Bad and Good Securitization

Is securitization the cause or the remedy of our financial crisis?

SUSAN M. WACHTER
ADAM J. LEVITIN
ANDREY D. PAVLOV

IN THIS CRISIS, real estate has been hit hard and, in turn, real estate has hit individual homeowners, the financial sector, and the overall economy. In fact, the losses in residential securities were the proximate cause of the meltdown of the financial system in the fall of 2008. Preceding this, the bubble in real estate assets and debt laid the groundwork for the eventual crash. Despite extraordinary countercyclical monetary and fiscal policy, as of the third quarter, housing continues to be a negative force. As of mid-year 2009, home prices have fallen more than 30 percent from their peak and the stock market has plummeted twice as much. Because the financial sector is

exposed to commercial and residential mortgages, banking and the economy depend fundamentally on the stability of real estate.

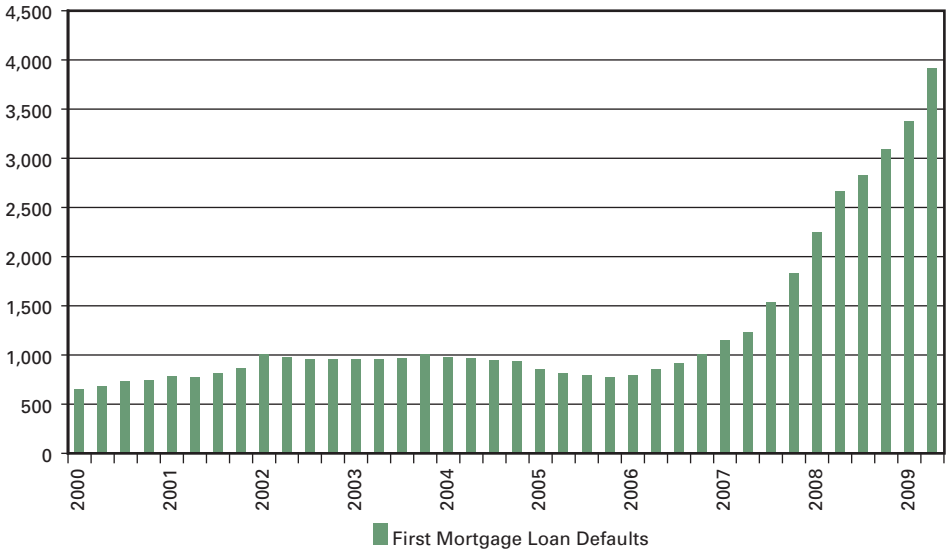
The proximate cause of the crisis: homeowners who could not make payments falling into foreclosure and the lenders putting these homes up for sale at fire sale prices resulted in an increase in supply, which left many homeowners with properties worth less than they owed on their mortgages. Under these conditions, many homeowners who otherwise would continue making payments despite financial reversals simply stopped making payments altogether, feeding more foreclosures (Figure 1). Those who lost their jobs as unemployment rose, with homes worth less than their mortgage, had no choice but to default.

How did this vicious cycle begin? How did home prices appreciate so far and so fast? Why did rational investors not recognize and stop mispricing and investing in these loans on Wall Street? This article describes the causes of the boom and bust in the U.S. housing market that brought down not just the U.S. financial system but the global economy.

THE NEW SECURITIZATION

The economic circumstances that contributed to the recent housing market boom and bust are not unique in history.

Figure 1: Foreclosure waves



Sources: Equifax, Moody's Economy.com

Real estate booms and subsequent banking crashes have occurred in the United States and elsewhere, in the early 1980s in Japan, in the late 1980s in the savings and loan crisis and as recently as the late 1990s in the Asian financial crisis. Moreover, the housing boom that preceded this crisis was global. Nonetheless, this time the asset and credit bubble blowout and subsequent crash were Made in the USA. Downturns in the mortgage and housing markets have caused economic problems before, but the current situation is the first of its kind and severity, underscoring profound changes in these markets.

