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THE HOUSING MARKET CRASH

By Todd J. Zywicki and Gabriel Okloski

MERCATUS CENTER
GEORGE MASON UNIVERSITY

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Introduction

Beginning in 2007 and continuing into 2008 and 2009, the residential real-estate market was roiled by tumult unprecedented in recent American history. Widespread foreclosures and a collapse in home prices in many areas of the country spawned an ongoing global financial crisis. Although home prices have fallen precipitously in many areas of the country and foreclosures have risen to all-time highs, the end of the crisis still may not be in sight. The United States government has engineered a series of unprecedented market interventions designed to stabilize the housing market and the financial markets dependent on mortgage-backed securities.

Consumer borrowing secured by residential real estate grew substantially over the past several years, due to a number of factors that tend to increase the value of housing by increasing the willingness of purchasers to pay higher prices for the houses. Standard economics thus provides a compelling explanation for much of the increase in household mortgage obligations—low interest rates, high effective tax rates, and the increased capital value of residential real estate. Other factors, moreover, are more difficult to explain by fundamentals, such as the prevalence of a large number of speculative investors in some of the major boom and bust markets.

This working paper focuses on underlying questions related to consumer behavior and looks at the impact of these developments in the housing market on household financial condition. Specifically, this paper looks at the factors that drove consumer demand during the “bubble” market that later popped with such widespread effects. It

particularly investigates foreclosure as a rational decision on the part of consumers who responded to various incentives put in place before the eventual fall of housing prices and crash in the housing market.

The Rise and Fall of the Mortgage Market

In contrast to this relative stability in the overall housing and residential mortgage market between 1980 and 2000, recent years have seen an unprecedented rise and implosion of the residential mortgage market, especially the rapid development of the subprime mortgage market. These events have given rise to major woes in the American real-estate market and overall economy and have major implications for thinking about consumer lending markets generally.

The mortgage market collapse can be studied from many different perspectives. Many commentators have focused on the impact of mortgage lending crisis on the financial side of the issue, such as the collapse of leading investment banks and governmental efforts to stabilize the financial economy. The discussion in this working paper, by contrast, will focus on the consumer side of the market, examining the real-estate and mortgage market to determine what it can tell us about consumer behavior more generally.

Homeownership and Economic Welfare

Homeownership can be a transformative life experience, both economically and psychologically. Homeownership historically has been an important source of wealth for American households and the primary method of wealth accumulation for low and

moderate-income people.¹ According to the 2004 Survey of Consumer Finances, a family that owns a home on average has \$624,900 in average wealth (median of \$184,400) and the average renter family has \$54,100 (\$4,000 median). The impact of homeownership on increasing the wealth of lower-income families is especially important, as low-income families generally do not own financial assets. In 2001, for example, the average low-income homeowner (annual income is less than \$20,000) had nearly \$73,000 in net wealth, compared with a similar renter with only \$900 of net wealth.² In fact, homeownership has been such a potent vehicle for wealth accumulation that the polarization of wealth between homeowners and renters has risen dramatically, even as the wealth polarization among different income classes has decreased.³ Low-income and even middle-class homeowners rely on homeownership for the majority of their net worth—almost 80 percent of the wealth of low-income households is in residential real estate.⁴ The richest quintile by income is the only income group that holds stock wealth in equal value to their home equity. The bottom four quintiles typically have home equity equal to at least twice the value of their stocks.⁵

In addition to improving the asset side of the household balance sheet, homeownership also may be valuable to the liabilities side of the balance sheet. The Federal Reserve's financial obligations ratio calculates the percentage of household

¹ Thomas P. Boehm & Alan Schlottmann, DEP'T OF HOUS. & URBAN DEV., *Wealth Accumulation and Homeownership: Evidence for Low-Income Households* 11–14 (2004), available at <http://www.huduser.org/Publications/pdf/WealthAccumulationAndHomeownership.pdf>.

² Zhu Xiao Di, *Housing Wealth and Household Net Wealth in the United States: A New Profile Based on the Recently Released 2001 SCF Data 10* (Harvard U., Joint Ctr. for Hous. Studies Working Paper No. W03-8, 2003).

³ See Conchita D'Ambrosio & Edward N. Wolff, *Is Wealth Becoming More Polarized in the United States?* 14–16 (Jerome Levy Economics Inst. of Bard College Working Paper No. 330, 2001), available at <http://ssrn.com/abstract=276900>. Wealth inequality appears to have increased over time, but wealth “polarization” is different from “inequality” in that polarization studies the clustering of homogeneous groups, such as homeowners, within a heterogeneous population. See *id.* at 2. Thus, it is a more useful tool for examining the effect on wealth of particular subsets, such as homeowners.

⁴ Di, *supra* note 2.

⁵ *Id.*

income dedicated to monthly payment obligations, including monthly rental payments on homes, apartments, and automobiles, real-estate tax obligations, and the debt-service burden, which includes monthly payments on mortgages, car payments, student loans, and credit cards.⁶ The household financial obligations ratio (“FOR”) is substantially higher for those households that rent compared to those that own their homes.⁷ Data indicates that homeowners also save more than do non-homeowners.⁸ Although some of this difference surely is attributable to the fact that homeowners generally have higher incomes than renters, renters also are more likely to revolve credit card debt and to hold student loan debt, both of which generally carry higher interest rates than mortgage debt.

In addition to these direct benefits, homeownership apparently has a number of indirect benefits. For instance, homeownership is correlated with a substantial increase in one’s propensity to vote, dramatic improvements in children’s life outcomes, and improvements in labor-market outcomes. Homeownership also creates incentives to improve property, generally increases life satisfaction, and is correlated with a reduction in crime rates.⁹ Recent research, however, questions the long-believed causal link between homeownership and these other benefits, arguing instead that there is a selection mechanism at work, i.e., that people with certain attributes tend to self-select into homeownership, or that other factors (such as reduced mobility caused by homeownership) explain the relationship between homeownership and observed positive

⁶ See FED. RES. BOARD, HOUSEHOLD DEBT SERVICE AND FINANCIAL OBLIGATIONS RATIOS (June 10, 2008), available at <http://www.federalreserve.gov/Releases/housedebt/>.

⁷ The Federal Reserve defines these measures as follows: “The household debt service ratio (DSR) is an estimate of the ratio of debt payments to disposable personal income. Debt payments consist of the estimated required payments on outstanding mortgage and consumer debt. The financial obligations ratio (FOR) adds automobile lease payments, rental payments on tenant-occupied property, homeowners’ insurance, and property tax payments to the debt service ratio.”

⁸ Ed Gramlich, *Subprime Mortgages: America’s Latest Boom and Bust* 75–77 (2007).

⁹ See *id.* at 58–60; Christopher E. Herbert & Eric S. Belsky, DEP’T OF HOUS. & URBAN DEV., *The Homeownership Experience of Low-Income and Minority Families: A Review and Synthesis of the Literature* (Feb. 2006); Robert D. Dietz & Donald R. Haurin, *The Social and Private Micro-Level Consequences of Homeownership*, 54 J. URB. ECON. 401 (2003).

outcomes.¹⁰ Thus, while there is a correlation between homeownership and many personal and social benefits, that correlation may not be causal in nature. There are costs to homeownership as well, notably increased sprawl and a less mobile labor force.¹¹ Nonetheless, policymakers have long (and somewhat reasonably, based on prevailing data) believed that the benefits of widespread homeownership outweigh the costs, and, therefore, expanding homeownership rates historically has been a linchpin of American financial and social policy.¹²

The Growth in Homeownership

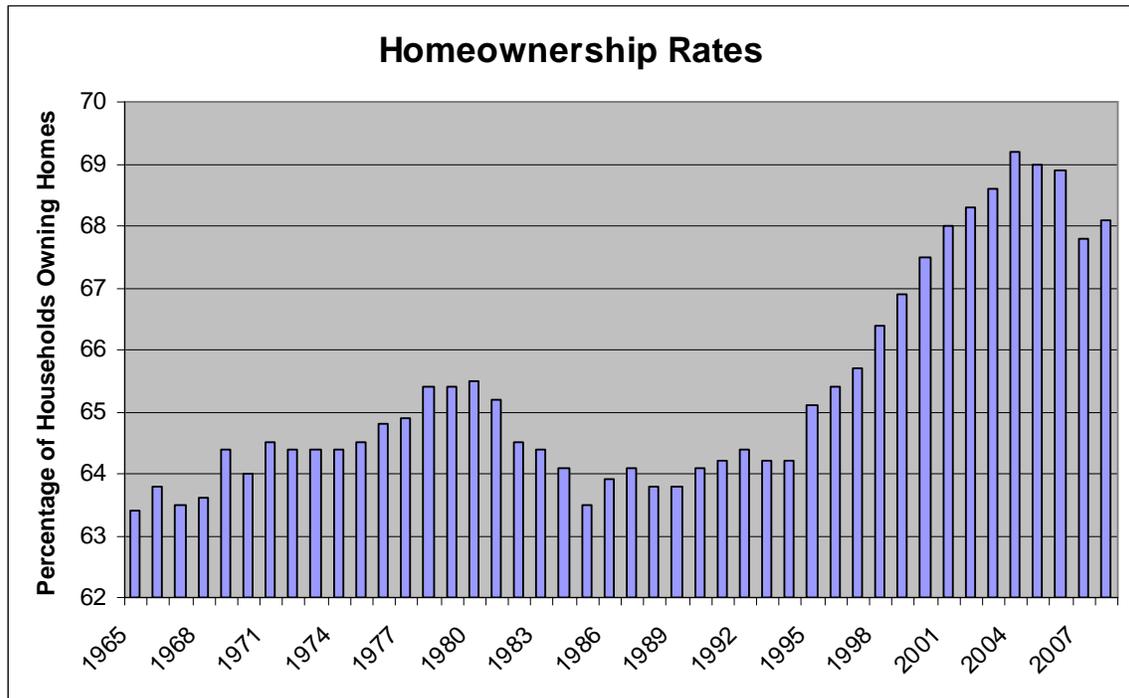
Homeownership grew rapidly beginning in the mid-1990s and continued to rise until it reached its peak in 2004, as seen in figure 1, below:

¹⁰ See discussion in Kristopher S. Gerardi & Paul S. Willen, *Subprime Mortgages, Foreclosures, and Urban Neighborhoods*, FED. RES. BANK OF BOSTON No. 08-6 (Dec. 22, 2008).

