial intermediaries' profits and enabled borrowers to bid up housing prices.

Despite mortgage securitization's inherent informational asymmetries, it is critical for the continued availability of the long-term fixed-rate mortgage, which has been the bedrock of American homeownership since the Depression. The benefits of securitization, therefore, must be reconciled with the need for economic stability. The Article proposes the standardization of MBS to reduce complexity and heterogeneity in order to rebuild a sustainable, stable housing finance market based around the long-term fixed-rate mortgage.

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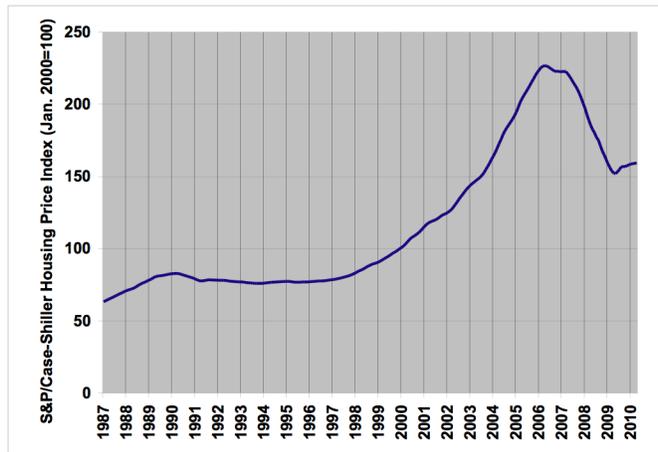
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INTRODUCTION

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 (See Figure 1.)

Figure 1. U.S. Housing Prices (Nominal), 1987-2010³



There is little consensus about what caused the bubble,⁴ or even on what part of the housing price appreciation between 1997 and 2006 was in fact a bubble.⁵ Some explanations, based on macroeconomics, posit that the bubble was caused by excessively easy monetary policy. Thus, economist John Taylor has 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.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 to the rise in

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 S&P/Case-Shiller Housing Price Index (Composite-10) (non-inflation adjusted).

⁴ See Edward L. Glaeser *et al.*, *Can Cheap Credit Explain the Housing Boom?*, NBER Working Paper, No. 16230, July 2010.

⁵ See *infra*, section II.B.

⁶ JOHN B. TAYLOR, *GETTING OFF TRACK: HOW GOVERNMENT ACTIONS AND INTERVENTIONS CAUSED, PROLONGED, AND WORSENE THE FINANCIAL CRISIS* (2009).

⁷ See, e.g., 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).

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. Housing economist Robert Shiller has propounded a mass psychology explanation, arguing that the bubble was the result of irrational consumer demand, encouraged by a mistaken belief that housing prices could only move upwards.¹⁰ Economists Markus Brunnermeier and Christian Julliard have presented an alternative behavioral theory of the housing bubble, suggesting that consumers' failure to disentangle real and nominal interest rates results in an overestimation of the value of real estate in times of falling inflation.¹¹ And urban economists Edward Glaeser, Joseph Gyourko, and Albert Saiz have argued that inelastic housing supply resulted in population growth

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).

¹¹ 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).

placing upward pressures on housing prices, thereby explaining some of the geographic variation in the housing bubble.¹²

In this Article, we challenge the existing explanations of the housing bubble and set forth a new, and we believe more convincing, explanation. We argue that the bubble was, in fact, a *supply-side* phenomenon, meaning that it was caused by excessive supply of housing finance. The supply-glut was not due to monetary policy, however, or government affordable housing policy. Instead, it was the result a fundamental shift in the structure of the mortgage finance market from regulated to unregulated securitization.

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 serious informational asymmetries between financial intermediaries and investors that resulted in investors underpricing risk and oversupplying mortgage finance. An oversupply of underpriced mortgage credit boosted financial intermediaries' volume-based profits and enabled borrowers to bid up housing prices, thereby fueling a bubble.

Securitization—the pooling of loans and issuance of securities backed by the cashflow 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.

¹² 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>.

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 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, nonamortizing, 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 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. PLS and the nontraditional mortgages they finance are heterogeneous, complex products. The structure of these products made it very difficult to accurately gauge their risk and hence price. In the presence of such informational opacity, informational asymmetries between the financial institution sellers of PLS and PLS investors abound.

¹³ Historically, the GSEs were federal agencies, but since 1968, they have been private-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.

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 problems 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 total cost of 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 problems 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 to make risks salient and therefore priceable.¹⁷ Product standardization

¹⁷ Traditionally, securities have been regulated through a disclosure-based regime; there is little regulation of the substantive terms and structures of securities. (A major exception is the Trust Indenture Act of 1939, which imposes some substantive requirements for publicly issued debt securities. Other substantive requirements are necessary for qualifying for various securities registration and disclosure exemptions.) Our argument that disclosure-based regulation requires substantive term regulation in order to be effective represents a major departure from previous approaches to financial regulation. Rather than substantive term regulation being a parallel regulatory approach to disclosure regulation, it is a complementary approach. While this Article focuses on the need to combine disclosure and substantive term regulation for MBS, this combined regulatory approach has potential for other products as well. We

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.

* * * * *

Part I of the Article begins with discussion of the importance of homeownership as a policy goal and the critical role of the long-term, fixed-rate, fully-amortized¹⁸ mortgage in achieving sustainable homeownership and housing market stability. The Article then explains why absent securitization the long-term, fixed-rate, fully-amortized¹⁹ mortgage would not be widely available. Next, the Article turns to a consideration of the changes in the securitization market that begat the housing bubble, in particular the rise of PLS and nontraditional mortgage products.

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. This section 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.

emphasize, nonetheless, that we are not proposing substantive term regulation for all securities; housing finance is different because of the systemic risk inherent in the housing finance system.

¹⁸ In a fully-amortized mortgage loan, part of every monthly payment is applied to the principal balance of the loan. In a non-amortized mortgage loan, monthly payments are only applied to interest and the entire original principal balance remains outstanding until the end of the loan's term.

¹⁹ Monthly payments on a fully-amortized mortgage are applied to both interest and principal; the principal balance is thereby steadily reduced on a fully-amortized mortgage. A non-amortized mortgage has payments of interest only until the final payment, when the entire principal is due as a "bullet." A mortgage can also be partially amortized, meaning that only some periodic payments are applied to principal, or the mortgage can be amortized over a longer period than the term of the loan, meaning that every periodic payment pays down principal, but there is still a larger "balloon" payment of principal due at the end of the loan.

Part III turns to a consideration of other 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. It shows that they are at best incomplete, and, at worst, contrary to all evidence.

Part IV argues that the oversupply of mispriced mortgage finance was the result of the shift from regulated Agency securitization to unregulated private-label securitization. The informational asymmetries that exist in nontraditional mortgages and PLS resulted in 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 constraints on declining mortgage and MBS underwriting quality—regulation, credit ratings, debt market discipline (including limited risk appetite from savvy subordinated debt investors), and short pressures—all failed, thereby enabling a bubble. Part IV includes consideration of the parallel commercial real estate bubble, which occurred in a market where there has always been only private-label securitization.

Part V concludes with a call for standardization of MBS 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 of 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 work is the first, to our knowledge, to incorporate an analysis of both the housing and the commercial real estate bubbles. Prior work has focused almost entirely on the residential housing bubble; virtually no scholarship exists on the commercial real estate bubble that paralleled the residential bubble. We believe that an explanation of the residential bubble must also be capable of explaining the contemporaneous commercial real estate bubble. Thus, the commercial real estate bubble presents a shibboleth for evaluating theories of the residential bubble.

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.

I. THE EVOLUTION OF THE U.S. HOUSING FINANCE MARKET

A. Sustainable Home Ownership and the Fixed-Rate Mortgage

The United States has a long history of supporting homeownership as a public policy goal. Public policy has favored homeownership because homeownership offers many social benefits. Historically,

there has been widespread agreement in the U.S. that homeownership is the preferred model for the vast majority of the population, both for reasons of “economic thrift” and “good citizenship,” and for reasons of better health, recreation and family life expressed through the physical form of the detached single-family house and garden.²³

²⁰ See, e.g., Taylor, *supra* note 6, 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), available 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.

²³ Marc A. Weiss, *Own Your Own Home: Housing Policy and the Real Estate Industry* 7 (June 11, 1998) (unpublished paper presented to the Conference on Robert Moses and the Planned Environment at Hofstra University).

Some of the arguments in favor of homeownership developed in reaction to the condition of renters in urban slums and tenements,²⁴ or to fear of urban proletariat unrest,²⁵ but there are good modern reasons to support homeownership as the preferred model of residency when it is within a consumer's economic means. Rental markets are incomplete markets; leases on particular properties are not available for every or even most possible durations. Instead, the typical lease is for one-year; longer term rental tenancies are rarely guaranteed. This means that renters must routinely renegotiate their leases, which presents regular possibilities of financial shock due to rent increases. Homeowners are protected against this sort of shock;²⁶ while their property taxes may go up, they are unlikely to be priced out of a neighborhood because of neighborhood improvement and gentrification.

Homeownership is also a major investment that homeowners want to protect. Homeowners have an incentive to care for their homes. As the famous Larry Summers adage has it, "In the history of the world, no one has ever washed a rented car." So too has no one ever put a new roof on their rental unit or fixed its furnace.

These benefits for the individual homeowner have important positive externalities on neighbors and communities. When homeowners take care of their homes, it improves the value of their neighbors' homes.²⁷ Homeowners also tend to move less frequently than renters, so higher homeownership levels contribute to more stable communities, whose social and civic benefits have been widely documented.²⁸ Homeowners' incentive to care for their homes also extends to caring for their neighborhood and being concerned with issues like zoning, schools,

²⁴ See Paul Matthew Stoner, *The Mortgage Market- Today and After WWI*, 19 J. LAND & PUB. UTIL. ECON., 224, 225 (1943); EDWARD L. GLAESER & JOSEPH GYOURKO, *RETHINKING FEDERAL HOUSING POLICY: HOW TO MAKE HOUSING PLENTIFUL AND AFFORDABLE* 48-49 (2008).

²⁵ See Marc A. Weiss, *Marketing and Finance Home Ownership: Mortgage Lending and Public Policy in the United States, 1918-1989*, in 18 BUS. & ECON. HISTORY 2D. SERIES 109 (WILLIAM J. HAUSMAN ED., 1989).

²⁶ See Todd Sinai & Nicholas Souleles, *Owner-Occupied Housing as a Hedge Against Rent Risk*, 120 Q. J. ECON. 763 (2005).

²⁷ Dan Immergluck & Geoff Smith, *The External Costs of Foreclosures: The Impact of Single-Family Mortgage Foreclosures on Property Values*, 17 HOUSING POL'Y DEBATE 57, 58 (2006); William C. Apgar *et al.*, *The Municipal Cost of Foreclosures: A Chicago Case Study* (Homeownership Pres. Found., Hous. Fin. Pol'y Research Paper No. 2005-1, 2005, available at http://www.995hope.org/content/pdf/Apgar_Duda_Study_Full_Version.pdf; Jenny Schyuetz *et al.*, *Neighborhood Effects of Concentrated Mortgage Foreclosures*, (N.Y. Univ. Ctr. For Law & Econ. Law & Econ. Research Paper Series, Working Paper No. 08-41, 2008), available at <http://ssrn.com/abstract=127021>; Zhenguo Lin *et al.*, *Spillover Effects of Foreclosures on Neighborhood Property Values*, 38 J. Real Est. Fin. & Econ. (2009); Charles W. Calomiris, *et al.*, *The Foreclosure-House Price Nexus: Lessons from the 2007-2008 Housing Turmoil* (July 4, 2008).

²⁸ Robert D. Putnam, *Bowling Alone: America's Declining Social Capital*, 6 J. DEMOCRACY, 65 (1995); ROBERT D. PUTNAM, *BOWLING ALONE: THE COLLAPSE AND REVIVAL OF AMERICAN COMMUNITY* (2000).

traffic, and crime. In a community of homeowners, there is a rich set of positive cross-externalities and positive network effects. Homeownership thus has welfare enhancing effects for homeowners, communities, and the nation.

Homeownership comes with risks, though. Homes are expensive. Few individuals are able to purchase their homes outright. Most people need to borrow funds to purchase a home, typically with a mortgage. Mortgage finance has risks, just like any leveraged investment. The homeowner has the upside of the property's appreciation, but also the downside of the property's depreciation, to the extent of the equity stake in the home. Owning a home also typically involves committing a large portion of household wealth into a single, non-diversified asset that cannot be hedged.²⁹ And as political scientist Jacob Hacker has noted the risk involved in regular debt payments is compounded in an age of growing income insecurity.³⁰

Despite these risks, homeownership is, on balance, socially beneficial, so long as it is sustainable. There is little point in policies that promote homeownership, unless the ownership is sustainable. The public benefits that come from homeownership only flow from long-term, sustainable homeownership.

The form of financing is critical for sustainable homeownership. Home mortgages divide, on the most generic level, into two types of products—fixed-rate mortgages (FRMs) and adjustable-rate mortgages (ARMs), depending on whether the interest rate is fixed for the life of the mortgage or adjusts periodically in reference to a public index rate such as LIBOR or the Federal Funds rate. Some ARMs are so-called hybrid or “rollover” ARMs; these mortgage have an initial fixed-rate period, after which the rate varies with an index.

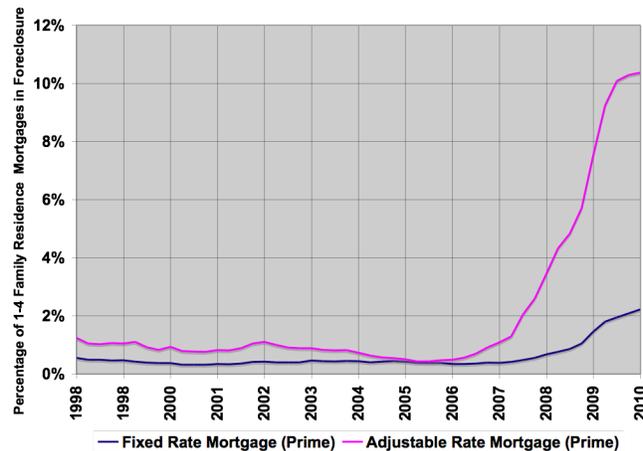
²⁹ Robert J. Shiller has suggested that housing derivatives could be used to hedge home price fluctuations. See Robert J. Shiller, *Derivative Markets for Home Prices*, *HOUSING MARKETS AND THE ECONOMY: RISK, REGULATION AND POLICY: ARTICLES IN HONOR OF KARL E. CASE* 17-32 (2009). Shiller has suggested that housing futures are not used as a hedging device by homeowners either because they do not want to face the fact that they might lose money or because the consumption value of housing is itself a hedge against its market value. *Id.* at 27-30. While both of these factors may be at play, we believe there is a simpler one: housing derivatives are poor hedges against home price decline. Housing derivatives only exist for metropolitan statistical areas (MSA), not for particular neighborhoods or blocks. There is only weak correlation between price changes in a MSA and for a particular house. For example, housing prices in Chevy Chase, Maryland bear little if any correlation to those in Loudon County, Virginia, Prince George's County, Maryland, Frederick, Maryland, or Southeast Washington, D.C., although all are within the same MSA. In theory, there could be housing futures on a particular neighborhood or block, but such narrowly focused futures would be very thin, illiquid markets and thus poor hedges, as the derivative's value might not move in time with housing values.