At the root of the mortgage meltdown was a new class of specialized mortgage lenders and securitizers unrestricted by regulations governing traditional lending and securitization. While from the mid-1970s to 2007 savings and loans saw their market share decline from nearly 60 percent of the mortgage market to 10 percent and commercial banks gained almost 50 percent of the market, both of these entities either held mortgages in portfolio or traditionally securitized using regulated entities. Beginning in the mid-1990s, and growing rapidly after 2000, nontraditional mortgage share grew from virtually zero to nearly 50 percent of originations. Many of the new loans were made to borrowers who could not qualify for traditional mortgages because of poor credit or low incomes. Lenders then passed the risk on to investors around the world who were more than willing to buy mortgage-backed securities (MBS) that carried higher yields than mortgages offered by the government-sponsored enterprises (GSEs) Fannie Mae and Freddie Mac whose regulation allowed them to securitize only safer "investment-grade" mortgages.

These private label MBS pooled thousands of loans into bundles. These pools were then divided into a hierarchy of default risk, or "tranches." The result was the creation of AAA securities from risky underlying mortgages. The riskiest tranches received the lowest ratings from the credit rating agencies and therefore paid the highest yields, and they were the first to lose value if borrowers fell behind in payments. On top of this, financial firms leveraged private label MBS by using these as collateral for additional debt, in the form of collateralized debt obligations (CDOs). Firms often made CDOs-squared by pooling and tranching CDOs themselves. Leverage on top of leverage left the system vulnerable to even the slightest decline in prices or increase in loan defaults.

The rating agencies did not carefully analyze the underlying collateral of the securities to identify the probability of default or price fluctuation. Instead, they assumed home prices would not decline by much, if at all. Since the United States had never experienced an economy-wide

decrease in home prices of more than 1 percent, the agencies considered this to be a reasonable assumption, and the firms issuing the securities assumed their diversification had removed any risk of considerable losses.

Private label MBS and CDOs had been created in the mid-1980s and remained small until the mid-1990s. They did not take off until 2003, at which point they grew rapidly until the bursting of the housing bubble. The GSEs had been issuing MBS since Ginnie Mae began securitizing government-issued mortgages in 1968, but these securities were exposed to interest rate risk only, and were liquid and traded frequently. The inflection point came with the introduction of private-label securities.

Lending standards were not monitored for private-label securitization and declined over time. Because these securities were not backed by standardized assets, they generally did not trade. Private-label securities (PLS), as opposed to those issued by the GSEs, were not traded because they were non-standardized and therefore illiquid. PLS were marked to model, not to market. Evidence of misallocated investment and growing risk was masked by the fact that the looser standards buoyed housing prices in the short term. Moreover, the erosion of lending standards was nearly impossible to identify in real time because mortgages were non-standardized and heterogeneous. Given this heterogeneity, it was not possible to track the change in the composition of mortgage product or the layering of risk. And because these were not traded, there was no ability to signal this credit erosion to the market. The price bubble fueled by poor underwriting increased the risk exposure of the entire mortgage system given the inevitable collapse of inflated prices. Home prices plummeted so sharply that some have estimated that by the spring of 2009, every fifth borrower owed more than his or her home was worth and defaults rose to postwar records: almost one out of every twenty-five borrowers is in foreclosure. This is the systemic risk engendered by securitization without regulation.