¹¹ Fernando Ferreira, Joseph Gyourko & Joseph Tracy, *Housing Busts and Household Mobility* (Nat'l Bureau of Econ. Research Working Paper No. 13410, 2008), available at <http://www.nber.org/papers/w14310>; Robert D. Dietz & Donald R. Haurin, *The Social and Private Micro-Level Consequences of Homeownership*, 54 J. URB. ECON. 401, 405 (2003).

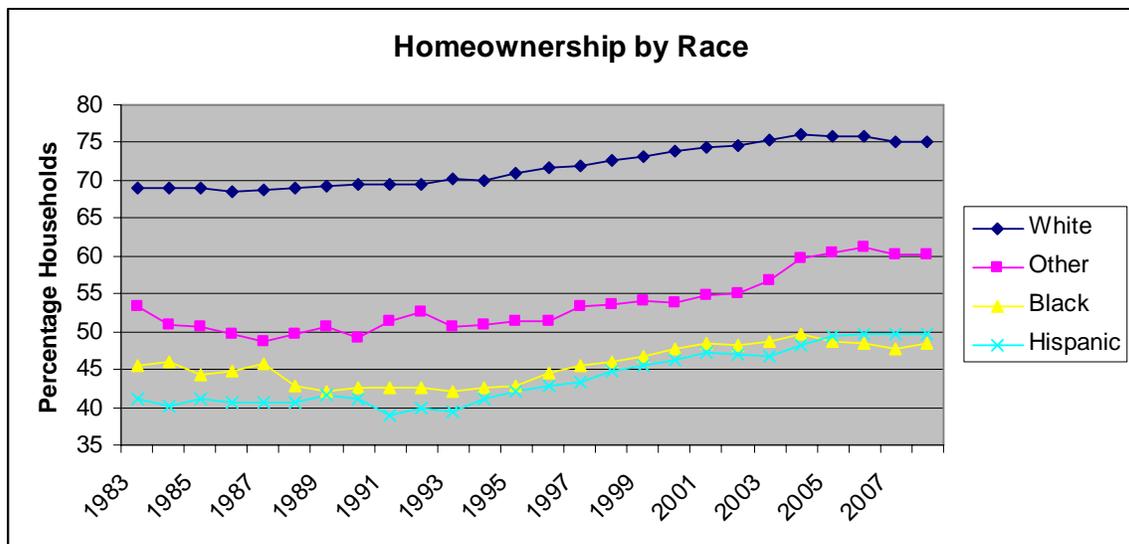
¹² See Melissa B. Jacoby, *Homeownership Risk Beyond a Subprime Crisis: The Role of Delinquency Management*, 76 FORDHAM L. REV. 2261 (2008).

Figure 1



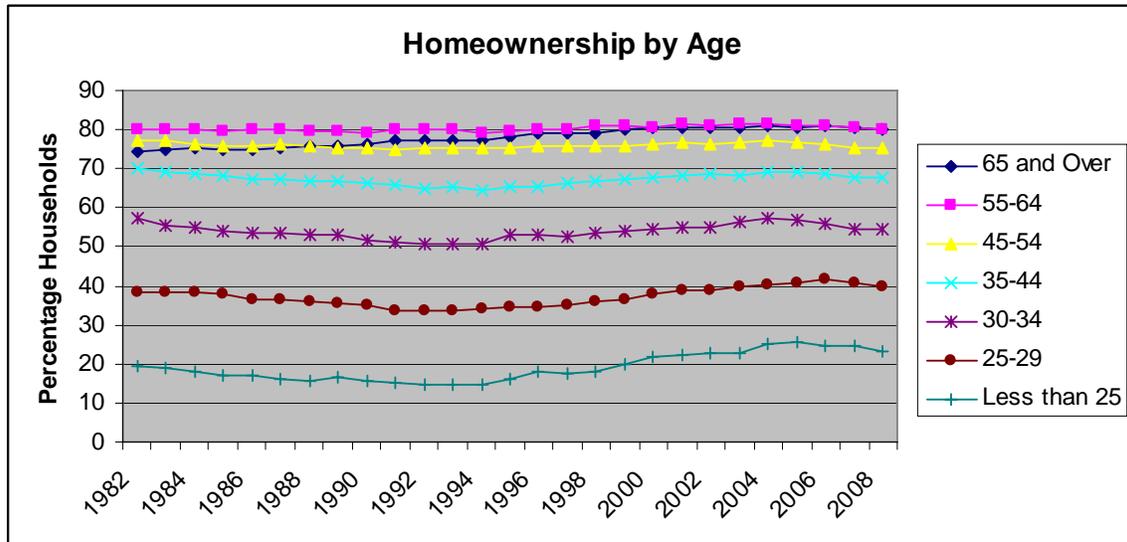
Ownership by minority groups grew during the period of expanding homeownership:

Figure 2



And the young:

Figure 3



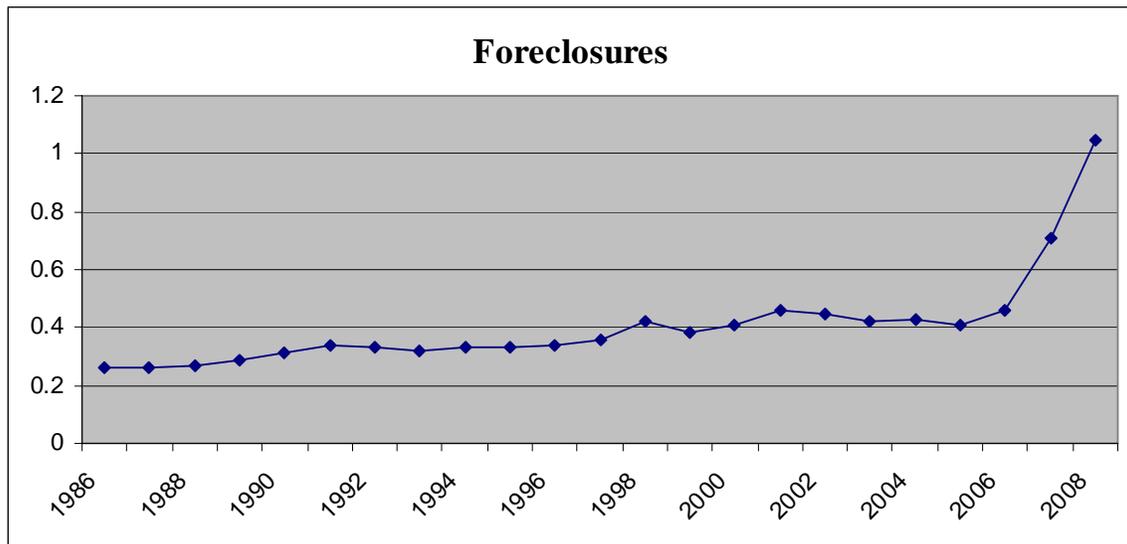
The Rise and Fall of the Mortgage Market

Beginning in late 2006 and continuing into 2007 and 2008, the United States residential real-estate market collapsed into widespread turmoil. Foreclosures rose steeply, resulting in chaos in the banking industry as well as complex securities backed by these mortgages collapsed in value. One Web site tracking the subprime bust has estimated that as of September 2009, 360 lenders have “imploded” since late 2006—i.e., gone bankrupt, halted major lending operations, or been sold at a “fire sale” price.¹³

In fact, the American economy has suffered an unprecedented rise in foreclosures. Figure 4 illustrates foreclosure start rates by yearly average over the past several decades.

¹³ The Mortgage Lender Implode-O-Meter Homepage, <http://ml-implode.com/> (last visited September 27, 2008).

Figure 4



The surge in foreclosures is often attributed to the growth of the subprime segment of the market during the 1990s and 2000s and the extension of mortgages to high-risk consumers who historically were locked out of the mortgage market. Congress, the Department of Housing and Urban Development, and Fannie Mae and Freddie Mac all encouraged more lending to higher-risk borrowers.¹⁴ Others have argued that this growth in high-risk lending was spawned by the rise of securitization of mortgages by Wall Street, which created an “originate to distribute” model of reckless lending.¹⁵ Whatever the inspiration for increased lending to higher-risk borrowers, to make these loans possible mortgage originators developed a variety of novel lending products, such as no or low downpayments, interest-only loans, reverse amortization, no- or low-documentation loans, and loans with high loan-to-value (LTV) ratios. In turn, many of

¹⁴ Russell Roberts, *House Government Stoked the Mania*, WALL ST. J., Oct. 3, 2008; Peter J. Wallison & Charles W. Calomiris, *The Last Trillion-Dollar Commitment: The Destruction of Fannie Mae and Freddie Mac*, AM. ENTER. INST. FOR PUB. POLICY RESEARCH, Sept. 30, 2008, available at http://www.aei.org/docLib/20080930_Binder1.pdf.