³⁰ JACOB S. HACKER, *THE GREAT RISK SHIFT: THE NEW ECONOMIC INSECURITY AND THE DECLINE OF THE AMERICAN DREAM* (2006).

ARMs are the dominant mortgage product in every country except the United States, Denmark, and Germany.³¹ While the ARM has prevailed in much of the world, it has been able to do so in recent decades because of a very hospitable macroeconomic environment. Since the early 1980s, global interest rates have generally been declining. When they have risen, it has been by relatively small amounts and slowly.

When interest rates are declining, an ARM is a borrower-friendly product; mortgage payments decrease as interest rates decline. If interest rates go up sharply, however, monthly payments on an ARM can shoot up and quickly become unaffordable for the borrower.³² Thus, as Figure 2 shows, foreclosure rates have thus been consistently higher for ARMs than for FRMs, even before the housing bubble, and during the financial crisis the discrepancy has been dramatic.

Figure 2. Home Mortgage Foreclosure Rate by Mortgage Type³³



Housing finance via ARMs thus always poses the risk of an asset-liability duration mismatch for homeowners. Homeowners'

³¹ See European Mortgage Federation, *Study on Interest Rate Variability in Europe*, July 2006. Denmark has a unique system of housing finance that dates back to the Great Fire of Copenhagen in 1795. See Michael Lee, *Alternative Forms of Mortgage Finance: What Can We Learn From Other Countries?* Working paper, 2010; Realkreditrådet, *The Traditional Danish Mortgage Model*, 2009; M. Svenstrup & S. Willeman, *Reforming Housing Finance: Perspectives from Denmark*, 28 J. R.E. RESEARCH, 2 (2006). Germany has long-term fixed-rate mortgages, but, unlike the U.S. and Denmark, these mortgages are not callable for their first ten years absent prepayment penalties that render refinancing uneconomic.

³² Indeed, this problem occurred in the UK in the early 1990s. Glen Bramley, *An affordability crisis in British housing: Dimensions, causes and policy impact*, 9 HOUSING STUDIES 103 (1994) (noting that a cause of the UK housing crisis in the 1990s was that most UK mortgages are ARMs without rate caps); David Miles, *The UK Mortgage Market: Taking a Longer-Term View, Final Report and Recommendations*, May 2004 (report to the Chancellor of the Exchequer), at 23, 91; see also RAY P. FORREST ET AL., *HOME OWNERSHIP IN CRISIS?: THE BRITISH EXPERIENCE OF NEGATIVE EQUITY* (1999).

³³ Mortgage Bankers Association National Delinquency Surveys.

income tends to be fixed, but with an ARM, their mortgage expenses—often their largest single expense—are variable and can exceed their income if the ARM’s rates go up. Therefore, while the ARM has been a vehicle for increasing homeownership in recent decades, it has the inherent potential to undermine the homeownership goal.

B. Securitization as a Solution to Asset-Liability Duration Mismatches

The United States’ savings and loan (S&L) crisis of the 1980s and early 1990s illustrates the danger of asset-liability mismatches due to adjustable-rate obligations. Since the New Deal, most mortgages in the United States have been long-term, fully-amortized FRMs.³⁴ Pre-New Deal mortgages were frequently short-term, adjustable-rate “bullet loans”—non-amortized, interest-only loans with the entire principal due as a “bullet” at the end. These loans were designed to be refinanced, but that was only possible if the homeowner had sufficient equity in the property and housing finance markets were functioning. Bullet loans exposed homeowners to significant refinancing and interest rate risk. The collapse of the mortgage market during the Depression showed just how fragile a housing market constructed of short-term, ARMs could be, and subsequent federal housing policy strongly encouraged the use of the long-term, fully-amortized FRM as a means of ensuring both affordability and systemic stability.

S&Ls are depository institutions restricted largely to consumer lending activities. They had, by the late 1970s, become dominant in the mortgage markets. Most of S&Ls’ assets were the long-term, fully-amortized FRM loans encouraged post-New Deal. This meant that S&Ls had a fixed income stream. S&Ls’ main liabilities—and source of operating funds—were deposits, which could be withdrawn with little notice.

In the 1970s, S&Ls were restricted in the interest rates they could pay on savings accounts. As interest rates rose in the late 1970s, S&Ls quickly lost deposits to money market mutual funds, which did not have regulated returns. Congress responded to this disintermediation in 1980 by phasing out the savings account interest rate restriction,³⁵ but this only meant that in order to compete for consumer savings with money market funds, S&Ls had to offer increasingly high interest rates on deposits. As a result, the cost of funds for S&Ls soared, but their

³⁴ See Adam J. Levitin & Susan M. Wachter, *Rebuilding Housing Finance*, working paper (2010) for a more detailed history of U.S. housing finance.

³⁵ Depository Institutions Deregulation and Monetary Control Act of 1980, 12 U.S.C. § 1735f-7a (2010).

income—from the FRMs—remained constant. The S&Ls were quickly decapitalized, and a drawn-out banking crisis ensued.³⁶

The asset-liability mismatch played out on the depositories' balance sheets in the S&L crisis, but it could just as easily on the household balance sheets because of ARMs.³⁷ In periods of interest rate volatility, there is an inevitable risk to relying on fixed rate income—either from employment or from fixed-rate assets—to service adjustable rate debt. The lesson from the S&L crisis was that depositories could not hold long-term FRMs in their portfolios without assuming significant interest rate risk.

In the United States, in the wake of the S&L crisis, two solutions emerged to the asset-liability mismatch problem. One was increased use of ARMs. ARMs grew in popularity in the 1980s, as interest rates fell, but risk-averse consumer tastes generally prefer FRMs because of the predictability of payments and because FRMs tend to be cheaper than ARMs on an option-adjusted basis.³⁸ ARM market share has thus remained limited when competitively priced FRMs are available.³⁹

The other solution was securitization. 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).⁴⁰

³⁶FDIC, *HISTORY OF THE EIGHTIES—LESSONS FOR THE FUTURE*, Vol. I, pin (1997); LAWRENCE J. WHITE, *THE S&L DEBACLE: PUBLIC POLICY LESSONS FOR BANK AND THRIFT REGULATION* (1991); WILLIAM K. BLACK, *THE BEST WAY TO ROB A BANK IS TO OWN ONE* (2005).

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

³⁷ See *supra* note 32.

³⁸ The typical US FRM is freely callable, meaning that it includes a prepayment option, which can be quite valuable, as the mortgage can be refinanced at a lower rate when interest rates fall. It is possible to price FRMs on an option-adjusted basis, meaning calculating the price of the mortgage if there were no prepayment option. On an option-adjusted basis, US FRMs are actually slightly cheaper than ARMs. James Vickery, *Interest Rates and Consumer Choice in the Residential Mortgage Market*, Fed. Reserve Bank of N.Y. Working Paper, Sept. 16, 2007, at 27-28, 42 Table 8 (finding that in the U.S., on an option-adjusted basis FRMs are 9 basis points cheaper than ARMs).

³⁹ We note that covered bonds, a mortgage financing method popular in some European countries—still pose an asset-liability mismatch problem for depositories and are done primarily with adjustable-rate mortgages.

⁴⁰ 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).

Securitization moved mortgage loans—and rate risk—off of depositories' balance sheets and placed the risk with investors better suited for bearing long-term rate risk, like insurance companies and pension funds. The use of secondary markets for mortgage financing ensured that FRMs remained widely available even after the S&L crisis.

Securitization is thus central to American housing finance. Despite its starring role in the recent debacle, it is essential for assuring the continued widespread availability of the long-term, fixed-rate mortgage, which has been the bedrock of American homeownership since the Depression, and the prevalence of which is critical for rebuilding a sustainable housing finance system.

Securitization, in its modern form, had been used for housing finance since 1971.⁴¹ 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.⁴² 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.⁴³ 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 LTV ratios under 80% absent private mortgage insurance or seller risk retention.⁴⁴ 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 would securitize most of the mortgages they purchased, meaning that they would sell the mortgages to legally separate, specially created trusts, which would pay for the mortgages by issuing MBS. The GSE would guarantee timely payment of principal and interest to investors on the MBS issued by the securitization trusts.

⁴¹ 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).

⁴² The GSEs originated as part of the federal government, but were privatized in 1968.

⁴³ 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).

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

Similarly, Ginnie Mae would guarantee the timely payment of principal and interest on MBS collateralized by FHA and VA mortgages. Fannie, Freddie, and Ginnie thus linked long-term FRM borrowers with capital market investors, such as insurance and pension funds, that were willing to assume long-term interest rate risk because they did not have the short-term liabilities of depositaries. Securitization thus ensured the continued widespread availability of the FRM in the wake of the S&L crisis as depositaries shied away from holding interest rate risk.

C. Private-Label Securitization

For Fannie and Freddie MBS, investors assumed the interest rate risk on the underlying mortgages, while the GSEs assumed the mortgages' credit risk. Investors in GSE MBS did incur credit risk—that of Fannie and Freddie—but also, indirectly that of the mortgages guaranteed by the GSEs, because the GSEs' financial strength was heavily dependent upon the performance of the mortgages. Because Fannie and Freddie were perceived as having an implicit guarantee from the federal government,⁴⁵ investors were generally unconcerned about the credit risk on the Fannie and Freddie, and hence on the MBS.⁴⁶ 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.⁴⁷ This was information that was fairly easy to obtain, particularly on standardized mortgage products.

Because the GSEs bore the credit risk on the mortgages, they were incentivized to insist on careful underwriting.⁴⁸ Moreover, the

⁴⁵ 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.

⁴⁶ Investors would be concerned only to the extent that defaults affected prepayment speeds.

⁴⁷ 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.

⁴⁸ The possibility of a federal bailout by being too-big-to-fail did raise potential moral hazard problems for the GSEs, which could have undermined their underwriting quality. It is notable, however, that the GSEs' failure was not due to shoddy underwriting on the mortgages they purchased, but to losses in their investment portfolio. The GSEs were major purchasers of PLS. Robert Stowe England, *The Rise of Private Label*, Mortgage Banking, Oct. 1, 2006 (“In the subprime RMBS category, for example, Fannie

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.⁴⁹ 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.

Beginning in the 1990s, however, a new, unregulated form of securitization began to displace the standardized GSE securitization. This was private label securitization (PLS), supported by a new class of specialized mortgage lenders and securitization sponsors.⁵⁰

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.⁵¹

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

Mae and Freddie Mac are big buyers of AAA-rated floating-rate securities. Indeed, Fannie and Freddie are by far the biggest purchasers of subprime RMBS.”). As of 2004, they held 33% of subprime MBS outstanding. Alan Greenspan, *The Crisis*, BROOKINGS PAPERS ON ECONOMIC ACTIVITY 38-40, available at http://www.brookings.edu/~media/Files/Programs/ES/BPEA/2010_spring_bpea_papers/spring2010_green span.pdf.

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 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.

⁴⁹ See *supra*, text accompanying footnote 44.

⁵⁰ 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 some time because of their unproven risk profile.

⁵¹ 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.

payment of interest and principal on the PLS. PLS investors, therefore, 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 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 bond rating agencies initially insisted that jumbo securitizations follow GSE underwriting guidelines in order to be rated.⁵² Loss rates on jumbos have been less than .5% since 1992.⁵³

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.⁵⁴ 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.⁵⁵ This is only possible when there is a liquid secondary market for the mortgages and necessitates mortgage standardization as well.

⁵² DAVID S. MURPHY, *UNRAVELLING THE CREDIT CRUNCH*, 133 (2007) (“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.”). See also Lewis Ranieri, comments at conference on the Future of Housing Finance, U.S. Department of Treasury, Aug. 17, 2010.

⁵³ *MBS Basics*, Nomura Fixed Income Research 22, Mar. 31, 2006.

⁵⁴ *Id.* at 22-23.

⁵⁵ 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.

The success of PLS depended heavily on the ability to achieve high investment grade-ratings for most securities because fixed-income investor demand is highest for high investment-grade products.⁵⁶ For jumbos, it was relatively easy to achieve AAA-ratings because of the solid underlying collateral.⁵⁷ 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.⁵⁸ 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,⁵⁹ excess spread,⁶⁰ shifting interest,⁶¹ reserve accounts,⁶² and pool and bond insurance.⁶³ Nonprime PLS thus involved

⁵⁶ PLS investors are almost entirely institutional investors. Many institutional investors want to purchase AAA-rated securities. Sometimes this is just because these securities are perceived as being very safe investments, albeit with a higher yield than Treasuries. Often, though, institutional investors are either restricted to purchasing investment grade or AAA-securities (by contract or regulation) or received favorable regulatory capital treatment for AAA-rated assets. Only a handful of corporate securities issuers have a AAA-rating, so structured products were the major source of supply for the AAA-securities demand. As Lloyd Blankfein, CEO of Goldman Sachs noted, “[i]n January 2008, there were 12 triple A-rated companies in the world. At the same time, there were 64,000 structured finance instruments...rated triple A.” Lloyd Blankfein, *Do Not Destroy the Essential Catalyst of Risk*, FINANCIAL TIMES (London), Feb. 8, 2009, at 7.

⁵⁷ 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.

⁵⁸ 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.

⁵⁹ 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.

⁶⁰ 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, as a further protection for senior MBS holders, excess spread cannot be released if certain triggers occur, like a decline in the amount of excess spread trapped in a period beneath a particular threshold.

⁶¹ 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).

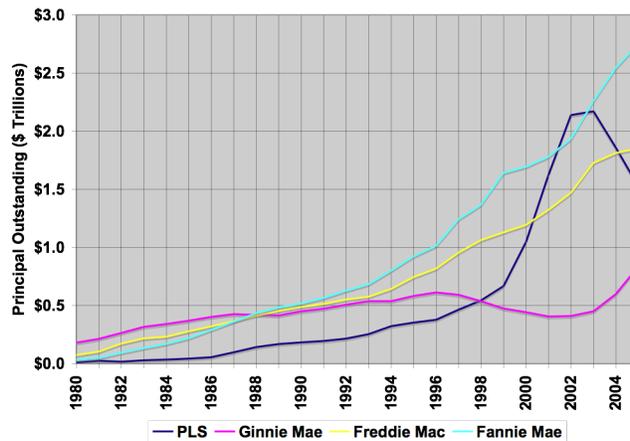
⁶² A reserve account is a segregated trust account, typically invested in highly liquid, investment grade investments (money market or commercial paper). It provides a cushion for losses due to defaults on the underlying mortgage loans. Reserve accounts come in two types: pre-funded cash reserves

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

D. 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 Figures 3 and 4.) 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 dollar volume in 2003 to 46% in 2004. (See Figure 4.)