NON-PRIME MORTGAGES

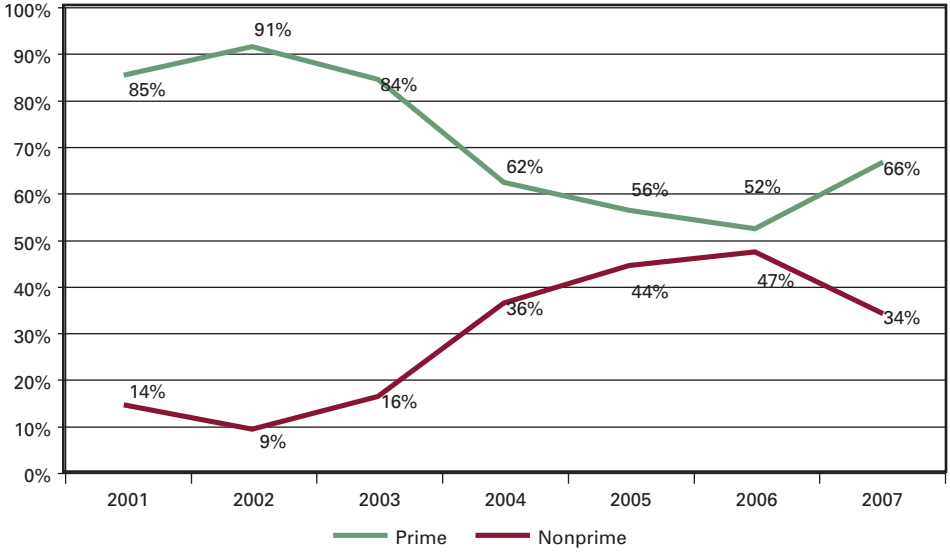
In an era of deregulation and optimism, private-label securitization drove the demand for new types of risky mortgages. The demand for securitized mortgages fed the demand for recklessly underwritten loans. As PLS grew in market share, so did non-standard mortgages, from 15 percent of market origination in 2002 to almost half of market origination in 2006. For the past half-century, the classic U.S. mortgage charged a fixed interest rate that stayed the same for the loan's 30-year life. Once the mortgage papers were signed, the home-

owner's monthly payments never changed, making payments easier and easier to shoulder as the borrower's income rose with inflation. Generally, home values went up as well, so the borrowers could expect to sell at virtually any time for more than they owed.

But the picture changed dramatically in the run-up to the housing bubble. Initially, MBS involved only "prime" mortgages issued to low-risk borrowers, but then private label securitizers entered the market to pool mortgages backed by increasingly risky loans that the GSEs were not permitted to securitize. Prior to 2003, non-prime mortgages never held more than 16 percent of the market; by 2006, they had reached a staggering 47 percent (Figure 2).

Nearly two-thirds of all home loans issued since 2003 were "aggressive," entailing risks not found in conventional loans. In addition to subprime loans, this included interest-only loans where the borrower made no principal payments; negative-amortization loans in which the borrower paid less than the full interest payment, with the shortfall added to the outstanding debt; "low doc" or "no doc" loans that required little or no down payment, documentation, or proof of income; and option adjustable-rate mortgages (ARMs) with low monthly payments and high year-end discretionary payments. At the same time, the subprime market developed new products whose features had never faced a market test. This included 2/28 and 3/27

Figure 2: Mortgage originations by product



Source: Inside Mortgage Finance 2008 Mortgage Market Statistical annual

loans, which had 30-year terms but began annual rate adjustments after the first two or three years. They carried prepayment penalties making it prohibitively expensive for borrowers to refinance when their payments got too high. Buyers qualified based on the initial low "teaser" rate, even though they might not be able to shoulder the higher payments that could come if the rate adjusted upward.

The race for market share fueled the extension of increasingly risky loans to borrowers without the capacity to repay. The expansion of these aggressive loans beyond their suitable use is the real concern. Alt-A loans, for example, are riskier than prime but less risky than subprime, and as a result they are niche products well-targeted to self-employed homeowners. Similarly, option ARMs were originally designed with investment bankers and professionals with similar pay structures in mind; because a large portion of their annual income comes from year-end bonuses, the high year-end payments fit their cash flow profile.

Aggressive lenders piled in by offering loans with low upfront costs, attracting first-time home buyers previously unable to afford houses, repeat buyers buying pricier homes and second homes, and speculators. Aggressive lending drove prices particularly high in Arizona, California, Florida, and Nevada, which had significant land use regulations and environmental controls that reduced supply elasticity, leading increases in demand to trigger mostly higher prices instead of a greater supply of housing.