¹⁵ On the other hand, those involved at every step in the loan process from origination to securitization to default insurance have suffered massive losses from the collapse of the subprime market thus it doubtful that this “originate to distribute” model explains much of the rise and fall of the subprime market. See Todd J. Zywicki and Joseph A. Adamson, *The Law and Economics of Subprime Lending*, 80 U. COLO. L. REV. 1 (2009).

them were securitized and sold throughout the United States and the world leading to global economic problems. Additionally, there was a severe deterioration in underwriting standards during the subprime boom and growth in more risky loan products.

While foreclosures (like bankruptcy) often result from forces outside the household's control (such as unemployment), many consumers act rationally and respond to incentives in deciding whether to permit default and foreclosure. Changing the incentives to default will have an effect on the propensity of borrowers to default and permit foreclosure, which results from three basic factors: adverse "trigger" events, mortgage payment shock, and negative home equity. Each of these three factors has dovetailed to contribute to the extraordinary foreclosure rates that developed.

Adverse Trigger Events.

Foreclosure can be caused by adverse life "trigger" events, such as job loss, divorce, illness, or some other factor that causes an unexpected dramatic drop in household income or increase in expenses. Although many of these factors are chronic and universal aspects of the human condition, others can cause foreclosure spikes in particular places at particular times. Macroeconomic trends play a substantial role in increased mortgage default and delinquency.

Delinquencies and foreclosures began to rise in Michigan, Ohio, and Indiana,¹⁶ before the rest of the country as a result of troubles in the American automotive industry and resultant layoffs and plant closures.¹⁷ Major natural disasters may also trigger

¹⁶ *Where Subprime Delinquencies are Getting Worse*, WALL ST. J. ONLINE, Mar. 29, 2007, at Map 2, available at <http://online.wsj.com/public/resources/documents/info-subprimemap07-sort2.html> (click "Map 2" header) (data provided by First American Loan Performance).

¹⁷ Chris Mayer, Karen Pence & Shane M. Sherlund, *The Rise in Mortgage Defaults*, 23 JOURNAL OF ECONOMIC PERSPECTIVES 27-50 (2009), at 45.

geographical surges in foreclosure, as resulted in the areas of Louisiana and Mississippi affected by hurricane Katrina in 2005 following the expiration of a temporary moratorium period.¹⁸ Problems in local labor markets also exert downward pressures on local home prices, making refinancing more difficult and reducing incentives to retain a home in the face of financial pressures. Thus, the adverse trigger events theory of foreclosures explains some element of regional and temporal variations in foreclosures over time.

Yet foreclosures rates in states such as California and Florida are much higher than in these economically hard-hit states.¹⁹ Adverse trigger events plainly cannot explain the record levels of foreclosures of recent years. Indeed, during the time that foreclosures skyrocketed, the economy remained relatively robust, with low unemployment and modest but positive economic growth. Indeed, whereas the adverse trigger events theory posits that rising foreclosures result from recession and a slowing economy, during the recent foreclosure crisis that basic causal relationship has been reversed—the dramatic rise in foreclosures has *caused* the subsequent financial crisis and recession.

Moreover, foreclosure and delinquency do not necessarily indicate the presence of unaffordable loans, predatory loans, rising interest rates, or borrowers under duress, especially with respect to subprime loans. Borrowers face a number of options with their loans—timely repayment, prepayment, delinquency, or default followed by foreclosure. Although the latter two options typically are assumed to be evidence of financial distress, the reality is more complicated. There is some evidence that subprime borrowers use their mortgages as a type of line of credit and choose to miss an occasional payment and

¹⁸ *Id.*

¹⁹ See National Association of Realtors Field Guide to Foreclosures, updated February 2009, available at <http://www.realtor.org/library/library/fg329>.

remain delinquent in order to smooth temporary financial problems.²⁰ In fact, loans that are delinquent over a long period of time typically terminate in prepayment rather than eventual default.²¹ This counterintuitive finding suggests that these homeowners are likely using the opportunity to remain delinquent to take advantage of the “free rent” of the delinquency period, using the opportunity to miss payments in order to smooth their income and manage their finances and to simply take advantage of the opportunity to delay and develop a solution to the problem.²²

Mortgage Payment Shock.

Foreclosure can also result from an unexpected increase in a household’s monthly payment obligations. In recent years, this resulted from the proliferation of adjustable-rate and “hybrid” ARM loans that had an initial period of a fixed “teaser” rate followed by adjustable rates for the duration of the loan. The easy-money policies followed by the Federal Reserve in the wake of the September 11, 2001 terrorist attacks opened up a substantial gap in market interest rates between short-term and long-term mortgages. Subsequent tightening of Fed monetary policy closed this gap, triggering resets on mortgage payments at higher rates. Borrowers who took ARMs initially were able to qualify for much larger principle amounts than was possible at long-term interest rates. Many of the states with the greatest percentage of ARMs (especially California and Florida) also saw the fastest run-ups in housing prices—and now the highest foreclosure rates.

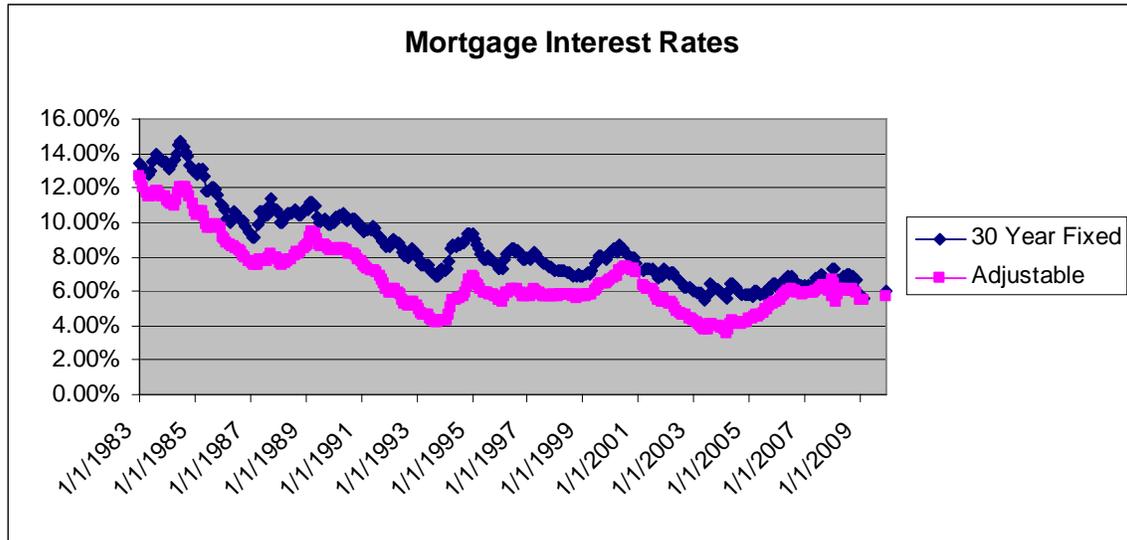
²⁰ Cutts & Van-Order, *On the economics of subprime lending* at 172. Even with penalties, the cost of credit through a delinquent mortgage is often lower than the alternatives a subprime borrower faces.

²¹ Michelle A. Danis & Anthony Pennington-Cross, *A Dynamic Look at Subprime Loan Performance* 13 (Fed. Res. Bank of St. Louis, Working Paper 2005-029A, May 2005), available at <http://research.stlouisfed.org/wp/2005/2005-029.pdf>.

²² *Id.*

Interest rates have generally fallen over the past twenty-five years following the exceedingly high mortgage interest rates of the early 1980s, as shown in figure 5.