Figure 3. MBS Outstanding by Securitization Type⁶⁴

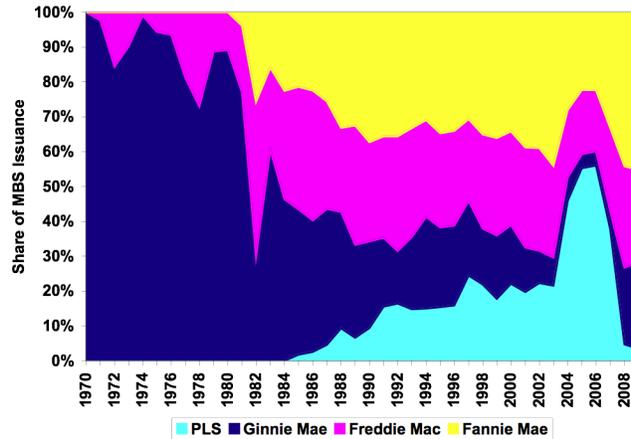


and excess spread. Pre-funded reserve accounts are funded in full at the deal's closing, typically by the originator or depositor, with a share of the deal's proceeds. The reserve account thus amounts to a holdback or a discount on the SPV's purchase price of the loans from the originator or depositor. 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.

⁶³ 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 insurance company guaranteeing the timely payment of principal and interest on a tranche of bonds. See Gangwani, *supra* note 61, at 35.

⁶⁴ Inside Mortgage Finance, 2010 Mortgage Market Statistical Annual.

Figure 4. Share of MBS Issuance by Securitization Type⁶⁵



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. (See Figure 5.) These low rates brought on an orgy of refinancing. (See Figure 6.) 2003 was a peak year for mortgage originations, 72 percent of which (by dollar volume) were refinancings.⁶⁶ Virtually all of the refinancing activity from 2001-2003 was in prime, fixed-rate mortgages. (See Figure 7.) The prime refinancing boom meant that mortgage originators and securitizers had several years of increased earnings.

⁶⁵ *Id.*

⁶⁶ *Id.*

Figure 5. Selected Interest Rates, 2000-2008⁶⁷

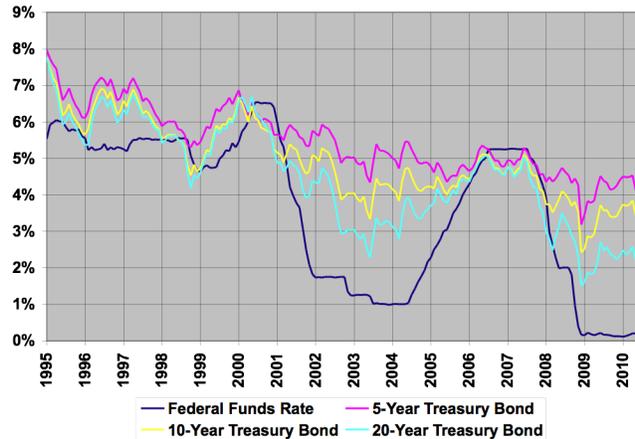
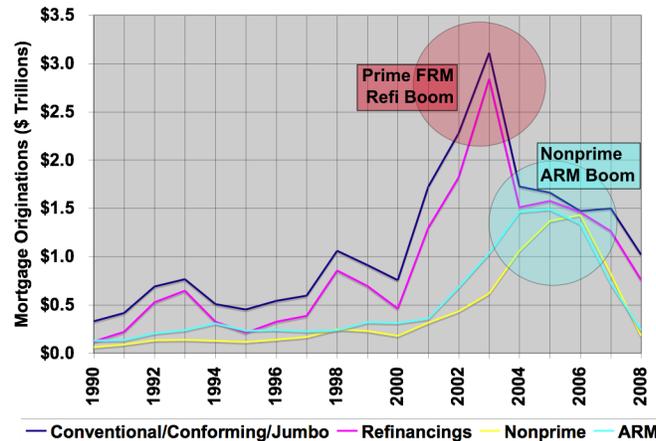


Figure 6. Refinancing and Purchase Money Originations⁶⁸



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 2001-2003.⁶⁹ The solution was to find more “product” to move in order to maintain origination volumes and hence earnings. Because the prime borrowing pool was exhausted, it was necessary to lower underwriting standards and look to more

⁶⁷ Federal Reserve Statistical Release H.15, available at <http://www.federalreserve.gov/releases/h15/data.htm>.

⁶⁸ Inside Mortgage Finance, *supra* note 66.

⁶⁹ See William W. Bratton, Jr. & Michael L. Wachter, *The Case Against Shareholder Empowerment*, 158 U. PA. L. REV. 653, 719 n.198 (2010).

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 7). As a result, loan-to-value ratios increased and borrowers income was more poorly documented (if at all). (See Figure 8).

Figure 7. Origination Volume by Mortgage Type, 1990-2009⁷⁰

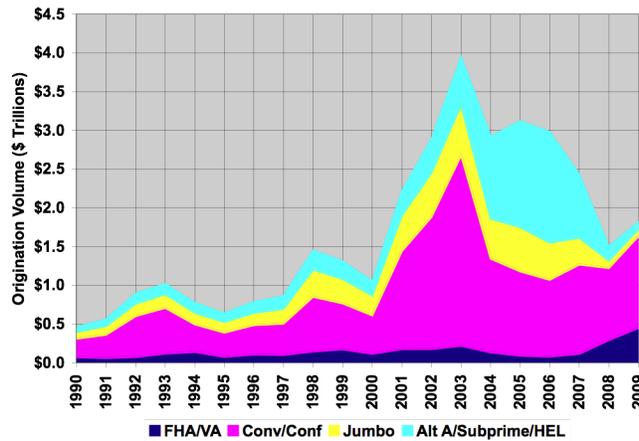
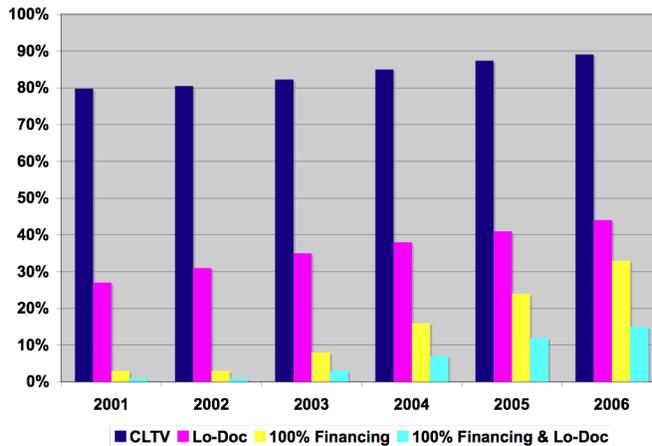


Figure 8. Erosion of Residential Mortgage Underwriting Standards⁷¹



The decline in underwriting standards was also reflected in a shift in product type. Nontraditional mortgage products are generally structured for initial affordability; the costs are back-loaded, either with

⁷⁰ Inside Mortgage Finance, 2010 Mortgage Market Statistical Annual.

⁷¹

balloon payments or increasing interest rates. Table 1, below, illustrates the relative initial affordability of various mortgage products. It shows that various 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 Products⁷²

Mortgage Product	Monthly Payment	Payment as Percentage of 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%

Thus, as Figure 6, above, shows, ARMs supplanted more FRMs (which are more expensive on a non-option adjusted basis⁷³), even as interest rates were rising from historic lows, which made ARMs a poor financing choice given that rates were likely only to adjust upwards in the foreseeable future.

Moreover, at this same point, 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 FRM. As Figure 9 shows, in 2000, the yield curve was flat, shifting to an upward slope from 2001-2003.⁷⁴ As Figures 9-10 show, the yield curve began to flatten out in 2004-2005, and was then flat in 2006-2007.

⁷² 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.

⁷³ See *supra* note 38.

⁷⁴ Figures 7 and 8 display the yield curves on Treasuries. While these are not the same as mortgage yield curves, where no equivalent data exists, mortgage yield curves tend to track Treasuries, and Treasuries are frequently used to hedge interest rates on mortgages with similar weighted average lives.

Figure 9. Annualized Treasury Yield Curves, 2000-2004⁷⁵

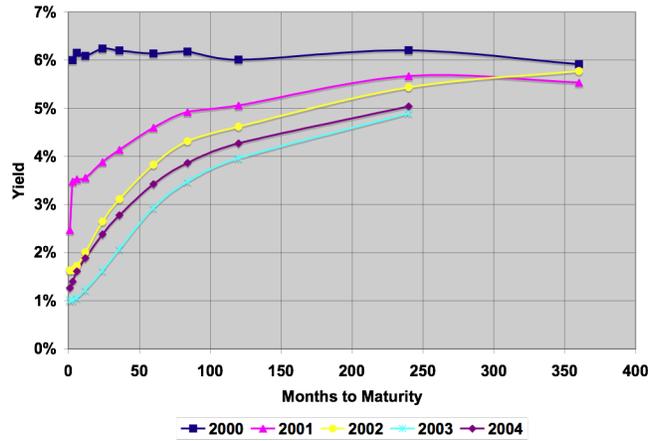
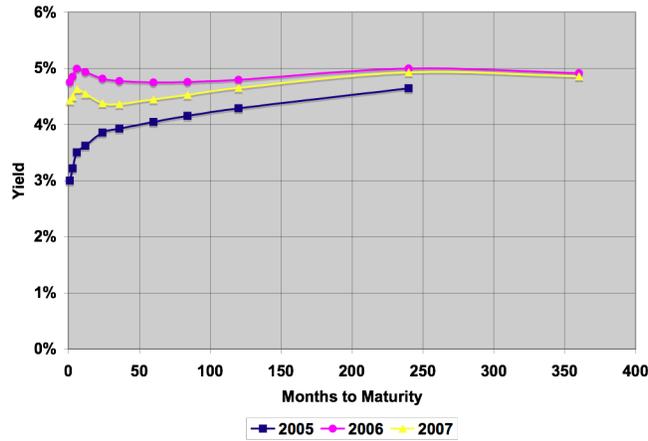


Figure 10. Annualized Treasury Yield Curves, 2005-2007⁷⁶



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.⁷⁷ 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

⁷⁵ Curves were calculated by taking the average daily yield for each duration for each year.

⁷⁶ Curves were calculated by taking the average daily yield for each duration for each year.

⁷⁷ 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.”).

the full term cost would have gravitated to FRMs. Instead, the explanation has to be found in the relative 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 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.⁷⁸ Thus, cheaper mortgage credit made it easier to gamble on housing. Second, ARM share growth could be because it was an affordability product, 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.⁷⁹ 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.⁸⁰

⁷⁸ See Andrey Pavlov & Susan M. Wachter, *Mortgage Put Options and Real Estate Markets*, 38 J. R.E. ECON. 89 (2009).

⁷⁹ 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.

⁸⁰ While housing economists have noted that interest rate changes do not explain the bubble, see Glaeser *et al.*, *supra* note 4, 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

Much of the growth in ARMs (and in mortgages generally), particularly in nonprime mortgages, was in nontraditional products,⁸¹ such as interest-only mortgages,⁸² payment-option mortgages,⁸³ 40-year extended amortization balloons mortgages,⁸⁴ or hybrid ARMs.⁸⁵ (See Figure 11.) 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.

rates were constant during the bubble misses the critical point that loan application volume rose dramatically.) 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, Mayer, and Sinai take pains to point out that housing prices are not the same as the annual cost of owning a house, they do not internalize this lesson, as they neglect to consider whether the shift in mortgage product mix was reducing the (initial) affordability of housing.

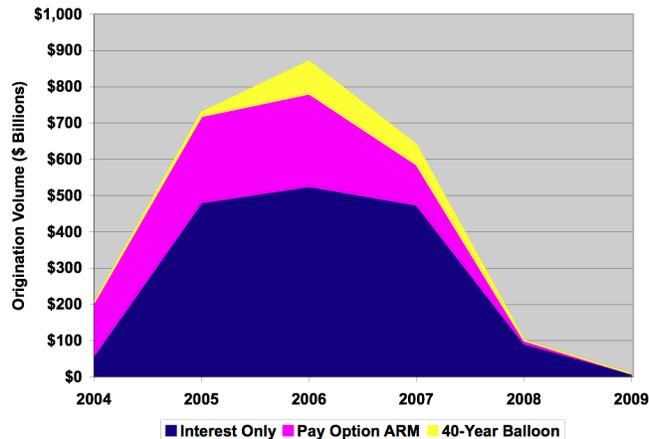
⁸¹ Christopher Mayer *et al.*, *The Rise in Mortgage Defaults*, 23 J. ECON. PERSPECTIVES, 27 (2009).

⁸² 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.

⁸³ Payment-option mortgages permit borrowers to choose between a number of monthly payment options. Typically, the choices are a payment equivalent to that if the mortgage were amortized over 30 years, to that if the mortgage were amortized over 15 years, an 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 the borrower’s monthly payments increasing substantially.

⁸⁴ 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.

⁸⁵ 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.

Figure 11. Growth of Nontraditional Mortgage Products⁸⁶

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 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—nonamortizing 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.

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

⁸⁶ Inside Mortgage Finance, *supra* note 66.

other potential homeowners, even with loosened (or even fraudulent) underwriting standards. 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. 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 foreclosures and declining housing prices: the bubble had burst.

II. A SUPPLY-SIDE EXPLANATION OF THE HOUSING BUBBLE

A. Evidence from RMBS 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 12 and 13.)

What’s more, spreads on AAA-rated PLS fell during 2004-2007, even as yield spreads on AAA-rated corporate bonds held steady. (See Figure 14.) In other words, the change in spreads was specific to PLS, and did not reflect a general movement in the AAA-rated bond market.

Declining PLS spreads meant that investors were willing to accept more risk for lower returns. In other words, housing finance was becoming relatively cheaper, even as it became riskier. The risk-adjusted price was dropping and quantity was increasing during 2004-2007!