By 2007, it was clear that neighborhoods and cities that had high concentrations of aggressive lending suffered the largest home-price declines after the market cooled. For each 1 percent higher share of subprime origination in 2005, prices declined by 1.5 percent for that region. This was especially ominous for inner-city and for far-out "drive to qual-

Table I: Deterioration of lending standards, 2002 to 2006

MORTGAGE INFORMATION	ALL LOANS		
YEAR OF ORIGINATION	1999	2003	2006
Number of loans (all loans)	596,710	1,840,040	3,251,355
Subprime loans	512,476	1,426,503	2,376,949
Alt-A loans	84,233	413,494	872,208
Low doc loans	120,682	678,810	1,635,176
Interest only loans	1,169	95,870	725,317
Second loans	86,482	192,337	708,343
ARM teaser loans	172,579	361,811	1,639,509
MARGIN (adjustable rate)	6	6	5

Source: LoanPerformance, Anthony Pennington-Cross, et al., WREC WRC

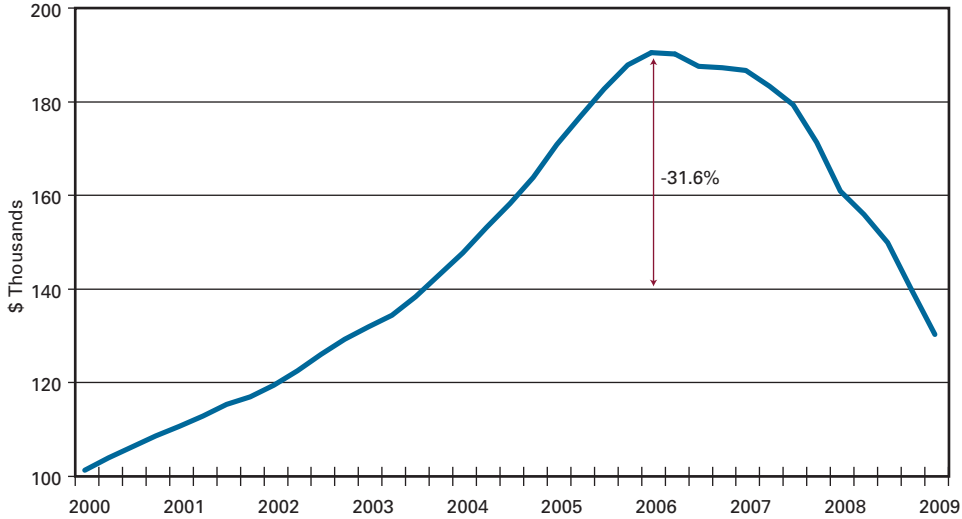
ify" neighborhoods where aggressive loans were prevalent.

For a time, capital markets had an appetite for almost any kind of risk, as long as participants received fees for the products they were manufacturing and selling. There was little understanding of the default risk in the new, fast-growing market, and firms did not have a strong incentive to focus on default risk. The bulk of new products were "originate-to-distribute," so they were sold off instead of held in firms' portfolios. The issuer, the securitizer and the rater were only interested in the fees that they booked for each sale, which of course lent itself to a high volume of short-term profits instead of calibration of default risk and long-term loan performance.

A DEBT-DRIVEN PHENOMENON

There are three common explanations for Wall Street's drive toward MBS and the incredible appreciation of home prices (Figure 3). The first argues that the low interest rates set by the Greenspan Federal Reserve made borrowing so cheap that consumers rationally bought houses in droves. This explains part, but not all, of the bubble. Low interest rates allowed people to borrow more, bidding up home prices. Because home prices soared, homeowners who ran into financial trouble could easily sell their homes for more than they owed, avoiding default and foreclosure. Interest rates do not tell the whole story, though. Even while the Fed

Figure 3: Home prices (Case-Shiller)



Sources: Standard & Poor's, Fiserv

was lowering interest rates, the rest of the world was experiencing the same cheap credit. By 2003, U.S. interest rates began to rise, and home price appreciation slowed throughout the world—except in the United States, where home prices continued to accelerate *despite* rising interest rates. Cheap credit helps explain the beginning of the boom, but the magnitude of the bubble-and-burst cycle requires a fuller explanation.