Figure 5



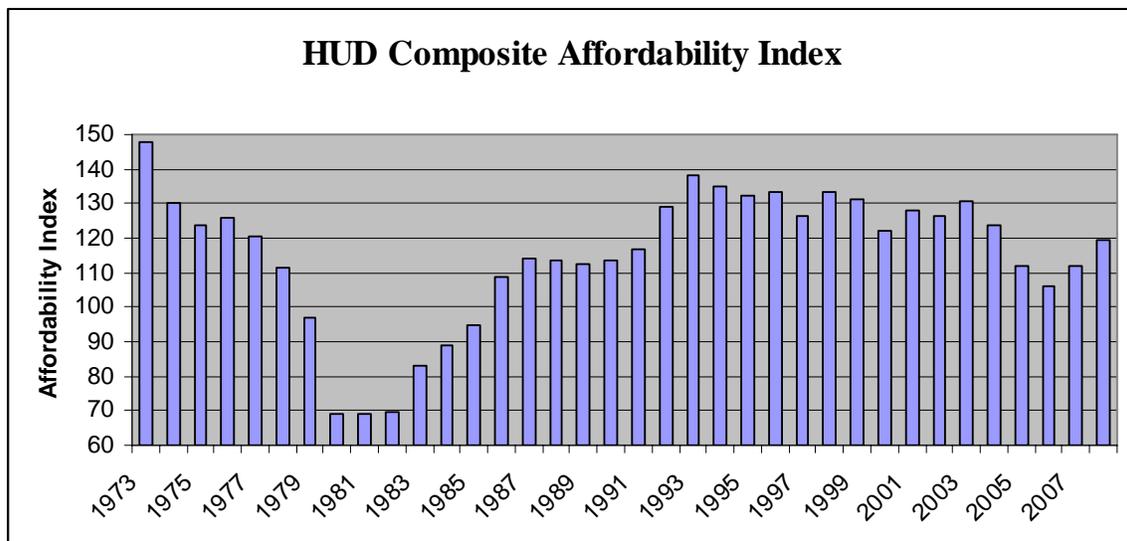
Falling interest rates probably reflect a general consensus in the western world about the value of low-inflation policies and steady economic growth in many countries that kept economic growth ahead of any inflation. Whatever the cause of this downward trend in interest rates over the past two decades, they were low during the period of the house price boom and short-term interest rates even dipped into what was likely a negative interest rate in light of actual inflation.

More important, however, was the pattern of interest rates during the crucial period of 2001–2007. Interest rates on 30-year fixed-rate mortgages remained relatively steady during that period. Interest rates on adjustable rate mortgages, by contrast, dipped to extraordinarily low interest rates, reflecting the Federal Reserve’s “easy money” policy during this period. These low ARM interest rates allowed many borrowers—both prime and subprime borrowers—to qualify for much larger mortgages than would otherwise be

the case. As can also be seen, however, beginning in 2004 the Federal Reserve began raising interest rates, causing a dramatic rise in the ARM rate, until by 2006 the interest rate on ARM and FRM mortgages had essentially converged.

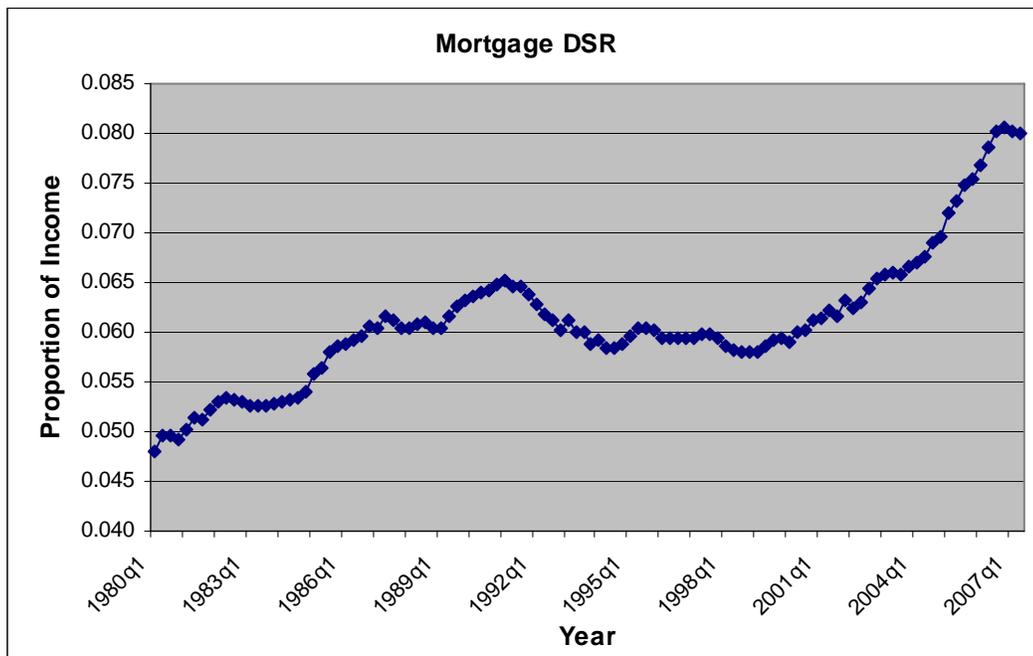
The Federal Reserve's monetary policy generated an incentive to consumers to utilize ARMs to finance their homes. These recent low-interest rates also seems to have had a measurable effect on consumers' abilities to afford a home, despite the general rise in prices. Figure 6 presents the "Housing Affordability Index," as reported by the Department of Housing and Urban Development, which measures the ratio of median family income to the income necessary to qualify for a mortgage to purchase the median-priced house at prevailing interest rates. Thus, an index value of over 100 indicates that the typical (median) family has more than sufficient income to purchase the median-priced home. As seen in the data, home affordability appears to keep pace with the previous two decades over the past few years despite a jump in housing prices. Favorable interest rates likely facilitated the larger mortgages that kept affordability at a stable level during the past several years.

Figure 6



Despite relatively stable affordability during the recent rise in the housing market, however, a large number of highly leveraged buyers became homeowners during this time. Figure 7 shows data from the Federal Reserve on the mortgage debt service ratio—the percentage of monthly income dedicated to mortgage debt service since 1980.

Figure 7

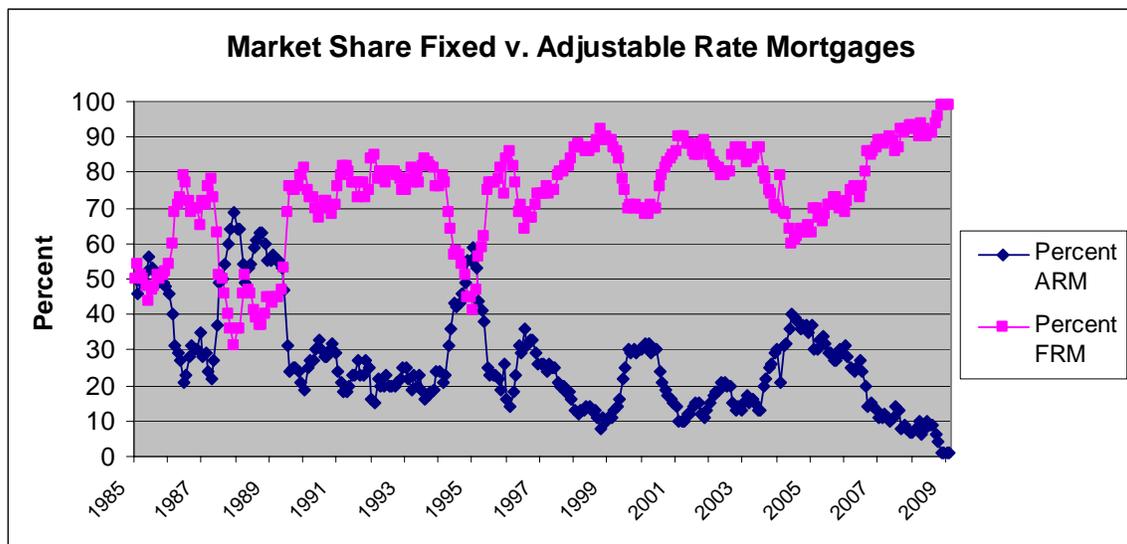


The portion of disposable income, that is post-tax income, going to pay off mortgage debt rises from 1980 to the early 1990s, after which it hovers around 6 percent until a rise beginning in 2000. While the recent increase may be described in part by a rising tax burden or the upward surge in the stock market, which left many homeowners feeling wealthier and led them to convert stocks into larger mortgages, there is another potential factor at play. Due to low-interest-rate loans and the increasing availability of adjustable-rate mortgages, more financially marginal homeowners were likely entering the market. Indeed, during the period that saw an increasing homeownership rate and

stable affordability, the proportion of income spent on mortgages sees its sharp rise. Presumably, lower-income homebuyers holding larger mortgages than they used to have greatly contributed to the increase seen in the figure above.

While there may be discussion on the extent to which riskier homeowners have contributed to the trend of increased income spent on mortgages, it is certain that more and more buyers took advantage of ARM mortgages to finance housing purchases. The large dip in ARM interest rates, relative to interest rates for FRM mortgages, led to a general growth in ARMs during the past several years, as shown in figure 8.