Moreover, from 2004-2007, yields on AAA-rated PLS were below those on AAA-rated corporate bonds, indicating that there was greater demand for AAA-rated PLS than for AAA-rated corporate bonds, *even though MBS have an interest rate risk that does not exist with 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, yield spreads should be *lower* on corporate bonds with the same credit risk as PLS. For PLS to have a lower yield spread than corporate bonds

implies a perceived default risk that is less than corporate bonds, but with a AAA rating, this is not possible. Therefore, other factors must be sought to explain the difference in yield spreads between AAA PLS and AAA corporate bonds.

Figure 12. PLS Issuance and Weighted Average PLS Spreads, 2003-2007⁸⁷

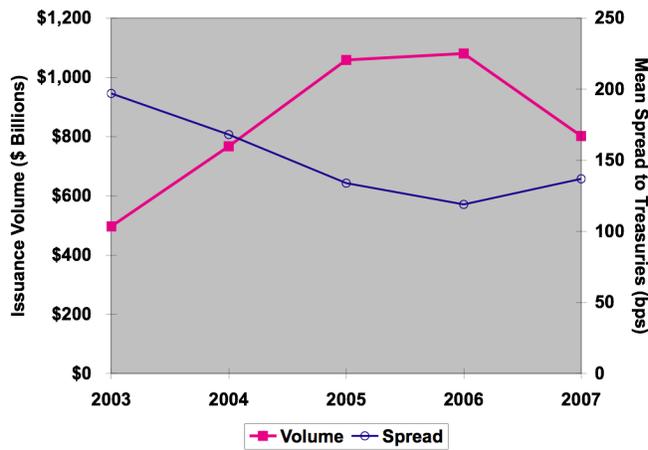
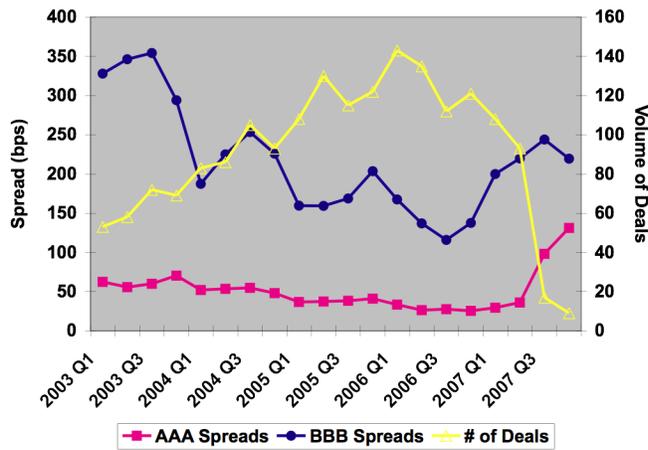


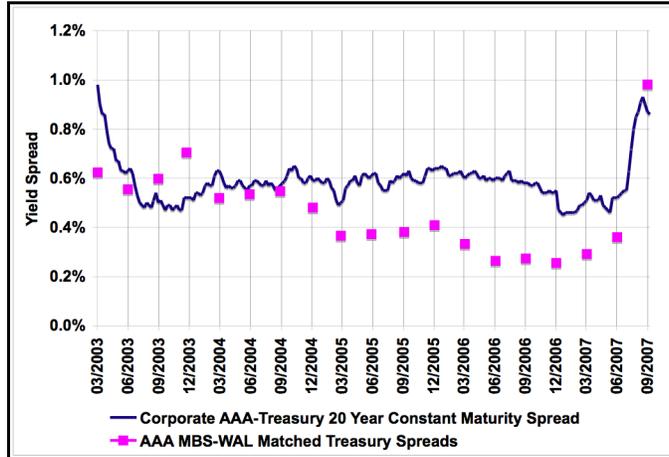
Figure 13. PLS Issuance and Spreads 2003-2007 for AAA and BBB Rated Tranches⁸⁸



⁸⁷ Adelino, *supra* note 58, 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.

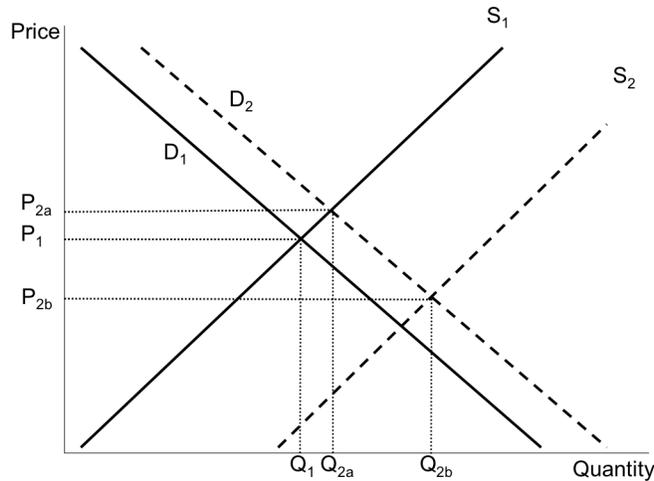
⁸⁸ Data provided by Manuel Adelino from proprietary data set.

Figure 14. Comparison of AAA PLS and Corporate Yield Spreads Over Maturity-Matched Treasuries⁸⁹



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 financing supply curve (from S_1 to S_2 , in Figure 15).

Figure 15. Shifts in Housing Finance Supply and Demand Curves



⁸⁹ Federal Reserve Board (corporate spreads); Manuel Adelino (MBS spreads).

There may also have been an outward (rightward) shift in the housing finance demand curve (from D_1 to D_2 , in Figure 15), 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.⁹⁰

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.⁹¹ Others place the start of the bubble in 2001-2002, when the Federal Reserve lowered short-term interest rates significantly.⁹²

We believe the actual bubble was much shorter: it began in 2004 (or possibly 2003) and burst in 2006. Economists define an asset bubble as when asset prices, driven by expectations of future prices, exceed the asset's fundamental value.⁹³ At what point did housing prices depart from fundamentals?

⁹⁰ 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.").

⁹¹ See, e.g., Edward Pinto, *Acorn and the Housing Bubble*, WALL ST. J., Nov. 12, 1999 ("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).

⁹² 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).

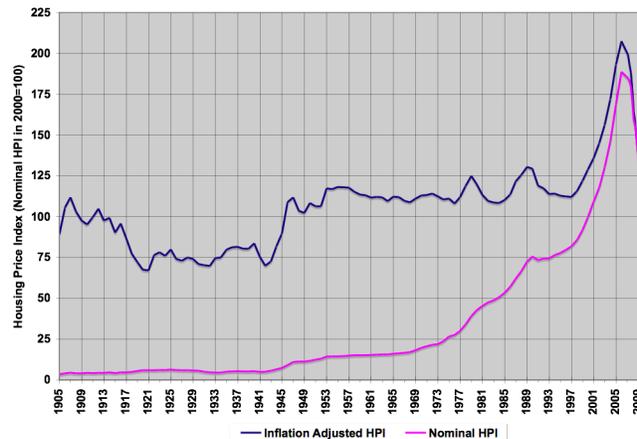
⁹³ Joseph E. Stiglitz, *Symposium on Bubbles*, 4 J. ECON. PERSPECTIVES 13 (1990) ("[I]f the reason that the price is high today is only because investors believe that the selling price is high tomorrow—when "fundamental" factors do not seem to justify such a price—then a bubble exists. At least in the 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

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 16, rather than the nominal housing prices shown in Figure 1. Figure 16 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.

Figure 16. U.S. Nominal and Inflation-Adjusted Housing Price Indexes⁹⁴



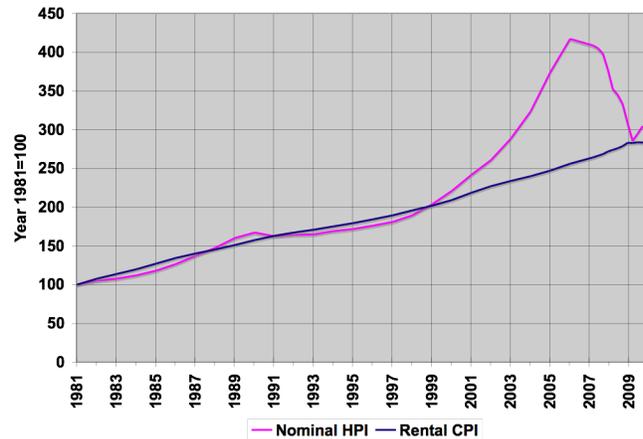
Housing prices also kept pace with rental prices during the period from 1997-2000, as Figure 17 shows. The rate of appreciation of both housing and rental costs remained basically identical, as they had since at least 1981, when the Bureau of Labor Statistics began to compile

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.

⁹⁴ 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.

a rental price index. This indicates that into 2000, housing prices were not straying from fundamental values.

Figure 17. Nominal US Housing Price Index and Rental Consumer Price Index⁹⁵



2. 2001-2003

Starting in 2000, housing prices began to appreciate at a much faster rate than rental prices, as Figure 17, 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. (See Figure 5, above.) 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 homeownership is heavily dependent upon interest rates.⁹⁶ With low mortgage interest rates during this period, the cost of homeownership fell, while the cost of renting did not. Accordingly, it follows that housing prices would rise faster than rental prices. Indeed, real estate economists Charles Himmelberg, Chris Mayer and Todd Sinai have shown 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.⁹⁷

⁹⁵ S&P/Case-Shiller Housing Price Index (HPI); Bureau of Labor Statistics, Rent of Primary Residence (Rental CPI).

⁹⁶ 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.*

⁹⁷ Himmelberg *et al.*, *supra* note 80, 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.

3. 2004-2006

From 2004 onwards, real estate fundamentals did not support any further price increases, as interest rates were rising, thereby reducing the attractiveness of homeownership relative to renting, yet these increases occurred. Corresponding with this, Figure 14, above, shows PLS spreads diverging downward from corporate bond spreads as of late 2004, while Figures 3 and 4 show 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.⁹⁸

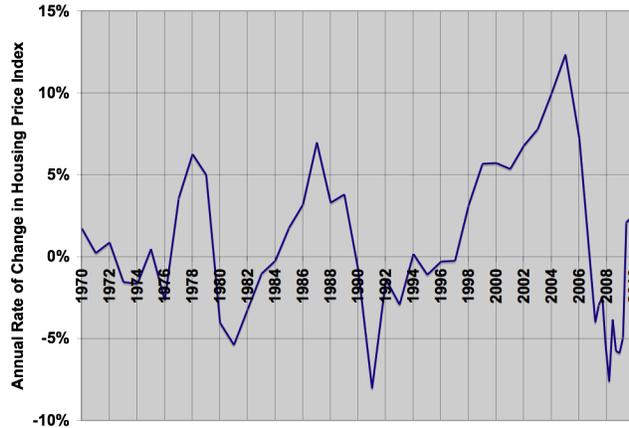
The annual rate of change in inflation-adjusted housing prices, displayed in Figure 18, also shows that 2003-2004 was an inflection point. While the rate of housing price appreciation jumps positive starting in 1997, it stayed steady at around 6% until 2001. In the recent historical context, this level of annual appreciation was unremarkable; it has occurred twice since 1970 and nine other times in the 20th century.

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.

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.

⁹⁸ See Andrey Pavlov & Susan M. Wachter, *Subprime Lending and Real Estate Prices*, 39 R.E. ECON. (forthcoming 2010).

Figure 18. Annual Rate of Change in U.S. Inflation-Adjusted Housing Price Index, 1970-2010⁹⁹



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 current market prices, it has returned not to 1997 levels or even 2000 levels, but to 2003 levels. (See Figure 16, 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.¹⁰⁰ 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

⁹⁹ Robert J. Shiller, *irrational exuberance.com*, <http://www.econ.yale.edu/~shiller/data/fig2-1.xls>, and authors' calculations.

¹⁰⁰ Glaeser *et al.*, *supra* note 4.

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.¹⁰¹

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.

2. Consumers' Inability to Anticipate Inflation

An alternative psychological theory has been presented by Markus Brunnermeier and Christian Julliard.¹⁰² 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

¹⁰¹ SHILLER, *SUPRA* note 10. See also Glaeser *et al.*, *supra* note 4 (concluding that Shiller's explanation is the most convincing); Ernan Haruvy *et al.*, *Traders' Expectations in Asset Markets: 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.").

¹⁰² Brunnermeier & Julliard, *supra* note 11.

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.

Brunnermeir 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.

3. *Inelastic Housing Supply*

A third 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.¹⁰³ There was considerable regional and local variance; some metropolitan areas, such as Detroit and Cleveland, did not experience a bubble, while others experienced bubbles of greater or lesser size.

Glaeser, Gyourko and Saiz explain the variation 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.

Glaeser, Gyourko and Saiz do not present supply constraints as the explanation for the bubble, although others do.¹⁰⁴ 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.¹⁰⁵ It is notable, though, that the bubble was

¹⁰³ 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](http://www.economics.harvard.edu/faculty/glaeser/files/bubbles10-jgedits-NBER-version-July%2016%202008.pdf).

¹⁰⁴ Randall O'Toole, *How Urban Planners Cause the Housing Bubble*, Cato Institute Policy Analysis No. 646, Oct. 1, 2009.

¹⁰⁵ GLAESER & GYOURKO, *SUPRA* note 24, at 3, 124 (noting that home mortgage interest tax deduction pushes up housing prices in supply constrained markets).

the most extreme in highly supply elastic markets like Phoenix and Las Vegas.¹⁰⁶

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.¹⁰⁷ 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,¹⁰⁸ but because of the role of the CRA is such a politically charged issue, it is worthwhile presenting the evidence in a concise fashion.

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.”¹⁰⁹ The CRA does not require covered financial institutions to make loans. Rather, covered

¹⁰⁶ Davidoff, *supra* note 4, 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).

¹⁰⁷ See *supra* note 7.

¹⁰⁸ 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).

¹⁰⁹ Michael S. Barr, *Credit Where It Counts: The Community Reinvestment Act and Its Critics*, 80 N.Y.U. L. REV. 513 (2006).

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 then 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.¹¹⁰ CRA evaluation methods have remained constant since 1995.¹¹¹

There is little evidence that the CRA contributed directly to the bubble. CRA subject institutions made a disproportionately small share of subprime mortgage loans.¹¹² 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.¹¹³ 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 timing is wrong. 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 1995.¹¹⁴

¹¹⁰ 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).

¹¹¹ Fed Staff Analysis, *supra* note 108 at 2.

¹¹² 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.