The second explanation, advocated by Joseph Gyourko of Wharton and Edward Glaeser of Harvard, argues that supply has become inelastic in the United States, so increased demand bid prices through the roof instead of increasing the quantity supplied. While this is certainly true (as indicated in the discussion of the effect of land use regulations), this housing focus ignores the role of the supply of capital, a link that we will address shortly. A related rationale has been put forth by Robert Shiller of Yale that "irrational exuberance"—or "animal spirits," to use the term he and George Akerlof of Berkeley borrowed from John Maynard Keynes—blinded consumers to the bubble, so they bid prices higher and higher, thinking they would never fall.

The third explanation pins the blame on the affordable housing policies of the GSEs. It is important to remember that regulation prevented them from issuing MBS based on subprime mortgages. In fact, the GSEs did not arrive on the subprime scene until 2005—well after the bubble had begun—and then only by buying so-called "AAA" and Alt-A tranches of subprime CDOs for their portfolio. In this regard, shareholders and Congress deserve the blame for pressuring the GSEs in this direction, and their safety and soundness regulator, the Office of Federal Housing Enterprise Oversight (OFHEO) deserves the blame for not stopping them (though, in fairness, Congress gave OFHEO very little power to do so). The GSEs therefore added a lot of fuel to an already raging fire, but bear less responsibility for starting the crisis.

Pavlov and Wachter have offered a fourth explanation: because the price of risk (represented by the yield rates of MBS) fell during the housing bubble, we cannot conclude that it was simply a shift in the demand curve for housing, as the first two explanations suggest, or else increased demand would have generated higher rates for MBS. Instead, it must be the case that supply of debt increased more than demand, which is consistent with the observed lower cost of capital according to standard economic theory. Specifically, Wall Street firms must have been supplying MBS at such a high pace that it exceeded the high demand for houses. In other words, the demand for mortgages, which drove high home prices, was led by Wall Street, which needed them to create and

sell MBS. Why, then, was Wall Street so eager to produce MBS?

Short-term incentives—such as origination-focused compensation packages and trader bonuses geared toward end-of-year profits instead of any long-run measure of performance—encouraged financial firms to sell MBS for a quick profit at a rapid pace and high volume. The credit boom created by the Fed, as earlier suggested, played an important role in initiating the price appreciation, but Wall Street's hunger for more mortgages ratified it.

NON-RECOURSE LENDING

Because most American mortgages are effectively non-recourse, a borrower who defaults stands to only lose the collateral—that is, the house—and any equity they have put into the house (which is a sunk cost anyway). The borrower, in other words, is not personally liable for the full amount of the loan in default. Another way to look at this structure is through the lens of a put option. When a bank makes a non-recourse loan, it implicitly provides a put option on the underlying asset. If the value of the asset declines, the borrower has the right, but not the obligation, to "put" the asset back to the bank (that is, walk away from the property). In other words, the borrower can "sell" the asset to the bank for the outstanding loan balance. This "right to sell" limits the losses of the borrower and is a put option, written by the bank, with a strike price equal to the outstanding loan balance.

If the put option is priced correctly, and its price is passed on to the borrower in terms of a higher interest rate, lending has no impact on asset prices, that is, property values. If the put option imbedded in a loan is underpriced, that is, if the interest rate charged is too low relative to the deposit rate, then investors incorporate this mistake in their demand price for the asset. Thus, lending without properly pricing the put option results in inflated price of the asset even within efficient equity markets. Once lenders began to issue mortgages with loan-to-value ratios greater than one, mortgages were almost "in-the-money" put options immediately at the point of origination.

Managers' inability to correctly value the put option results in underpricing. Managers who underprice the put option are discovered only in case of financial crisis. Absent such crisis, managers have an incentive to underprice the put option in order to increase the profits in good states. Long-term managers have a lot to lose if they underprice and are discovered. Thus, long-term managers would not underprice. Short-term managers, however, have relatively little to lose if their underpricing is discovered. For them the benefit of increased profits in the short run is suffi-

cient to underprice. In fact, as Pavlov and Wachter have previously shown, the presence of short-term managers puts sufficient competitive pressure on the industry that all managers underprice the put option, regardless of their time horizon. This result holds even if managers act in the best interest of shareholders, absent any agency conflicts.