Figure 8

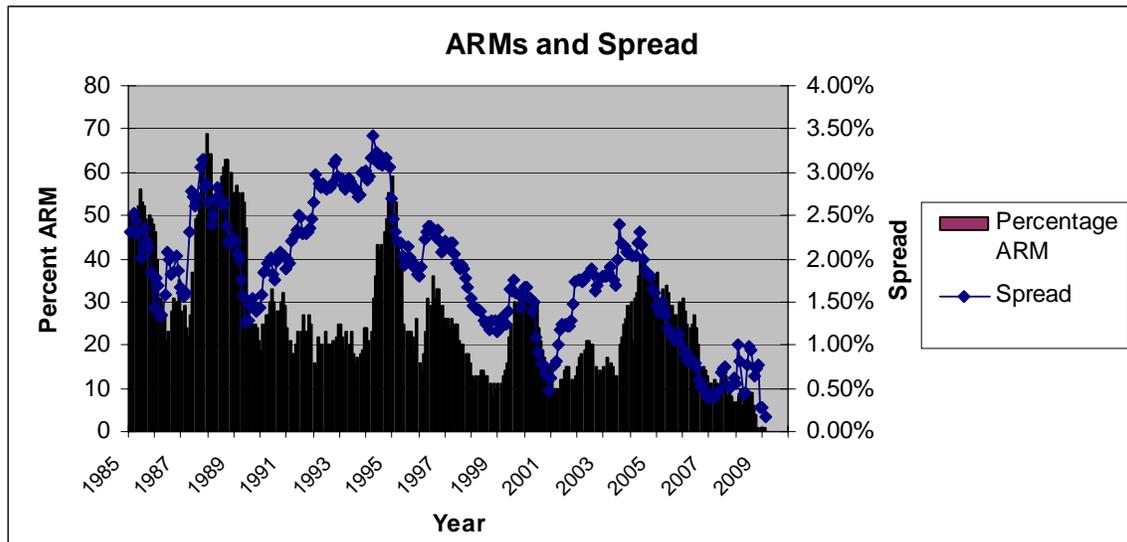


As can be seen, the ratio of ARMs to FRMs rose during the period of low ARM interest rates. But this high market share for ARMs is not unprecedented. ARMs are not uncommon in recent American history and, in fact, were much more common in the past than in recent years. In 1984, ARMs comprised 61 percent of the *conventional* mortgage market and in 1988 the figure was 58 percent. Moreover, ARMs (with average loan terms substantially shorter than the 30-year term in the United States) are standard fare in the

rest of the world and efforts to introduce the American 30-year fixed-rate mortgage have generally failed. This suggests that ARMs are not inherently dangerous products.

The popularity of ARMs appears to be driven by one overriding factor—the spread between fixed and adjustable rates, i.e., as the spread between fixed and adjustable rates widens, consumers shift to adjustable rates. As seen in figure 9, over time there is a clear relationship between the spread between interest rates on ARM and FRM mortgages and the percentage of mortgages that are ARMs.

Figure 9



At the height of the housing boom in 2004, the spread between ARMs and FRMs was about two percentage points and about 40 percent of the mortgages that were written were ARMs. As can be readily seen, however, the percentage of ARMs was even higher at times in the past, yet this did not lead to a financial calamity. This strongly suggests that ARMs are not inherently dangerous.

Fixed-rate mortgages provide homeowners with insurance against fluctuations in interest rates. And as figure 9 illustrates, this insurance usually is far from free:

Borrowers pay about 100 basis points on average to avoid bearing this risk (and sometimes more than 200 basis points). The risk of ARMs is that one's mortgage interest rate will rise if interest rates rise. But the equally obvious benefit of an ARM is that one's interest rate will fall if interest rates fall. Although adjustable-rate mortgages appear unreasonably risky when interest rates rise, it must be recognized that they are also equally beneficial when interest rates fall. For a fixed-rate borrower to benefit from falling interest rates, she had to incur the substantial cost and hassle of refinancing the mortgage as well as the uncertainty about whether interest rates would go still lower. Because ARMs offer lower interest rates, they may also be especially attractive to homeowners who plan to move within a few years and thus have little need to pay a premium to buy "insurance" to hedge against long-term fluctuations in interest rates.

Interest-rate resets connected to adjustable-rate mortgages helps to explain the rapid rise in foreclosure rates. Moreover, it helps to explain the spread of the foreclosure contagion beyond the subprime market into the prime market in many areas, as seen in figures 10 and 11.

Figure 10

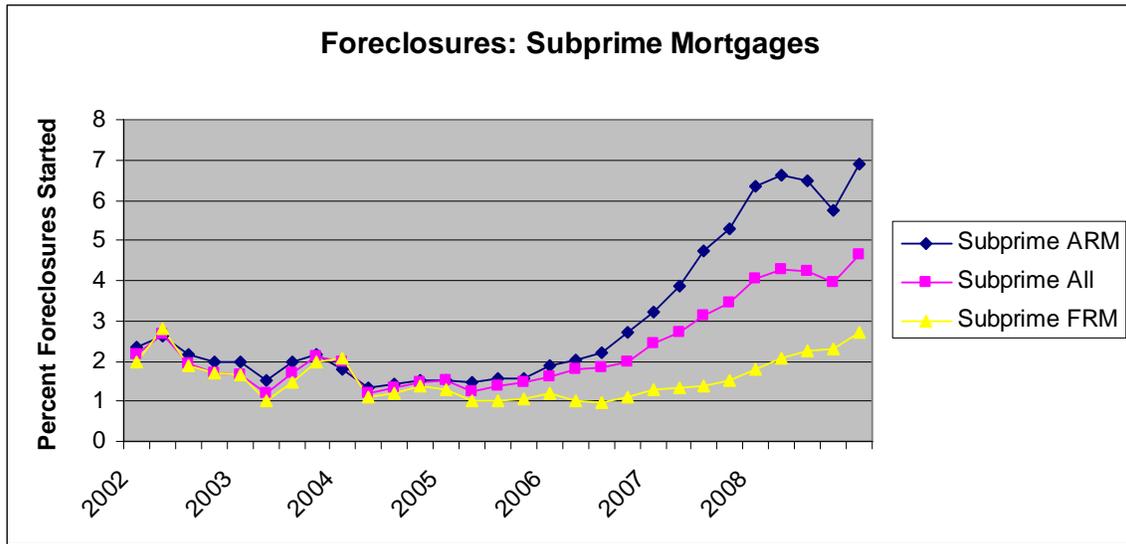
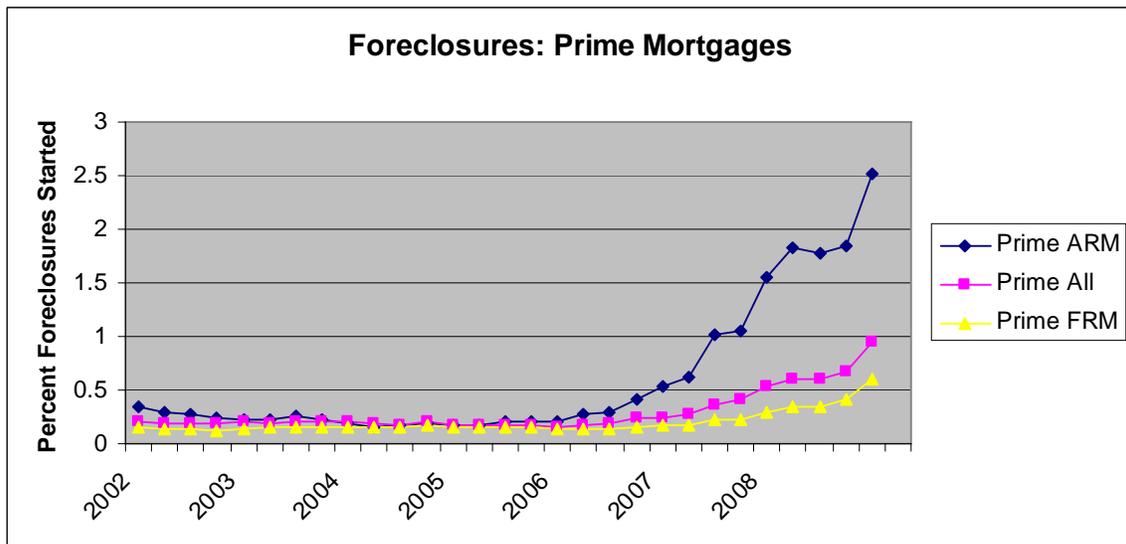


Figure 11



As can readily be seen, the initial surge in foreclosures for *both* prime and subprime mortgages were a manifestation of ARMs, not of subprime lending. A dramatic rise in the subprime ARM foreclosure rate begins in 2006, and although the foreclosure rate on subprime FRMs rises, it actually remains *lower* than at periods in the past. A similar pattern can be seen observed in the prime mortgage market—the growth in ARMs greatly

outpaces the growth in FRMs. In part this distinction in default rates reflects differential sorting by lenders among subprime borrowers for fixed- and adjustable-rate mortgages as subprime ARM borrowers have substantially lower FICO credit scores and higher combined LTV ratios than subprime FRM borrowers.²³ The difference, however, is not huge and it is difficult to imagine that the characteristics of the borrowers alone rather than the characteristics of the loans themselves explain the dramatically different performance of these loans.

In short, the “payment shock” theory may have some validity in the current climate although the mechanism of transmission is difficult to understand. The artificial lowering of interest rates from 2001–2004 pushed down short-term interest rates, allowing borrowers to qualify for larger mortgages than they otherwise could. But this was a phenomenon that was not limited to the subprime market. On the other hand, ARM-related payment shock does not provide a comprehensive explanation of all foreclosures. One estimate of subprime loans facing foreclosure in the early wave of foreclosures found that 36 percent were for hybrid loans (with an initial fixed period, followed by adjustable rates for the duration of the loan), fixed-rate loans account for 31 percent, and adjustable-rate loans for 26 percent.²⁴ Of those loans in foreclosure, the overwhelming majority entered foreclosure *before* there was an upward reset of the interest rate.²⁵ Most defaults on subprime loans occur within the first 12 months of the

²³ Mayer, Pence & Sherlund, *The Rise in Mortgage Defaults*, *supra* note 17 at 32.