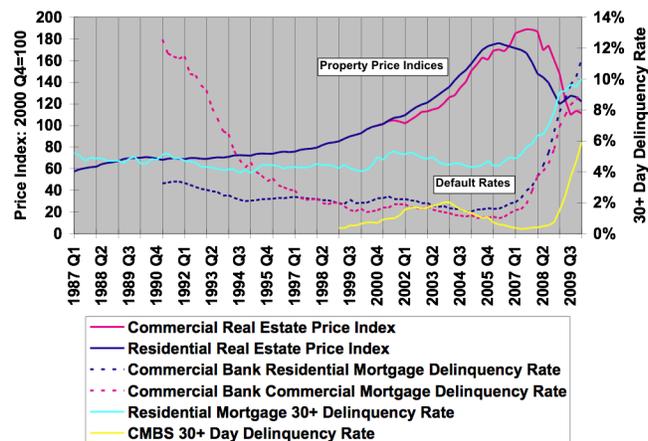
CRA-subject institutions made only a small percentage of HOEPA loans during the 2004-2006 period. Avery, *et al.*, *supra* note 112. While depositories made over 40% of loans, they made less than 30% of HOEPA loans. *Id.* When their subsidiaries and affiliates are included, market share of all loans 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.*

¹¹³ Avery, *et al.*, *supra* note 112. 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 108, at 7.

¹¹⁴ 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.

Second, the residential housing bubble was mirrored almost exactly by a commercial real estate bubble (see Figure 19, 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 imprudent lending is not tenable.¹¹⁵

Figure 19. Commercial and Residential Real Estate Bubbles and Defaults¹¹⁶



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.¹¹⁷ Thus, Edward Pinto, has claimed

¹¹⁵ 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.

¹¹⁶ 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).

¹¹⁷ 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.

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.”¹¹⁸

The GSEs have been subject to affordable housing goals since 1993.¹¹⁹ These goals, set by the Department of Housing and Urban Development, are designed “to facilitate credit access and homeownership among lower-income and minority households.”¹²⁰ 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.¹²¹ 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).¹²² The goals are measured as the ratio of qualifying mortgages financed to total mortgages financed. High-priced “HOEPA” mortgages¹²³ 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.¹²⁴

As Figure 20 shows, the GSE affordable housing goals were raised in 1997, 2001, and 2005. The GSEs have generally met the goals.¹²⁵ In order to do so, the GSEs increased their proportion of loans made to target populations,¹²⁶ and expanded their underwriting criteria to

¹¹⁸ Pinto, *Acorn and the Housing Bubble*, *supra* note 7.

¹¹⁹ 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).

¹²⁰ 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);

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

¹²² 12 U.S.C. §§ 4562-65.

¹²³ 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).

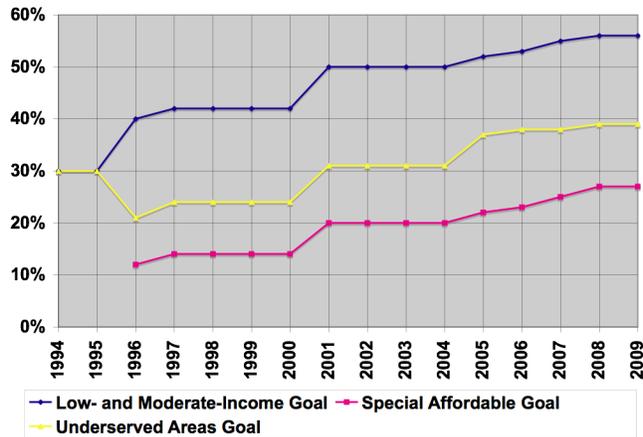
¹²⁴ 24 C.F.R. §§ 81.16(b)(8), 81.16(b)(12), 81.2 (defining “HOEPA mortgage” and “unacceptable terms”).

¹²⁵ U.S. Dept. of Housing and Urban Development, *Overview of the GSEs’ Housing Goal Performance, 1996-2003* (2005).

¹²⁶ 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*

enable the purchase of riskier loans.¹²⁷ Yet there is little evidence that the GSE affordable housing goals increased the total amount of credit available to underserved communities.¹²⁸

Figure 20. GSE Affordable Housing Goals



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.¹²⁹ 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.¹³⁰ 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

Fannie Mae and Freddie Mac, 1996-97 Update, U.S. Dept. of Housing and Urban Development, Housing Finance Working Paper Series HF-006 (1998).

¹²⁷ 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. Wily, *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).

¹²⁸ 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, EDs.) (2009) (finding "essentially no evidence" that GSE affordable housing goals increase lending or homeownership); An & Bostic, *supra* note 127; An & Bostic, *supra* note 120, 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).

¹²⁹ An & Bostic, *supra* note 120, at 207-208.

¹³⁰ 24 C.F.R. § 81.16(c)(2).

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.¹³¹ This means that other investors were more than substituting for GSE demand of PLS.¹³²

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. 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 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,¹³³ and they paid dearly for it.¹³⁴ The

¹³¹ 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.

¹³² 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.

¹³³ Federal Housing Finance Agency, *supra* note 159.

¹³⁴ 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

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.¹³⁵ 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.

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 informational failures that existed irrespective of the role of affordable housing goals.¹³⁶

2. Monetary Policy

Macroeconomist John B. Taylor, the inventor of the eponymous Taylor Rule for setting monetary policy,¹³⁷ has argued that the housing bubble was the inevitable consequence of mishandled monetary policy.¹³⁸ 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.¹³⁹ Taylor's counterfactual regressions suggest that housing prices would have been far less inflated if the Fed had adhered more closely to

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.

¹³⁵ 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.

¹³⁶ 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.

¹³⁷ John B. Taylor, *Discretion Versus Policy Rules in Practice*, 39 CARNEGIE-ROCHESTER CONFERENCE SERIES ON PUBLIC POL'Y 195 (1993).

¹³⁸ 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 WORSENE THE FINANCIAL CRISIS* (2009).

¹³⁹ *Id.* See also Pavlov & Wachter, *supra* note 98 (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).

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, interest rates only have a weak affect on housing prices.¹⁴⁰ 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.¹⁴¹ 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%, 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 2005.¹⁴² (See Figure 21, below).

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.¹⁴³ A one percent decline in the long-term rate results in roughly an eight percent increase in housing prices.¹⁴⁴ 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 only a 26% increase in housing prices, not the 38% increase that occurred during that time period, much less the further 52% price increase that occurred once long-term rates started to rise (to 4.99% at the peak o the bubble).

¹⁴⁰ Glaeser *et al. supra* note 4, 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 Luftballons: Monetary Policy and the House Price Boom across U.S.*, 4 J. MONETARY ECON. 1962 (2007).

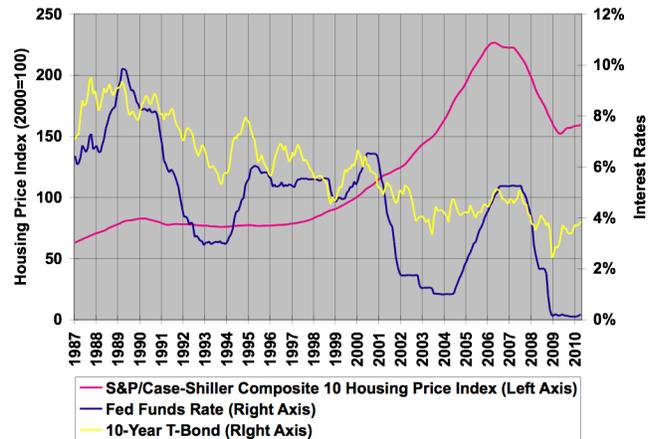
¹⁴¹ Bernanke, *supra* note 21; Greenspan, *supra* note 48, at 38-40. Bernanke also contests Taylor's counterfactual regressions and argues that the Fed actually adhered closely to the Taylor rule as it should be applied, accounting for anticipated, rather than actual inflation. Bernanke, *supra* note 21.

¹⁴² 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.

¹⁴³ 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.

¹⁴⁴ *Id.*

Figure 21. Housing Prices (Nominal) and Interest Rates



Third, and related, monetary policy doesn't explain why lenders mispriced risk. 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. And given that most of the mortgages in the bubble were ARMs, the risk-free rate was ultimately irrelevant. Why would yield spreads (the risk premium) drop even when risk was rising?

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 which did not.¹⁴⁵ Countries like Canada, with very similar monetary policy to the U.S. did not have bubbles,¹⁴⁶ while countries like Spain that attempted counter-cyclical “dynamic provisioning” of capital had even worse bubbles.¹⁴⁷

¹⁴⁵ Bernanke, *supra* note 21.

¹⁴⁶ Adam J. Levitin *et al.*, *North Star: Lessons for the U.S. from the Canadian Housing Finance System*, working paper, 2010.

¹⁴⁷ 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 and others did not).

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.

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.¹⁴⁸ A number of studies have pointed to securitization as being critical to the relaxation of credit terms and emphasize the principal-agent problem inherent in securitization.¹⁴⁹ 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.

Our supply-side theory extends the latent relaxation of underwriting standards argument into a patent formal explanation of the housing bubble. It does so by connecting the relaxation of underwriting standards to the change in mortgage products, 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. 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

¹⁴⁸ See Khandani *et al.*, *supra* note 9; Favilukis *et al.*, *supra* note 9.

¹⁴⁹ See Keys *et al.*, *supra* note 9; Mian & Sufi, *supra* note 9; Mian *et al.*, *supra* note 9.

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. 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.

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

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 Society 2004 North American 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).

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 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

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).

¹⁵² Intentional falsification of information in disclosures would violate the securities laws, but the Private Securities Litigation Reform Act of 1996 makes it very difficult for investors to bring suit over such a problem. Investors would have to plead fraud with specific factual allegations, but it would be hard for investors to obtain such facts absent discovery, which they could only get if their pleading were sufficient. PLS trustees could, in theory, bring suit, and they would have greater access to information, but PLS trustees have no incentive to bring suit, and without the ability to plead specific facts, it is unlikely that PLS investors could force the trustee to bring suit. Tort reform has thus created a Catch-22 for PLS investors.

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, 2011, yield spread premiums will be illegal under Regulation Z. [Fed. Reg. cite to be provided when available], *to be codified*

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 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.

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.¹⁵⁷ 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.*"¹⁵⁸ The fee-based business model of private-label securitization encouraged greater supply of mortgage credit

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.

¹⁵⁷ Todd Davenport, *What's Behind Wall Street Players' Mortgage Deals*, AM. BANKER, Aug. 14, 2006.

¹⁵⁸ *Id.* (quoting John Kriz of Moody's) (emphasis added).

in order to generate mortgages for securitization to generate fee income for financial institution intermediaries.

Financial institutions play 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 GSE and Ginnie Mae 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.¹⁵⁹

The combination of information asymmetries on both sides of the housing finance market meant that borrowers were mispricing risk and entering into overly leveraged purchases, 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 inflating 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.¹⁶⁰ 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:

¹⁵⁹ See Federal Housing Finance Agency, *Conservator's Report on the Enterprises' Financial Performance, Second Quarter 2010*, Aug. 26, 2010, at 6, 12.

¹⁶⁰ See Stephen Ross, *The Arbitrage Theory of Capital Asset Pricing*, 13 J. ECON. THEORY 341 (1976).

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.

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.¹⁶¹ There are three major credit rating agencies, and most PLS were rated by at least one, if not two agencies.

Approximately 90 percent of PLS bore AAA-ratings, meaning that the risk of default or loss was negligible.¹⁶² Investors in the AAA-rated securities market do not appear to have been informationally sensitive.¹⁶³ 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.¹⁶⁴ 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.¹⁶⁵ 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

¹⁶¹ 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."

¹⁶² Adelino, *supra* note 58, at 31.

¹⁶³ *Id.* 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.

¹⁶⁴ Adelino, *supra* note 58, at 22.

¹⁶⁵ *Id.* at 14-15, 43.

in any particular rating, beyond its long-term reputational effect.¹⁶⁶ 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, might have been different. The rating agencies became highly dependent on revenue from structured financing ratings, which commanded premium prices; by 2007, structured products like PLS accounted for 40% of their revenue and 50% of their ratings revenue.¹⁶⁷ 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.¹⁶⁸ 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.¹⁶⁹

The rating agencies' problems went beyond misaligned incentives. The ratings agencies' historical strength has been rating corporate bonds, which are largely homogeneous products for which the ratings agencies have time-tested models going back over a century. PLS, however, lacked multi-cycle experience and are heterogeneous products; no two deals are alike. The underlying collateral, borrower strength, and credit enhancements vary across deals. The novelty, heterogeneity, and complexity of structured finance products made ratings much more speculative.

Moreover, the ratings agencies' models did not seem to adequately account for the possibility of a national housing price

¹⁶⁶ 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).

¹⁶⁷ Gretchen Morgenson, *Debt Watchdogs: Tamed or Caught Napping?* N.Y. TIMES, Dec. 7, 2008, at A1.

¹⁶⁸ 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).

¹⁶⁹ Patrick Bolton, et al., *The Credit Ratings Game* 15 (SSRN, Working Paper No. 1342986, 2009), available at <http://www.research.net/bitstream/2072/14564/1/1149.pdf>.

decline.¹⁷⁰ The ratings agencies, just like investors, were not in a position to carefully analyze the underlying collateral of the PLS to identify the probability of default or price fluctuation.¹⁷¹ A basic assumption of the rating agencies was that housing prices adequately represented fundamentals. This is implicit in the use of appraised values of collateral, which are based on comparable properties. This assumption made it unnecessary for rating agencies to evaluate the market-specific pricing risk of deviation from fundamentals that directly determines default risk.

Furthermore, rating agencies had no capacity to undertake such analysis. The ratings agencies received pool-level rather than loan-level information.¹⁷² Therefore, the rating agencies, just like investors, often lacked sufficient information to adequately assess the default risk on the mortgages. PLS prospectuses disclosed information about the underlying collateral—percentage make-ups, weighted averages, and ranges for items such as loan balances, loan-to-value ratios, FICO scores, loan interest rates, state-by-state location, fixed vs. adjustable rate structures, property types, loan purpose, amortization type, lien priority, completeness of loan documentation, term to maturity, presence of prepayment penalties, etc.¹⁷³ The information disclosed, however, is aggregate data, not individual loan data. The data disclosed are not verified by an independent source, and do not include all material information for investors. While a great deal of information was being disclosed, rating agencies and PLS investors invariably knew less about the mortgage loan collateral backing the PLS than the financial institutions that originated the mortgages and sponsored the securitizations. Originators and securitization sponsors were able to exploit this informational asymmetry to sell more PLS at higher prices than they would otherwise have been able to do.

PLS heterogeneity and complexity also enabled issuers to “shop” for ratings. As economists Vasiliki Skreta and Laura Veldkamp have argued, increased complexity in products makes ratings more variable between agencies, which encourages issuers to shop for the most

¹⁷⁰ See, e.g., Gary Shorter & Michael V. Seitzinger, *Credit Rating Agencies and Their Regulation*, Cong. Research Service, Sept. 3, 2009 at 5, 11.

¹⁷¹ GRANT, *SUPRA* note 155, at 183.