The absence of short-selling in real estate and the ability of optimists to drive prices up can, for example, produce price bubbles even in the absence of underpricing, but funding is necessary to keep them going. The willingness and ability of the banking sector to provide underpriced funding ratifies and exacerbates these inefficiencies.

MISALIGNED INCENTIVES

The key link in the chain, as described above, is the short-term perspective of managers. If managers had reason to worry about the franchise value of the firm, they would not risk a financial crisis by underpricing MBS. Several factors contributed to this perspective.

First, the compensation structure at most Wall Street firms focused on year-end bonuses based on annual revenues. Managers needed to produce a high volume of profits before December 31, and had no incentive to consider the systemic risk that underpricing MBS might lead to an unsustainable housing bubble.

Second, there was no way to "keep the market honest." In complete markets, traders can recognize underpricing and short-sell the assets to profit from the long-term default of the system. Real estate, however, is famously difficult, if not impossible, to short. Because financial firms kept MBS in their portfolios, they were not actively traded. Without a trading market for MBS, short-selling cannot occur. Without short-selling, the market cannot indicate or correct underpricing.

Also, firms attempted to hedge their risk by buying credit default swaps (CDS) from insurance firms like AIG and some investment banks like Lehman Brothers. CDS insured the owner against default on a particular transaction—in this case, the mortgages underlying MBS held in the banks' portfolios. Because the CDS buyers felt that they had hedged their downside risk, they had an incentive to continue to underprice MBS. Unfortunately, the firms underwriting CDS did not hold enough collateral to support most of their transactions. One of an insurer's primary duties is to analyze their counterparty risk to determine a sufficient amount of collateral to cover any eventual payments; for CDS, that means understanding the risk profile of the transactions being insured and hold-

ing enough collateral to pay for any defaults. Why, then, did CDS sellers like AIG and CDS buyers like Lehman fail in their primary duty?

Managers at CDS firms, like managers at MBS issuers, had a compensation structure that rewarded short-term revenues instead of long-term performance. Selling CDS now and worrying about risk later was a profitable strategy. Buying CDS now and worrying about counterparty risk later was also a profitable strategy. Furthermore, CDS buyers may have considered most of their counterparties "too big to fail," and so there was a moral hazard in the system that encouraged CDS sellers to issue more insurance than they could cover in the belief that any remaining losses would be socialized.

The system was essentially insolvent. Firms had underpriced MBS and could not sustain the losses of an economy-wide housing crash. They had bought and sold CDS that did not really hedge their risk, as the buyers would be stuck with losses they could not pay, and the sellers would be forced to insure defaults that they did not have sufficient collateral to cover. The result was a run on the bank in reverse: Managers had an incentive to "get it while you can." It was the classic looting behavior described by George Akerlof of Berkeley and Paul Romer of Stanford twenty years ago.

THE NEW NEW SECURITIZATION

While it is clear that systemic risk derives from the pro-cyclical erosion of lending standards, there is no consensus on how to avoid this. While no system is perfect, fixed-rate long-term mortgages with robust, standardized securitization historically have been consistent with financial stability. Standardization promotes liquidity, ensures suitability, and enhances system stability. A market and a formal trading exchange for standardizing and, if necessary, short-selling real estate securities could be helpful in bringing increased liquidity, decreased heterogeneity, and the ability to recognize and prevent credit mispricing. But more is necessary.

The central question is how to prevent excesses that inevitably lead to liquidity crises. Bernanke and Gertler argued in 1999 that asset bubbles are not destructive enough to systemic stability to warrant monetary intervention, but their model did not account for the possibility that credit will dry up, bringing about the historical banking system panic scenario. Asset bubbles that affect the payment mechanism have repeatedly led to liquidity crises. It is the real estate asset bubble that must be addressed in particular because banks are heavily exposed to residential and commercial mortgages. Not

only is this sector particularly prone to bubbles because of the difficulty in the shortselling of the underlying asset, but banks' exposure to real estate makes the financial system susceptible to real estate booms and busts. Relying on a macro-prudential risk regulator may not be sufficient. To make securitization work, rules of the game are needed, such as a clearinghouse to achieve transparency and assure against counterparty risk and data provision to inform trading. Markets can price and expose risk, if we let them.