²⁴ James R. Barth et al., *Mortgage Market Turmoil: The Role of Interest-Rate Resets*, in SUBPRIME MORTGAGE DATA SERIES (Milken Inst.) (2007); C.L. Foote, K. Gerardi, L. Goette & P.S. Willen, *Subprime Facts: What (We Think) We Know about the Subprime Crisis and What we Don't*, FED. RES. BANK BOSTON PUBLICLY POLICY DISCUSSION PAPER 08-02 (2007); Mayer, Pence & Sherlund, *The Rise in Mortgage Defaults*, *supra* note 17.

²⁵ Barth at 18, available at <http://www.ghb.co.th/en/Journal/Vol2/07.pdf>. Of those subprime loans in foreclosure, 57 percent of 2/28 hybrids and 83 percent of 3/27 hybrids “had not yet undergone any upward reset of the interest rate.”

loan, well before any interest adjustment.²⁶ Furthermore, after examining the evidence, several economists from the Boston Federal Reserve flatly state, “Interest-rate resets are not the main problem in the subprime market.”²⁷

Economists generally conclude that of more importance to foreclosures is falling house prices—the interest rate on a mortgage is largely irrelevant if the borrower can refinance or sell out of the mortgage. It is only when the borrower is unable to sell or refinance that the interest rate matters, thus adjustable rate or hybrid mortgages matter for foreclosures only in a falling real-estate market. Mortgages with positive equity tend to terminate in a prepayment of the mortgage (either as the result of a sale or refinance) whereas those with negative equity tend to terminate in foreclosure.²⁸

The relationship between ARMs and foreclosures appears to have been a manifestation of the unique circumstances of the past several years rather than an inherent problem of ARMs. The percentage of ARMs in the market have been much higher at times in the past, yet they did not previously result in the surge of foreclosures that have resulted in the most recent environment. In fact, adjustable-rate mortgages are the norm in most of Europe and the rest of the world without the catastrophic events that have transpired in the United States in recent years.²⁹ The primary difference, it appears,

²⁶ Mayer, Pence & Sherlund, *The Rise in Mortgage Defaults*, *supra* note 17 at 41; Shane Sherlund, *The Past, Present, and Future of Subprime Mortgages*, Federal Reserve Board (Sept. 2008); Kristopher Gerardi, Adam Hale Shapiro & Paul S. Willen, *Subprime Outcomes: Risky Mortgages, Homeownership Experiences, and Foreclosures*, Federal Reserve Bank of Boston Working Paper No. 07-15. Mayer, Pence, and Sherlund find a dramatic rise in “early payment defaults” well before any interest rate adjustment takes place.

²⁷ Christopher L. Foote, Kristopher Gerardi, Lorenz Goette, and Paul S. Willen, *Subprime Facts: What (We Think) We Know about the Subprime Crisis and What We Don't*, FED. RES. BANK OF BOSTON PUBLIC POLICY DISCUSSION PAPERS 2 (May 30, 2008). Other studies have confirmed this conclusion about the limited role of interest-rate resets in driving increased foreclosures when compared to falling house prices and deteriorating underwriting standards. See Patrick Bajari, Chenghuan Sean Chu & Minjung Park, *An Empirical Model of Subprime Mortgage Default from 2000 to 2007*, NBER WORKING PAPER 14625 (Dec. 2008) (finding that interest rate resets play a positive, but relatively minor role, in defaults).

²⁸ Anthony Pennington-Cross, *The Duration of Foreclosures in the Subprime Mortgage Market: A Competing Risks Model with Mixing 4-5* (Fed. Reserve Bank of St. Louis, Working Paper No. 2006-027A, 2006).

²⁹ Richard K. Green & Susan M. Wachter, *The American Mortgage in Historical and International Context*, 19 J. ECON. PERSP., Fall 2005, at 93, 107–08 (2005). Most other countries also have shorter mortgage maturity payments combined with a final balloon payment in contrast to the 30-year fixed-rate self-amortizing mortgage that is standard in the United States.

is that in recent cases, the interest rates on ARMs were pushed artificially and unsustainably low, thus the eventual interest-rate reset resulted in the interest rate on ARMs *rising* back to the level of FRMs, rather than FRMs falling to the level of ARMs (as was generally the case in the past). It appears that it is only when ARMs are combined with a monetary policy that pushed short-term interest rates to unsustainably low rates that ARMs became a problem.

Negative Home Equity

The decision to maintain homeownership or default and allow foreclosure can be modeled as a financial option. Where the option is “in the money” (i.e., the home is worth more than the amount owed) the homeowner can treat the house as a “call” option—if the homeowner is unable or unwilling to make her monthly payments (perhaps because she is moving) then she can either sell the home or refinance it and pay off the underlying mortgage. Thus, the option to allow foreclosure is of low value to the homeowner in a rising market because the homeowner can instead sell or refinance the house and pocket the equity. But where the house has negative equity (often referred to as “under water” or “upside down”), then the consumer has a put option—either she can continue to pay the mortgage and retain ownership or exercise the “option” to default and allow the lender to foreclose. If this option rises in value or becomes less expensive to exercise, homeowners will become more likely to exercise it.

Under the option theory of foreclosure, therefore, the decision to allow default is essentially a voluntary and rational response to the incentives created by the change in value of the asset—the borrower *could* continue to service the loan but chooses not to.

Default and foreclosure result because the borrower strategically chooses the option of foreclosure over the option of continued payment of the loan. Empirical studies traditionally have tended to support the option theory of foreclosure.³⁰ For instance, even though interest rates generally rise uniformly across the country, the foreclosure rate is lower for residential real estate where price appreciation has been higher.³¹ This suggests that in deciding whether to default the primary consideration by homeowners is the amount of equity that they have accrued in their property (which might be lost in the event of a foreclosure) rather than “payment shock” resulting from an unexpected rise in interest rates. Similarly, those who have drawn against accumulated home equity through home-equity loans or junior liens exhibit a greater propensity to default than those who have retained their equity.³²

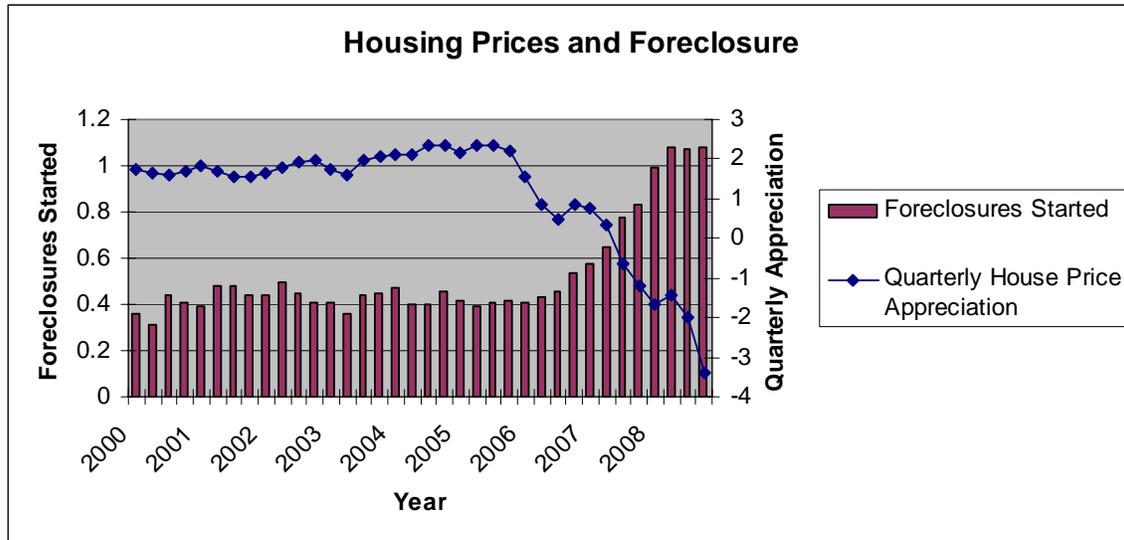
Falling real-estate prices helps to explain the rising foreclosure rate. There is a very close relationship between the timing of the nationwide drop in housing prices and the rise in the foreclosure rate. This striking relationship can be seen in figure 12 below and seems to lend support to this option theory:

Figure 12

³⁰ See Kerry D. Vandell, *How Ruthless Is Mortgage Default? A Review and Synthesis of the Evidence*, 6 J. HOUSING RES. 245 (1995); James B. Kau & Donald C. Keenan, *An Overview of the Option-Theoretic Pricing of Mortgages*, 6 J. HOUSING RES. 217 (1995); Patric H. Hendershott & Robert Van Order, *Pricing Mortgages: An Interpretation of the Models and Results*, 1 J. FIN. SERVICES RES. 19 (1987).

³¹ Mark Doms, Frederick Furlong & John Krainer, *House Prices and Subprime Mortgaged Delinquencies* 1–2 (FRBSF ECON. LETTER NO. 2007-14, 2007); Brent W. Ambrose, Charles A. Capone, Jr. & Yongheng Deng, *Optimal Put Exercise: An Empirical Examination of Conditions for Mortgage Foreclosure*, 23 J. REAL EST. FIN. & ECON. 213, 218 (2001) (higher default rates where home price appreciation slower); Kristopher Gerardi, Adam Hale Shapiro & Paul S. Willen, *Subprime Outcomes: Risky Mortgages, Homeownership Experiences, and Foreclosures* 2–3 (Fed. Res. Bank of Boston, Working Paper No. 07-15, 2008), available at <http://www.bos.frb.org/economic/wp/wp2007/wp0715.pdf> (concluding that dramatic rise in Massachusetts foreclosures in 2006-07 resulted from decline in house prices beginning in summer 2005); Ellen Schloemer, Wei Li, Keith Ernst & Kathleen Keest, *Losing Ground: Foreclosures in the Subprime Market and Their Cost to Homeowners*, CRL RES. REPORTS, (Ctr. for Responsible Lending, Durham, N.C.), Dec. 2006, at 1, 13.