¹⁷² LEWIS, *SUPRA* note 90, at 170. We have been told by others, but unable to verify, that the rating agencies did in fact receive loan-level data on RMBS, as they did on CMBS, where presale reports contain detailed discussions of individual underlying collateral properties. If so, then our case on information failures being driven by heterogeneity and complexity is even stronger.

¹⁷³ See, e.g., Prospectus Supplement dated August 23, 2005 (to Prospectus dated June 23, 2005), Ace Securities Corp. Home Equity Loan Trust, Series 2005-HE5, S-21-S-33, at <http://www.secinfo.com/dScj2.z5Tk.htm-1kbi>.

favorable rating.¹⁷⁴ The ratings agencies also made their models available to investment banks, which designed their products to game the ratings models.¹⁷⁵

The ratings agencies' models for structured products proved inadequate. Thus, even if incentive alignment had been better, the rating agencies still would likely have failed in their PLS ratings.

2. Subordinated Debt Investors and CDOs: Residential Real Estate

Not all investors purchased based entirely off of ratings given by rating agencies. Some were more sophisticated. They understood a principle widely accepted in securities markets: ratings are but a veil; markets in fact do price securities very differently from ratings.¹⁷⁶ If anything, ratings respond to market conditions as opposed to revealing market risk. Ratings downgrades are frequently reactive, not predictive.

Some investors not only did not rely on the ratings, but they recognized the risks in PLS despite (or perhaps because of) PLS's complexity.¹⁷⁷ Why didn't the risk premium demanded by these investors or short pressure cause a price correction? If the PLS investors believed that the underlying real estate was overpriced, they would have demanded a risk premium in the form of higher yields on the PLS. In order to support the higher yields, PLS issuances would have to contain higher yielding mortgages, meaning mortgages with higher interest rates.¹⁷⁸ 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 thus should provide a natural limitation on risk, and restore correct asset prices according to the fundamental theorem of asset pricing.

Subordinated debt investors tend to be more circumspect about credit risk precisely because they are the most exposed to it by virtue of their subordination. Even with creative deal structuring, not all PLS tranches received AAA-ratings. The lower-rated, junior tranches had higher yields than the senior AAA-rated tranches, but even with these higher yields, it was not always easy for underwriters to place the junior tranches with investors. Economist Manuel Adelino has found that

¹⁷⁴ Vasiliki Skreta & Laura L. Veldkamp, *Ratings Shopping and Asset Complexity* (SSRN Working Paper No. 1295503, 2009).

¹⁷⁵ Gretchen Morgenson & Louise Story, *Rating Agency Data Aided Wall Street in Deals*, N.Y. TIMES, April 23, 2010, at A1.

¹⁷⁶ GRANT, *SUPRA* note 155, at 181-83.

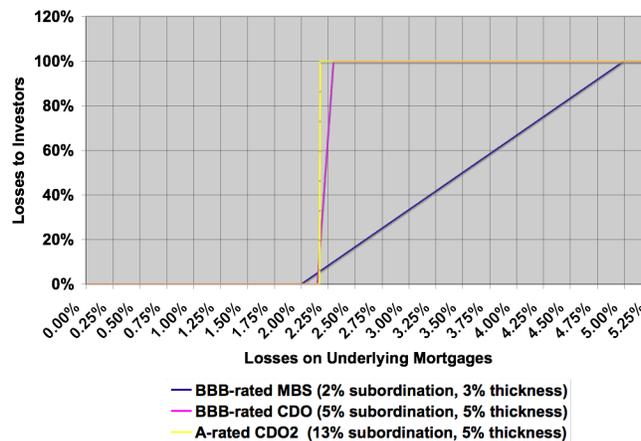
¹⁷⁷ See generally LEWIS, *SUPRA* note 90.

¹⁷⁸ 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.

buyers of subordinated PLS often demanded a premium for investing in riskier deals.¹⁷⁹ Subordinated debt investors' risk tolerance should have thus provided a limit on the expansion of PLS; if the junior tranches of PLS became too risky, investors simply would not buy them.

The expansion of the collateralized debt obligation (CDO) market largely (or at least temporarily) bypassed the risk limitation on PLS provided by subordinated debt investors.¹⁸⁰ 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. The junior tranches of the CDOs could then be resecuritized again as CDO²s, and so on, again turning high-yield dross into investment-grade gold. By 2005, most subprime PLS were being resecuritized into CDOs.¹⁸¹ Resecuritization enabled investors to take on additional leverage, which meant that investors in resecuritizations were much more exposed to mortgage defaults than investors in MBS.¹⁸² (See Figure 22.)

Figure 22. Stylized Correlation Risk for Resecuritizations¹⁸³



¹⁷⁹ Adelino, *supra* note 58, at 27.

¹⁸⁰ Mark H. Adelson & David P. Jacob, *The Subprime Problem: Causes and Lessons*, 14 J. OF STRUCTURED FIN., 12, 12 (2008).

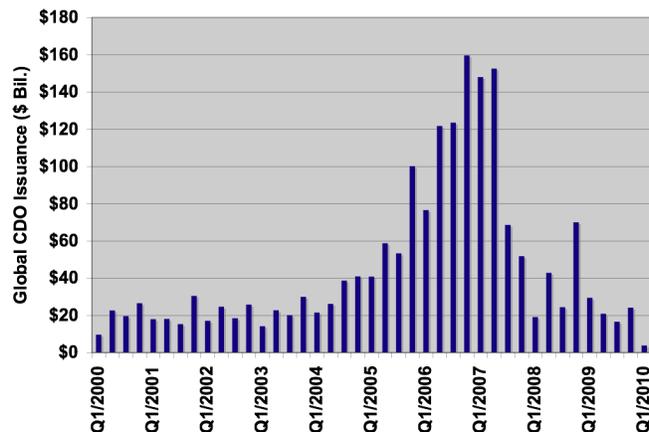
¹⁸¹ Anna Katherina Barnett-Hart, *The Story of the CDO Market Meltdown: An Empirical Analysis* 10-11 (Mar. 19, 2009) (unpublished B.A. thesis, Harvard College), available at <http://www.hks.harvard.edu/m-rcbg/students/dunlop/2009-CDOMeltdown.pdf>.

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

¹⁸³ Authors' calculations. Assumes CDO2 tranche of 5% thickness with 13% subordination support comprised of perfectly correlated CDO tranches of 5% thickness with 5% subordination support, themselves comprised of perfectly correlated MBS tranches of 3% thickness with 2% subordination support.

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 23.) The expansion of the CDO market occurred just when subordinated debt investors would have begun to demand larger risk premiums and market appetite for direct investment in junior PLS tranches would have reached its limit. But, as noted in Figures 12, 13 and 14, spreads were falling on PLS, and PLS issuance was expanding.¹⁸⁴ This was possible only because CDOs thus enabled the PLS market to bypass the constraint of subordinated debt investors' limited risk appetite.¹⁸⁵ CDOs likely lengthened the housing bubble by at least a third, making the decline all the more painful.

Figure 23. Growth of Collateralized Debt Obligations¹⁸⁶



Many CDOs contained synthetic assets, particularly credit default swaps—credit insurance contracts, frequently written on PLS. CDOs were generally insurance *sellers*, not buyers, in CDS, meaning that they received regular premia until an insurable event occurred. For hybrid cash-synthetic CDOs, selling CDS protection provided a regular income stream that enabled the purchase of more PLS to supplement the CDS.¹⁸⁷ This business model only worked as long as the CDOs' outflows from having to pay on CDS on defaulted PLS did not outpace the inflows of premia on other CDS. Once mortgage defaults rose too

¹⁸⁴ 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.

¹⁸⁵ See generally LEWIS, *SUPRA* note 90, 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.”).

¹⁸⁶ Asset Backed Alert.

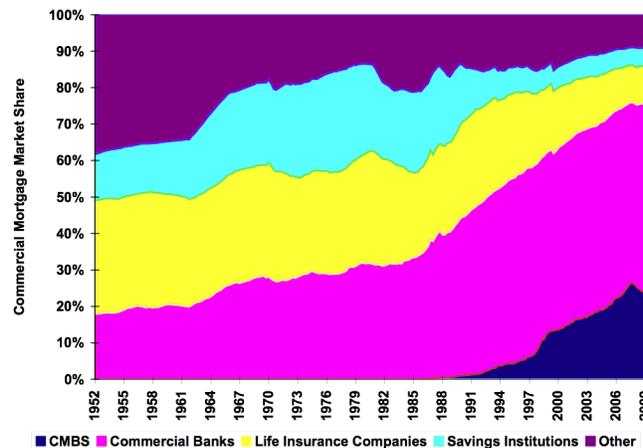
¹⁸⁷ See LEWIS, *SUPRA* note 90, at 143.

fast, however, CDOs were no longer capable of providing the funding for the subordinated PLS tranches, and the whole structure collapsed.

3. Subordinated Debt Investors and CDOs: Commercial Real Estate

The expansion of the CDO market also explains the commercial mortgage bubble that closely paralleled the residential mortgage bubble. (See Figure 19, above.) Commercial real estate (CRE) mortgages are securitized at a much lower rate than residential mortgages (see Figure 24, below), but commercial mortgage-backed securities (CMBS) are entirely a private-label market; there are no GSEs or government agencies involved in the CRE market. Why, then, didn't a CRE bubble develop with the advent of CMBS in the early 1990s?

Figure 24. Commercial Mortgage Market Share¹⁸⁸



The answer relates to the unique structure of CMBS. Historically, CMBS were much more focused on credit risk than RMBS structures because CMBS are prone to idiosyncratic default risk—the risk of major loss because of a small number of loan defaults.¹⁸⁹ In contrast to RMBS, CMBS pools feature small numbers of loans with large balances. Whereas an RMBS issuance will be backed by a pool of thousands of properties, a CMBS pool will be backed by dozens or

¹⁸⁸ Federal Reserve Statistical Release Z.1, Table L. 220.

¹⁸⁹ Trepp for CMBS, Pricing, at http://www.trepp.com/temp1_a.cgi?whichTrepp=m&cmbs_product=pricing (“In the RMBS universe, credit concerns are dwarfed by interest rate risk considerations. In the CMBS universe, however, the opposite is true. Credit risk dominates the analytical process in CMBS as interest rate sensitivity, while still relevant, is of secondary concern.”). RMBS investors have historically been more focused on interest rate risk, which is a much smaller concern for CMBS investors. CMBS have little prepayment risk because most CRE loans have prepayment penalties, yield maintenance, or defeasance provisions that make refinancing impractical. Instead, their prepayment characteristics are similar to corporate bonds. See FRANK J. FABOZZI, *FIXED INCOME ANALYSIS*, (2007).

hundreds or sometimes even a single property.¹⁹⁰ Therefore, in a CMBS pool, the relative importance of any particular property's performance is much greater than in an RMBS pool, where idiosyncratic default risk is largely eliminated through diversification.

CMBS's concern about credit risk has resulted in a very different deal structure than in RMBS. A CMBS deal is divided into two parts, an "A-piece" and a "B-piece." The A-piece consists of the investment-grade tranches, whereas the B-piece consists of the subordinated, non-investment-grade tranches. Because credit risk is concentrated on the B-piece, CMBS deals provide special rights and protections to B-piece investors, beginning in the origination process.¹⁹¹

After a pool of commercial real estate mortgages is created, the CMBS deal sponsor presents the pool to rating agencies in order to get a sense of what the rating will be given particular structures and credit enhancements.¹⁹² Next the pool is presented for bidding to B-piece investors.¹⁹³ The winning bidder gets to perform additional diligence on the pool.¹⁹⁴ As the result of the diligence, the B-piece investor will sometime insist on "kickouts"—the removal of particular loans from the pool.¹⁹⁵ Once negotiations with the B-piece investor are finalized, the deal is presented to the rating agencies for rating, and once the bonds are rated, the prospectus for the investment grade (A-piece) is circulated to investors.¹⁹⁶

Before 2004, there were only a small number of B-piece investors. This meant that they could exert significant market power and insist on kickouts for any properties with which they were uncomfortable. Kickouts are expensive for CMBS deal sponsors, which are typically investment banks that are borrowing money on warehouse lines from commercial banks to finance the purchase of CRE loans that they are pooling for securitization. If a property is kicked out of deal, the deal sponsor will have to continue to hold that property itself, which means the sponsor is left financing a lemon. The risk of kickouts, thus led CMBS deal sponsors to be careful in their selection of properties for

¹⁹⁰ The median (mean) number of properties in a US-denominated CMBS deal with US collateral is 99 (130), and the median (mean) number of loans of is 53(119) with median (mean) loan size of \$6.62 million (\$6.19 million). Commercial Mortgage Alert CMBS database, authors' calculations. The typical US residential mortgage loan is for about \$200,000.

¹⁹¹ See Larry Cordell & Adam J. Levitin, *What RMBS Servicing Can Learn from CMBS Servicing*, working paper, July 2010, at <http://ssrn.com/abstract=1640326>.

¹⁹² CW Capital Investments, *The Evolution of the CMBS Market*, Powerpoint Slides for a presentation at the CRE Annual Convention, Maui Hawaii, October 23-26, 2006, slide 11, at http://www.cre.org/images/events/hawaii_06/presentations/hawaii_06_silva.ppt.

¹⁹³ *Id.*

¹⁹⁴ *Id.*

¹⁹⁵ *Id.*

¹⁹⁶ *Id.*

pools, which meant that riskier CRE ventures did not get securitized. Because riskier ventures were consigned to balance sheet lending, underwriting standards retained discipline. The strength of subordinate lenders in the CMBS market served to keep underwriting standards in check.¹⁹⁷

This market equilibrium changed in 2004, as the B-piece market dramatically expanded.¹⁹⁸ As a real estate investment trust (REIT) noted in a 2004 letter to investors:

The flurry of new entrants and the emergence of improved CDO technology have dramatically changed the dynamics of B-Piece acquisition. The norm for a B-Piece investor has changed from a buy-and-hold mentality to a CDO warehouse mentality. Many B-Piece investors are aggressively pursuing product with the intent of aggregating it for resale in the form of a CDO. This factor has changed the focus on subordination levels, credit quality, and required yields from appropriate long-term risk-return balancing from a real estate perspective to that of short-term stability until CDO execution. Between the high CDO proceeds (and don't forget who is buying those bonds) and the fees from special servicing and asset management, the B-Piece investors have very low basis in their interests—no investment at risk.¹⁹⁹

The result of the expansion of the B-piece market was tremendous liquidity in CRE lending. This led to a deterioration in underwriting standards, as CRE loan originators became agents for securitization conduits, eager to increase volume and without “skin-in-the-game.” Thus, the same REIT letter to investors observed that by 2004:

“Competition among lenders [in the commercial real estate market] is so fierce that borrowers can dictate terms that fly in the face of accepted credit standards. High loan proceeds, low debt service coverage requirements, aggressive property valuations, limited or

¹⁹⁷ See Nomura Fixed Income Research, *The Evolution of Commercial Real Estate (CRE) CDOs*, Jan. 4, 2006, at http://www.securitization.net/pdf/Nomura/CRE-CDO_4Jan06.pdf (“Subordinate lenders often exercise great influence on the fortune of troubled CRE loans, and the involvement of commercial real estate experts also benefits other CDO investors.”).

¹⁹⁸ *Id.*

¹⁹⁹ ARCap, REIT, Inc. *An Open Letter to Investment Grade Investors: Buyer Beware*, 2 The B-Piece 1 (Oct. 2004), at <http://www.centerline.com/news/Newsletters/Vol2No3.pdf>.

no reserve requirements, substantial interest-only periods and other similarly aggressive loan terms are increasingly prevalent in conduit transactions. Combined with the non-recourse nature of conduit lending, these terms make it possible for a borrower to purchase and finance a property with little or no equity, strip cash flow for an extended period of time while the property performs, and then “put” the property back to the CMBS trust if the property fails to perform. Between the high loan proceeds and the immediate cash flow, borrowers often have absolute no equity in a property—no investment at risk.²⁰⁰

Structured finance attorneys Stuart Goldstein and Angus Duncan also observed the same phenomenon:

As competition for commercial real estate product has grown, firms have found themselves chasing loans in the US that did not neatly fit into the CMBS ‘box.’ We have seen the emergence of mezzanine loans, B notes, B participations and preferred equity as means of offering mortgage loan borrowers increased leverage. Originators of this collateral and investors in the B pieces of conduit securitizations wanted to be able to securitise this product, but the rules relating to CMBS would not permit it.²⁰¹

CDOs offered the solution for securitizing nontraditional CRE collateral. As Jonathan Shlis has noted:

Prior to 2004/2005, CRE CDOs were terra incognita – and deservedly so – to most commercial real estate borrowers. Before those dates, CRE CDOs almost always were comprised solely of REIT debt, and, importantly, unrated and below-investment-grade rated CMBS tranches known as first loss pieces (“B-Piece”), providing long term financing to B-Piece buyers, thereby adding liquidity and providing a degree of risk sharing to the CMBS process. But in 2004, B-Notes [subordinated mortgage notes], mezzanine loans [loans made to LLC development companies that own the equity in real

²⁰⁰ *Id.*

²⁰¹ Stuart Goldstein & Angus Duncan, *The Developing Global Market for CRE CDOs*, ISR CDO SUPPLEMENT, March 2007, www.isr-e.com, at <http://www.cadwalader.com/assets/article/030107DuncanGoldsteinISR.pdf>.

estate developments], credit tenant leases, loans and debt-like preferred equity were included with B-Pieces and REIT debt in CRE CDOs. And then in 2005, first mortgage commercial real estate loans – “whole loans” – started becoming collateral assets in CRE CDOs [meaning that whole loans were going directly into CDOs, rather than into CMBS.²⁰²

CRE CDOs had existed since 1999,²⁰³ but they were originally created to provide “long-term, non-mark-to-market financing for CMBS B-piece buyers.”²⁰⁴ The first CRE CDOs were liquidity provision mechanisms for B-piece buyers, not a source of market demand for CRE assets in their own right.

By 2004, however, the CRE CDO market had begun to change and with it the leverage that traditional B-piece buyers had over quality of CMBS underwriting declined. As the CRE CDO market expanded, a new class of B-piece buyers emerged. These new buyers were primarily conduit buyers, looking to repackage the B-pieces they purchased into CRE CDOs. As intermediaries, rather than end-investors, these new B-piece buyers were not particularly concerned about credit risk and lacked the long-standing CRE experience of traditional B-piece buyers. Not surprisingly, underwriting standards deteriorated.

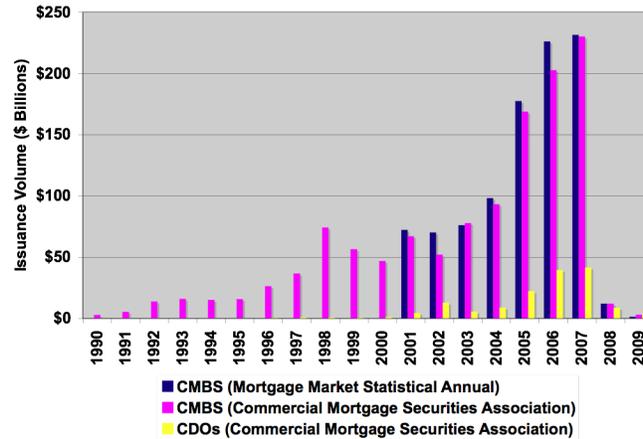
Because it was now much easier for CMBS sponsors to sell the B-piece of deals, CMBS volume boomed along with CRE CDO volume. (See Figure 25, below.) CRE CDOs nearly tripled in volume from 2004 to 2005 and CRE CDO volume was nearly a fifth of the total CMBS market. Moreover, existing CRE CDOs and CDO²s were also resecured, creating an investment cocktail with unique “complexity and high leverage.”²⁰⁵

²⁰² Jonathan Shils, *Managed CRE CDO v. CMBS: Is One Better For A Borrower?*, at http://files.ali-aba.org/thumbs/datastorage/skoob/articles/TAB16-Shils_thumb.pdf.

²⁰³ Nomura Fixed Income Research, *The Evolution of Commercial Real Estate (CRE) CDOs*, Jan. 4, 2006, at http://www.securitization.net/pdf/Nomura/CRE-CDO_4Jan06.pdf.

²⁰⁴ *Id.* (“Since the early days, the primary motivation of CRE CDOs has been the financing needs of B-piece buyers and special servicers, who have extensive experience in the commercial real estate market.”).

²⁰⁵ *Id.*

Figure 25. CMBS and CRE CDO Issuance Volume²⁰⁶

The development of the “new breed of CRE CDOs” created “added complexity in analyzing exposures to the commercial real estate sector that involve multiple layers of pooling and tranching.”²⁰⁷ Accordingly, Nomura Fixed Income Research observed in 2006, that “Unfortunately, it is not clear at present if the rating agencies and market participants fully appreciate the implications of structural characteristics in different CRE assets [CRE, CMBS, CRE CDOs, and CRE CDO²s].”²⁰⁸

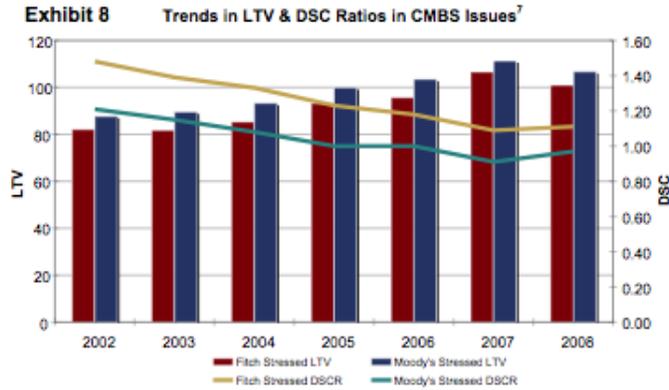
As with RMBS, CMBS underwriting standards declined noticeably from 2004-2007. While nominal LTV ratios were steady and debt service coverage ratios (DSCR) increased, these were reflecting a booming economy and rapidly appreciating real estate prices. Stressed LTV ratios (the anticipated LTV in a stressed market) actually increased and stressed debt service coverage ratios fell. (Figure 26.) Thus difference between the underwritten LTV and the LTV in a stressed real estate market (Moody’s Stressed LTV) soared. (Figure 27.) Yet, even as risk for CMBS investors was noticeably increasing, the spreads between CMBS tranches and Treasuries narrowed. (Figure 28.)

²⁰⁶ Inside Mortgage Finance, 2010 Mortgage Market Statistical Annual; Commercial Mortgage Securities Association.

²⁰⁷ Nomura Fixed Income Research, *supra* note 197.

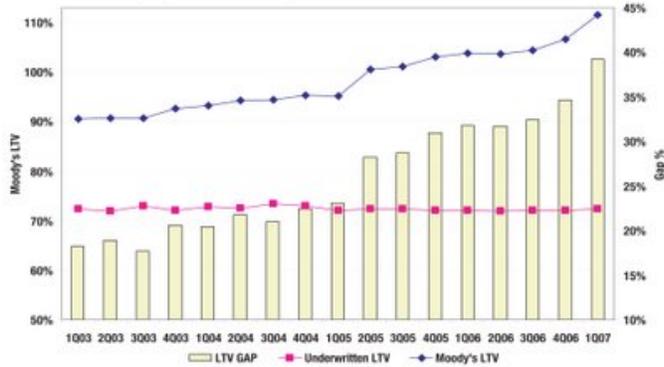
²⁰⁸ *Id.*

Figure 26. Decline in CMBS Underwriting Standards²⁰⁹



Source: Fitch Ratings and Moody's Investor Services Pre-Sale Reports

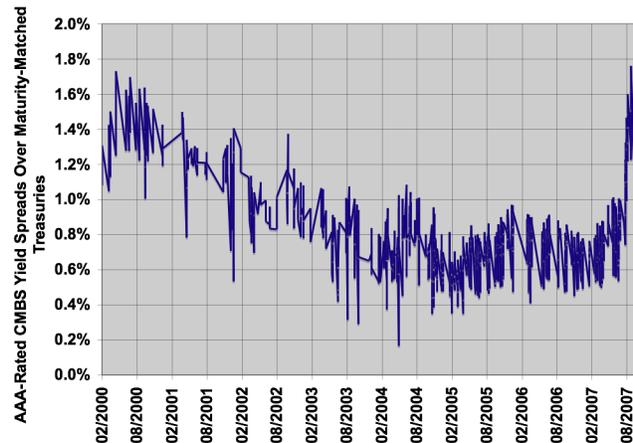
Figure 27. CMBS LTVs Compared with CMBS Stressed LTVs²¹⁰



²⁰⁹ Joseph N. Iadarola, Jr., *The Opportunity for Investing in Commercial Mortgage Debt*, Babson Capital, Nov. 2008, 4.

²¹⁰ Moody's Structured Finance, *US CMBS: Conduit Loan Underwriting Continues to Slide - Credit Enhancement Increase Likely*, Special Report, Apr. 10, 2007, at 2.

Figure 28. AAA-Rated CMBS Yield Spreads Over Maturity-Matched Treasuries²¹¹



As with RMBS, risk premiums on CMBS declined, while risk rose, a story consistent only with a glut of supply in the commercial mortgage finance market. Historically, CMBS maintained discipline over underwriting standards in a manner parallel to RMBS. CMBS's reliance on subordinated debt investors to uphold underwriting standards is similar to reliance on Agencies for underwriting standards; in both cases, the underwriting standards are being upheld by a party in the first loss position on the MBS, as the Agencies hold the credit risk on their MBS. In both cases, this discipline was unraveled: for RMBS, it was the market's shift to PLS, while for CMBS, it was the dilution and bypassing of the small, skilled cadre of B-piece investors by resecuritization. In both cases, underwriting standards were arbitrated by a shifting of risk to a less disciplined market.

4. Short Investors and Credit Default Swaps

Subordinated debt investors were unable to exert market pressure on PLS, both residential and commercial, which would have controlled against the decline in underwriting standards. But why didn't short

²¹¹ CMBS data comes from the Commercial Mortgage Alert database, an extensive private subscription data source covering all commercial mortgage securitizations. From the CMA Database, we removed all tranches with the following characteristics: (1) All deals with non-US collateral, (2) All deals or tranches not denominated in dollars, (3) All deals with Ginnie Mae or GSE issuers, (4) All deals with unidentified issuers, (5) All deals priced after 2007, (6) All deals priced before 2000, (7) All deals with adjustable rate notes or mixed fixed/adjustable notes, (8) all deals without ratings by at least one of Moody's, S&P, or Fitch's, (9) all deals other than conduit or fusion (conduit and large loan) deals. This left us with a sample of 1204 AAA tranches. We matched maturities with 1, 2, 3, 5, 7, 10, and 20-year Treasuries as closely as possible and then calculated the spread using the "corporate bond equivalent" coupon measure in the CMA database (converting coupons on CMBS into 360-day semi-annually paid corporate bond equivalents), which is depicted in the graph.

pressure—investment decisions made in anticipation of asset price declines—exert market discipline on mortgage and MBS underwriting? There were certainly short investors who understood that an enormous decline in underwriting standards for both mortgages and MBS was occurring,²¹² and CDOs did not affect the ability of investors to take out short positions. As it turns out, PLS were uniquely immune to short pressure as well.

The real estate market in general presents particular problems for shorts. 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.²¹³ Every parcel of real estate is unique, so the short seller cannot meet its delivery obligation.²¹⁴ 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! Indeed, the difficulty in shorting real estate is one reason that it has historically been so prone to price bubbles.

MBS can, in theory, be shorted directly,²¹⁵ but because they are relatively illiquid shorting is a risky endeavor; the short seller might not be able to find MBS to purchase that meet its delivery obligation. Markets with short sale constraints are particularly susceptible to asset bubbles.²¹⁶

²¹² See, generally, LEWIS, *SUPRA* note 90.

²¹³ 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.

²¹⁴ 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)

²¹⁵ 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.

²¹⁶ 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

It is possible, however, to short mortgages indirectly, through credit default swaps (CDS). A CDS is a form of credit insurance²¹⁷ in 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.²¹⁸ 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 MBS tranche, not on an entire MBS deal.²¹⁹ CDS, however, are not an effective means of shorting an individual MBS 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 MBS tranche, it is possible to buy the MBS tranche directly.²²⁰ 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?

Because of the difficulty in using CDS to short individual MBS, short investors like John Paulson (the famed short investor in the Goldman Sachs Abacus CDO scandal)²²¹ and Magnetar (a hedge fund that executed a major shorting strategy on the housing market)²²² utilized CDOs as their counterparties, rather than direct investors. CDO managers, who choose (at least nominally) the assets of CDOs received

investors hold a divergence of opinions, asset prices may rise above fundamental levels because the price only reflects the view of optimistic investors).

²¹⁷ 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 146, 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 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.

²¹⁸ *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 Mengle, *Credit Derivatives: An Overview*, FED. RESERVE BANK OF ATLANTA, ECON. REV. 1 (QIV, 2007).

²¹⁹ 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.

²²⁰ 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.

²²¹ *See Joe Nocera, A Wall Street Invention Let the Crisis Mutate*, N.Y. TIMES, Apr. 17, 2010, at B1.