³² See Michael LaCour-Little, *Equity Dilution: An Alternative Perspective on Mortgage Default*, 32 REAL ESTATE ECON. 359, 369 (2004).



Source: OFHEO Home Price Index (Sales) and Mortgage Bankers Association

Another practice that increased the incentives for strategic default was the growth of lending products that reduced certain homeowners' equity investments in their loans, such as low or no-downpayment loans, as well as certain lending products like interest-only mortgages that meant that consumers accumulated no equity through their monthly payments.³³ Gerardi, et al., find that the most dramatic change in the subprime lending market over the course of the housing boom was the dramatic growth in the number of high loan-to-value (LTV) ratio loans in the latter stages of the boom.³⁴ While housing prices were rising, these loans performed exceedingly well, as borrowers could either sell or refinance if they were unable or unwilling to make payments. When housing prices turned down, however, high-LTV loans quickly went underwater, leaving homeowners with strong incentives to permit foreclosure.

³³ This latter factor may be of minimal importance, however, as 30 year conventional fixed mortgages provide for the payment of a much greater ratio of interest to principal at the beginning of the loan repayment term, thus equity accumulation is minimal for many years.

³⁴ Kristopher Gerardi, et al., *Making Sense of the Subprime Crisis*, BROOKINGS PAPERS ON ECONOMIC ACTIVITY (Douglas W. Elmendorf, N. Gregory Mankiw, and Lawrence Summers eds, Fall 2008) at 9-10.

The positive experience with unconventional products in the early stage of the boom, however, encouraged lenders to increasingly *combine* various unconventional terms, a practice known as risk layering. As housing prices started to decline, the combination of more than one unconventional term have proven particularly problematic and likely to trigger foreclosure, with the interaction between different risk-layering terms giving rise to a geometric increase in the propensity to default rather than being merely additive.

One technique that led to this result was the growing popularity of “piggyback loans.” With a piggyback loan, the borrower simultaneously takes out a first mortgage and a junior-lien (piggyback) loan. The piggyback loan finances the portion of the purchase price that is not being financed by the first mortgage.³⁵ Piggyback loans often were taken out so that the first-lien mortgage can meet the conforming loan size limits.³⁶ Virtually nonexistent in 2000, by 2006 about 22 percent of mortgage loans for owner-occupied houses also had piggyback second-lien mortgages attached.³⁷

As noted above, a primary factor driving foreclosure is the presence or absence of equity in the property. Thus, loans with little or no down payments (such as those with high LTV or mortgages combined with piggyback loans) offer an unusually powerful incentive to default if property values fall.³⁸ Lower downpayments are correlated with

³⁵ *Id.*

³⁶ *Id.* at A85.

³⁷ Robert B. Avery, Kenneth P. Brevoort & Glenn B. Canner, *The 2006 HMDA Data*, 93 FED. RESERVE BULLETIN A 73, at A85; *see also* EDWARD VINCENT MURPHY, CONGRESSIONAL RESEARCH SERVICE, ALTERNATIVE MORTGAGES: CAUSES AND POLICY IMPLICATIONS OF TROUBLED MORTGAGE RESETS IN THE SUBPRIME AND ALT-A MARKETS (2008), at 5. The apparent absence of piggyback loans before 2000, however, may overstate the distinction. Although the purchase-money lender did not traditionally provide a piggyback home equity loan, for many decades consumers who could not come up with a full 20% downpayment might borrow the needed amount from a consumer finance company (presumably on an unsecured basis). *See* PAUL MUOLO & MATHEW PADILLA, CHAIN OF BLAME: HOW WALL STREET CAUSED THE MORTGAGE AND CREDIT CRISIS 37 (2008).

³⁸ In fact, LaCour-Little, et al., conclude that negative equity for homes in foreclosure are more often the result of post-purchase cash-out refinancing or home equity loans are more responsible for the presence of negative equity than housing price declines. *See* Michael LaCour-Little, Eric Rosenblatt & Vincent Yao, Do Borrowers Facing Foreclosure Have Negative Equity? 20 (July 11, 2008) (working paper, available at <http://ssrn.com/abstract=1162398>).

higher rates of default³⁹ and lower LTV ratios are reflected in lower risk premiums in interest rates.⁴⁰ One study found that conventional mortgages with loan-to-value ratios at origination of 91–95 percent were twice as likely to default as loans with LTVs of 81–90 percent and five times more likely to default than those with LTVs of 71–80 percent.⁴¹

A related factor in the general reduction in homeowner equity cushion was the growing use of cash-out refinancing in recent years, especially in the later stages of the housing boom. The United States is almost unique in the world in adopting a general practice of permitting an almost unlimited right of mortgage prepayment and thus the ability to refinance at almost any time.⁴² Most commercial loans and subprime mortgages, by contrast, prohibit or penalize prepayment for certain periods of time at the outset of the mortgage.

From 2003 to 2006, the percentage of refinances that involved cash-out doubled from under 40 percent to over 80 percent,⁴³ and among subprime refinanced loans in the 2006–2007 period around 90 percent involved some cash out.⁴⁴ The result of this cash-out activity was similar to that of piggyback home-equity loans, namely to strip out borrower’s equity cushions, thereby making it more likely that a subsequent fall in the value of the home would bring the mortgage into negative equity and bring about circumstances for a default and foreclosure.

Anecdotal reports in the current market also report a growing number of “mortgage walkers” who are exercising their “put” option to voluntarily surrender their

³⁹ See *id.*

⁴⁰ See Gregory Elliehausen, Michael E. Staten & Jevgenijs Steinbuks, *The Effect of Prepayment Penalties on the Pricing of Subprime Mortgages*, 60 J. ECON. & BUS. 33, 34 (2008) (reviewing studies)

⁴¹ Robert B. Avery, Raphael W. Bostic, Paul S. Calem & Glenn B. Canner, *Credit Risk, Credit Scoring, and the Performance of Home Mortgages*, 82 FED. RES. BULL. 621, 624 (1996).

⁴² Green & Wachter, at 100-01.

⁴³ Luci Ellis, *The Housing Meltdown: Why did it happen in the United States?* Bank for International Settlements Working Paper No. 259 (2008), at 22 and Fig. 9.

⁴⁴ C J Mayer & Karen Pence, *Subprime Mortgages: What, Where, and To Whom*, NBER Working Paper no. 14083.

home to the lender, a practice known as “jingle mail” after the practice of the borrower mailing her keys to the lender and surrendering the house.⁴⁵ As house prices fall, mortgage walking has begun to spread beyond the subprime market. Kenneth Lewis of Bank of America recently observed that while in the past, consumers would default only after falling behind on car payments, credit cards, and other debts, there has been a general change in social norms regarding mortgage default.⁴⁶ Today, Bank of America reports a growing number of borrowers who are current on their credit cards but defaulting on their mortgages suggesting that “[a]t least a few cash-strapped borrowers now believe bailing out on a house in one of the easier ways to get their finances back under control.”⁴⁷ This temptation is especially strong for those homeowners who put little or nothing down or borrowed against their home equity.

The incentives to “walk” are especially strong in those states with antideficiency laws that limit creditor’s remedies to foreclosure without the right to sue the borrower personally for the deficiency. In a study of the neighboring provinces of Alberta and British Columbia in Canada, Lawrence Jones found that “in a period of sizable house-price declines, the prohibition of deficiency judgments can increase the incidence of default by two or three times over a period of several years.”⁴⁸ In fact, in Alberta (which had an antideficiency law) 74 percent of those who deliberately defaulted had negative equity; in British Columbia (which permitted deficiency suits) only one homeowner defaulted with negative book equity.⁴⁹ Moreover, if it is the case (as it appears to be) that the propensity for default and foreclosure is a function in part of state laws regarding the

⁴⁵ Nicole Gelinas, *The Rise of the Mortgage “Walkers,”* WALL ST. J., Feb. 8, 2008, at A17.

⁴⁶ George Anders, *Now, Even Borrowers With Good Credit Pose Risks,* WALL ST. J., Dec. 19, 2007, at A2.

⁴⁷ *Id.*

⁴⁸ Lawrence D. Jones, *Deficiency Judgments and the Exercise of the Default Option in Home Mortgage Loans,* 36 J. L. & ECON. 115, 135 (1993).

⁴⁹ *Id.* at 128–29. Jones states that the one defaulter in British Columbia reportedly left the country. *Id.* at 129.

collection of deficiency judgments and judicial foreclosure actions and that lenders have already priced that risk *ex ante* in the loan, this raises questions about the propriety as a matter of equity and efficiency of governmental “bail outs” for distressed borrowers and lenders.