²²² Jesse Eisinger & Jake Bernstein, *The Magnetar Trade: How One Hedge Fund Helped Keep the Bubble Going*, PROPUBLICA, Apr. 9, 2010.

fee-based compensation based on assets under management.²²³ 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.²²⁴ CDO managers were eager for the revenue streams and to increase assets under management. In some cases, their asset selection were also effectively controlled by the short investors. Thus, John Paulson had significant influence over the choice of the assets of the Abacus CDO with which he entered a set of CDS,²²⁵ while Magnetar was able to choose the assets of its CDOs by virtue of holding the junior "equity" position, even though it simultaneously took out larger CDS on the intermediate "mezzanine" positions in those CDOs.²²⁶ While there is no data on the percentage of CDS protection sold by CDOs, it appears to have been a significant portion, if only because of the tremendous growth of synthetic and hybrid CDOs during 2006-2007.

5. The ABX Index

The widespread use of CDS to short MBS led in to the development in 2006 of the ABX, a series of indices that track CDS pricing on MBS.²²⁷ (A similar set of indices, the CMBX, exist for CMBS.²²⁸)

Each ABX index track the prices of CDS on twenty initially equally-weighted subprime PLS issued in the prior six months.²²⁹ The deals referenced by the CDS in the index must have a minimum deal size of \$500 million, consist of at least 90% first lien mortgages with a

²²³ See LEWIS, *SUPRA* note 90, at 142.

²²⁴ CDO manager fees are divided into a senior and junior component. The senior is at the top of the cashflow waterfall. KOTHARI, *SUPRA* note 218, at 433; Aaron Johnson & Olivia Thetgyi, *Half Of ABS CDO Managers Could Go*, Dec. 7, 2007 (10 bps for high-grad, 25 bps for mezzanine); CDO Managers get 10 bps + 2bps admin fee.; David DeBiase, *A CDO Primer*, Standish Mellon, Jan. 2005; Caroline Salas & Darrell Hassler, *CDOs May Bring Subprime-Like Bust for LBOs, Junk Debt (Update3)*, BLOOMBERG, Mar. 13, 2007 (CDO manager fees of 45-75bps).

²²⁵ See *supra* note 221.

²²⁶ See *supra* note 222.

²²⁷ 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.

²²⁸ 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.

²²⁹ 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.

weighted average borrower FICO score of no more than 660 and have at least four tranches registered with the SEC under the Securities Act of 1933.²³⁰ The deals must also have tranches of at least \$15 million that are rated AAA, AA, A, BBB, and BBB-.²³¹ The major CDS dealers that collaborate on the ABX²³² select the referenced deals by ranking their preference for the two largest PLS deals for each of the twenty-five largest RMBS issuers.²³³ The twenty most-preferred deals are the ones referenced by the index, with the stipulation that the index cannot reference more than five deals with the same majority originator for the underlying mortgages.²³⁴

Each ABX index also contains six sub-indices, each of which tracks a particular ratings level: the penultimate AAA sub-index, which tracks the AAA tranches in the deals with the second-longest expected weighted average life, the AAA sub-index, which tracks the AAA tranches with the longest expected weighted average life, and then separate sub-indices for AA, A, BBB, and BBB- rated tranches.²³⁵ A new set of ABX indices commences every six months; there are two ABX series every year.²³⁶

Economist John Geanakoplos has argued that widening spreads on the ABX during 2006-2007 resulted in investors cooling on MBS and real estate assets in general, and when this occurred, the bubble was no longer sustainable.²³⁷ Geanakoplos's argument implies that the ABX accurately reflects risk on the underlying referenced RMBS (and hence

²³⁰ *Id.* at 2-4.

²³¹ *Id.*

²³² Originally sixteen financial institutions participated in the ABX: ABN AMRO; Bank of America; Barclays Capital; Bear Stearns; BNP Paribas; Citigroup; Credit Suisse; Deutsche Bank; Goldman Sachs; JPMorgan; Lehman Brothers; Merrill Lynch; Morgan Stanley; RBS Greenwich; UBS; and Wachovia. Press release, *CDS IndexCo and Markit Announce Roll of the ABX.HE Indices*, BUSINESS WIRE, Jan. 19, 2007. Several of these firms no longer exist as independent entities.

²³³ *Id.* at 4-5.

²³⁴ *Id.* at 5.

²³⁵ *Id.* at 7.

²³⁶ Pricing of the ABX is somewhat complex. The ABX references a few price components of CDS. It presents a coupon, a price index, and a factor. The coupon, in basis points, reflects the base protection premium that must be paid on the reference asset. The factor weights the reference asset based on its amortization; the factor starts at 1 at the beginning of a series and declines thereafter. The price index is actually an additional price component on top of the coupon. The price index is 100 percent at the start of a series' roll. Counterintuitively, when the price index *declines*, the cost of CDS insurance *increases* and vice-versa. Thus, to calculate the cost of CDS insurance from the ABX, one takes the reference asset amount, multiplies it by the coupon and the factor and then adds that to the reference asset amount multiplied by the factor and by (100% minus the price index percentage). Accordingly, on what was initially a \$20 million reference asset with a coupon of 50, a factor of .75 (meaning that \$15M is still owed on the reference asset), and a price index of 80, the average cost of a year's worth of CDS insurance, as reflected by the ABX, would be $(\$20M * .005 * .75 = \$75,000) + (\$20M * .75 * (100\% - 80\%) = \$3M) = \$3,075,000$.

²³⁷ 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>.

on the underlying mortgages), and that it thus serves as a useful market discipline tool.

It seems unlikely, however, that the ABX could effectively play such a role. The ABX has a number of serious limitations as a market discipline tool for mortgage finance. 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.

Second, the ABX suffers from being a very narrowly based index, with only twenty reference assets in each series.²³⁸ Thus, even assuming that CDS are priced accurately (and given that they are relatively illiquid and traded OTC, this is doubtful²³⁹), 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.

Indeed, because of the ABX's particular methodology, it could be vulnerable to gaming by market participants. The eligibility thresholds of 90% first lien mortgages, 660 average FICO score, \$15 million tranche size, \$500 million deal size, SEC registration, and being one of the two largest deals by a top 25 originator all present possible avenues for channeling the best quality mortgages into deals that are eligible to be in an ABX series and moving the lemons into deals that the ABX will not track. Savvy originators will structure deals with 89% first lien mortgages or 661 average FICO scores, smaller tranches and deals, or Rule 144 offerings. Or, the most problematic originations could simply be ceded to smaller originators. To be sure, there might be costs to such deal structuring and coordination problems, but the bright-line eligibility cut-offs present a potential gaming risk.

Third, the ABX is an inherently delayed and reactive measure of risk. ABX series start as much as six months after the RMBS deals it references are issued, and the RMBS deals themselves lag the origination of the mortgages they contain by several months. Thus, the first ABX series, ABX.HE Series 06-1, was referencing PLS assembled in the

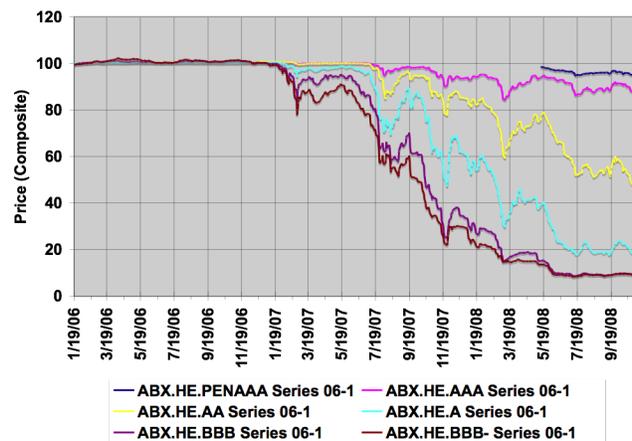
²³⁸ Gary Gorton, *Information, Liquidity, and the (Ongoing) Panic of 2007*, 99 AM. ECON. REV. 567 (2009).

²³⁹ See LEWIS, *SUPRA* note 90, at ___ (discussing CDS dealer handing up phone when confronted with difference between quoted prices and what deals were being done).

second half of 2005, which contained mortgages likely made in the first half of 2005 or second half of 2004. By the time the ABX shows the cost of CDS protection on the PLS rising (indicated, counterintuitively, by falling ABX prices), at least a year's worth of dodgy mortgage underwriting would have occurred.

Consider the performance of the ABX.HE Series 06-1, illustrated in Figure 29. It did not start to show increased risk until January 2007. To the extent that the ABX is supposed to be a canary in the coalmine, it simply sang too late to prevent the housing bubble. The presence of continually rolling indices may not alleviate this lag problem, as any particular ABX series will only reflect the risk in a limited origination vintage. Rising housing markets can reduce default levels because of the ability to refinance or sell properties. If in a rising housing market it takes over two years for the ABX to reflect risky underwriting, then it might, as Geanakoplos argues, deflate housing bubbles, but it suffers from too much of a lag to prevent them.

Figure 29. ABX.HE Series 06-1 Performance²⁴⁰



Lastly, and most importantly, 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 RMBS its CDS reference.²⁴¹ 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 RMBS underwriting.

²⁴⁰ MarkIt, ABX.HE Series 06-1.

²⁴¹ Jerome S. Fons, *Shedding Light on Subprime RMBS*, Feb. 23, 2009.

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.²⁴² 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 securities.”²⁴³ Thus, Stanton and Wallace have found that the credit performance of the ABX’s referenced subprime RMBS is uncorrelated with fluctuations in the ABX.²⁴⁴ 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.²⁴⁵

The ABX might also reflect excessive demand for hedging due to the illiquid nature of RMBS, rather than credit risk on the RMBS. 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.²⁴⁶

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 RMBS did not suddenly change; Bear Stearns’ collapse had no effect on the soundness of the mortgages backing the RMBS. Likewise, the spreads for the ABX—the difference in cost between purchasing CDS protection and purchasing a risk-free investment like a Treasury—spiked during the height of the financial crisis in September-October 2008, and then fell dramatically on October 28, when Treasury’s

²⁴² 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).

²⁴³ Richard Stanton & Nancy Wallace, *ABX.HE Indexed Credit Default Swaps and the Valuation of Subprime MBS*, Feb. 15, 2008 at 5.

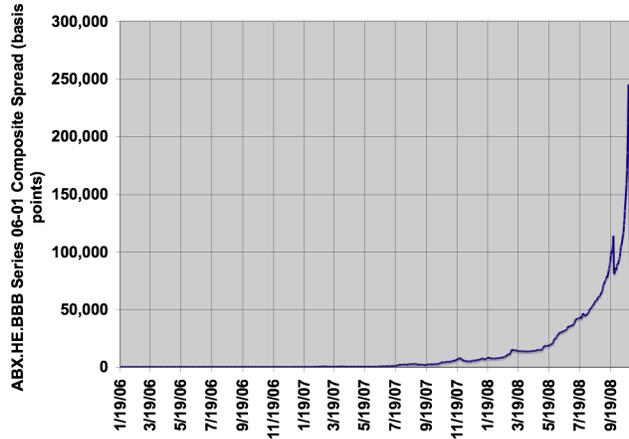
²⁴⁴ *Id.* at 24.

²⁴⁵ *Id.*

²⁴⁶ Gorton, *supra* note 238.

capital injection into the nation's largest financial institutions was announced. Figure 30 illustrates the spike and 73% decline in the spreads²⁴⁷ for the ABX.HE.BBB Series 06-1.²⁴⁸

Figure 30. ABX.HE.BBB Series 06-1 Spreads



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 RMBS risk.²⁴⁹ 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.²⁵⁰ 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. If the repo obligor defaults, its counterparty keeps the collateral security. RMBS 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.²⁵¹

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 RMBS. And because of rehypothecation, the number of financial institutions seeking CDS protection would exceed the actual exposure to RMBS that existed in the system, thereby further spurring demand for

²⁴⁷ ABX composite spreads are a different pricing measure; they are not actually spreads over a risk-free baseline, but a composite of the coupon and price components of the ABX.

²⁴⁸ This series is shown by itself because the scaling obscures the parallel effect on other series they are presented together.

²⁴⁹ *Id.*

²⁵⁰ 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>.

²⁵¹ *Id.*

CDS protection and pushing up CDS prices.²⁵² 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 MBS 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.²⁵³ The result 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.

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.²⁵⁴ 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.

A government-backed mortgage finance market poses its own problems, however, such as the socialization of risk and the potential politicization of underwriting standards. Lesser forms of

²⁵² 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).

²⁵³ See *supra* note 51.

²⁵⁴ Snowden, *supra* note 41, at 270.

standardization—of mortgage and MBS credit risk structures, rather than of credit risk—may themselves be sufficient to facilitate adequate risk pricing without forcing a trade off between market stability and risk socialization.²⁵⁵

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”)²⁵⁶ has noted, unless PLS investors rely on ratings, they need to reverse engineer deals as part of their investment analysis.²⁵⁷ Reverse engineering a PLS is an incredibly expensive process. Because deals are not standardized, each deal must be reverse engineered on its own in order to identify the best investment, adding to the expense of the analysis. As a result, most investors resort to relying on ratings.

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.²⁵⁸

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

²⁵⁵ 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, *supra* note 34 for our views on potential forms for the U.S. housing finance market.

²⁵⁶ Mike McNamee, *Lewis S. Ranieri: Your Mortgage Was His Bond*, NEWSWEEK, Nov. 29, 2004.

²⁵⁷ 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).

²⁵⁸ 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.”).

standards prevented the systemic scope of the housing bubble from being manifest until it was too late. 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.²⁵⁹ Instead, investors need to 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.²⁶⁰ 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.

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

²⁵⁹ 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.

²⁶⁰ 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.

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. But 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.

Standardizing MBS does not mean eliminating consumer choice for mortgages. There have always been niche mortgage products, and there will always be borrowers for whom these products are appropriate. But niche products should not be securitized. They involve distinct risks and require more careful underwriting and should remain on banks' 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.

We, therefore, propose restricting securitization to proven, sustainable mortgage products for which there is well-established consumer demand and performance history²⁶¹. If securitization were restricted to a limited menu of mortgage forms—the “plain vanilla” 30-year fixed, the “plain chocolate” 15-year fixed, and the “strawberry” 5/1 or 7/1 adjustable-rate mortgages—investors would not be taking on mortgage product risk. 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

²⁶¹ 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. § 780-9. (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. § 780-9. (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.”

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 the 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 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 nonprime PLS. Ultimately standardization benefits investors by increasing liquidity, which increases the value of securities.

Securitization is necessary to guarantee the widespread availability of the long-term fixed-rate mortgage, which has been the cornerstone of American homeownership since the Depression. The long-term fixed-rate mortgage is not only a uniquely consumer-friendly product, but also promotes housing market stability. 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.