Even where the laws do not mandate that mortgages are nonrecourse, lenders have exhibited willingness to voluntarily waive an action for deficiency.⁵⁰ Although laws vary among states, over a dozen states have some type of antideficiency laws that limit creditors to seizure of the property in the event of default, with no right of recourse against the borrower personally. Many of the states with antideficiency laws, such as California and Arizona,⁵¹ are also among the states with the highest foreclosure rates. Other high-foreclosure states, such as Nevada and Colorado, have laws that limit the amount that lenders can recover from borrowers but do not bar deficiency judgments completely. Antideficiency laws also appear to affect homeowners’ incentives to maintain their property—homeowners in states that have antideficiency laws may be less willing to invest in maintenance and improving their homes.⁵²

What Happened?

The underlying cause of the housing boom and bust, and the subsequent rise in foreclosures, thus seems to be largely explained by two fundamental factors. First, artificially low short-term interest rates, relative to long-term interest rates that provided

⁵⁰ There is also evidence that subprime lenders tend to foreclose much more slowly. See Dennis R. Capozza & Thomas A. Thomson, *Subprime Transitions: Lingering or Malingering in Default?*, 33 J. REAL ESTATE FIN. ECON. 241, 257 (2006).

⁵¹ See Michael T. Madison, Jeffrey R. Dwyer & Steven W. Bender, 2 THE LAW OF REAL ESTATE FINANCING §12:69 (Dec. 2007), available in Westlaw REFINLAW § 12:69.

⁵² John Harding, Thomas J. Micelli & C.F. Sirmans, *Deficiency Judgments and Borrower Maintenance: Theory and Evidence*, 9 J. HOUSING ECON. 267, 271 (2000); see also John Harding, Thomas J. Micelli & C.F. Sirmans, *Do Owners Take Better Care of Their Housing Than Renters?*, 28 REAL ESTATE ECON. 663, 669–70 (2000).

incentives for consumers to switch from fixed-rate to adjustable-rate mortgages, allowed borrowers to qualify for larger mortgages than would otherwise be the case, and resulted in trouble for some borrowers who were unable to make their payments when short-term interest rates rose. This household financial distress was exacerbated as the economy dipped into recession, piling traditional causes of foreclosures (such as job loss), on top of this distress caused by interest-rate adjustments. Second, a rapid, severe, and sustained fall in house prices provided many consumers with an incentive to exercise their default option and to allow foreclosure to go forward on their homes. This was exacerbated by a variety of factors, including new mortgage lending practices that led to little or no equity for many homeowners and certain states' laws that provide great protection for borrowers in the event of a foreclosure, such as antideficiency or non-recourse laws.

Basic economic theory, therefore, seems to explain most of the underlying dynamics of rising foreclosure rates and bankruptcy filing rates by explaining the basic decision-making of homeowners. On the other hand, this analysis does not address the more fundamental questions, which are: Why did the housing price bubble develop as it did, why did foreclosures rise so dramatically as house prices fell, and why did Wall Street and the banking industry so badly misjudge the financial problems?

Conventional wisdom about the mortgage crisis provides several hypotheses, such as the rise of securitization of mortgage debt or the role of government policies that provided incentives for overinvestment in housing and reckless credit expansion to poor risks. Although the causal mechanisms differ, these hypotheses share a common similarity that they both interpret the fundamental cause of the mortgage crisis as increased reckless lending to risky borrowers or loan terms that were excessively risky.

On closer examination, however, while these factors may have exacerbated the underlying mortgage crisis, it is doubtful that they can explain the fundamental nature of the housing boom and bust.

The Two Phases of the Mortgage Crisis

Before looking in some detail about the causes of the housing boom and bust, it is important to consider an often-overlooked element of the crisis; namely, that there are really two phases of the housing boom and mortgage crisis, one lasting from about 2001–2004 and a second running from about 2005–2007. While loan performance during the later phase (2005–2007) has been disastrous, loan performance during the earlier phase was largely non-problematic, even those loans that contained particular terms that have subsequently drawn criticism, such as hybrid mortgages, low-documentation loans, and low-downpayment loans. Indeed, as will be developed more below, it is likely that the disastrous collapse of the housing and mortgage markets came about precisely *because* the strong performance of non-traditional loans in the first phase of the credit expansion encouraged more aggressive loans in the second phase of the boom.

Empirical data provide a picture of the differences between these two periods of the housing boom. A few key differences between the two phases of the housing boom emerge when examining the data. The most important factor—to put the matter quite simply—is that house prices were rising in many parts of the country in the early stages of the mortgage boom. Second, the structure of the loans in the later phase of the housing boom were substantially different from the first phase. In particular, in the first phase many subprime borrowers were at least as risky as borrowers in the second phase;

moreover, many of the loans issued in the first phase included many of the features that were later criticized, such as low-documentation, low-downpayment, or interest-only loans. The difference in the second phase, however, was that loans increasingly *combined* these various features, a practice known as “risk layering.” Of particular concern was the increasing use of no-downpayment loans, often combined with interest-only or negative amortization features.

House Prices and the Foreclosure Crisis

First, as suggested above, a primary distinction between the first period of the housing boom (2001–2004) and the second (2005–2007) was that house prices were appreciating rapidly in many areas during the initial period but falling during the second period. This meant that homeowners during the first period were accumulating equity in their homes, enabling them to either sell or refinance if necessary. Moreover, this appreciation in house prices meant that a steeper drop in house prices was necessary before they were in a negative equity position and thereby tempted to default, an equity buffer that was reinforced by the higher likelihood of having made a downpayment and lower likelihood that they would have engaged in a cash-out refinance that would have further depleted their equity cushion.

Refinances in the earlier stages of the housing boom also were more likely to have been triggered by falling interest rates and thus cash-out refinances were less common than at later times.⁵³ But refinancings continued even as interest rates began to rise beginning in 2005. But the nature of these refinancings changed from the earlier wave—refinancing in the 2005–2007 period were much more likely to be cash-out refinancing,

⁵³ Ellis, *supra* note 43.

suggesting that these homeowners were refinancing for different purposes but also that they were depleting equity at a greater rate than earlier borrowers, leaving them with a much higher combined loan-to-value ratio than earlier refinancers.

But this raises a question—did the causal relationship in the early stage of the boom run from house prices to expansive lending practices or from expansive lending to higher house prices? This is actually quite a complex question and available data suggests that both elements are present. In general, however, it appears that in the earlier stages of the boom, house-price appreciation was caused primarily by underlying economic factors; in turn, this strong house-price appreciation led to an extraordinarily strong performance record for all mortgages made during this time, including novel subprime mortgages. But, in turn, this early record of success resulting from rising house prices in the earlier stages of the boom fueled more aggressive and risky lending in the later stages of the boom.

As suggested above, the early phase of the boom seems to have been fueled by a variety of macroeconomic factors that led to a run-up in home prices in many markets. Most importantly, extremely low short-term interest rates allowed many borrowers to “stretch” to pay more for homes than otherwise would have been the case otherwise. Thus, consumers could afford “more” home than they might otherwise. As noted above, the HUD housing affordability index was at record highs during this period—thus, even as housing prices were rising, they were more than offset by record-low interest rates.

In addition, a variety of other factors raised the return to home ownership and led to increased house prices. Most notably, in 1997 the tax code was amended to permit homeowners to pay no tax on any capital gains of up to \$500,000 upon the sale of their

home. This led to a strong tax code preference for investments in housing relative to other forms of investment and saving leading to household overinvestment in real estate.⁵⁴ By contrast, ordinary saving is “double-taxed” as income when first earned as well as when interest is paid. And financial investments do not have this preferential capital gains tax treatment. Moreover, the bursting of the dot-com bubble and the struggles of the stock market in the immediate aftermath may have persuaded many consumers that homeownership was a more reliable form of wealth accumulation than financial assets.

To understand the difference between the earlier and later phases of the housing boom and the different performance of the mortgages issued during those two vintages, it is necessary to understand the nature of housing markets in the United States. There are effectively three different types of housing markets and differences among these markets help to explain the different performance patterns of mortgages from these two different eras.⁵⁵ Fundamentally, these housing markets are differentiated by underlying supply and demand dynamics.

The first type of housing market is those markets with traditionally cyclical markets that experience high but essentially predictable volatility, such as New York, Washington, DC, and Boston. Because of zoning and other constraints on construction of new homes, these markets have a highly inelastic supply of housing supply. Thus, when housing demand rises or falls for exogenous reasons, prices fluctuate widely in these markets. As explained above, extremely low interest rates and other governmental policies dramatically increased demand for home ownership. Therefore, prices rose

⁵⁴ Vernon Smith, *The Clinton Housing Bubble*, WALL ST. J., Dec. 18, 2007, at A20.

⁵⁵ See Christopher Mayer & R. Glenn Hubbard, *House Prices, Interest Rates and the Mortgage Market Meltdown* (working paper, Columbia Business School).

dramatically in these markets, a price appreciation that fundamentally reflected supply and demand dynamics, although exaggerated by various other factors and the artificial nature of the demand boost. As a result, although prices have fallen in these markets, foreclosures have not risen as much, as the initial “bubble” was not as much a bubble as an exaggerated response to fundamental supply and demand dynamics and as homeowners expect for prices to rebound in the near future.

A second type of market is the “steady” markets that underwent a steady appreciation in home prices over the past decade, with prices driven largely by underlying supply and demand dynamics.⁵⁶ Steady markets that have relatively modest regulations and restraints on expansion of housing supply to meet demand growth and thus have a relatively elastic housing supply. These markets, therefore, tend to respond to increases in demand by a relatively rapid increase in supply. Thus, these markets did not experience the same sort of house price bubble as many other markets—nor are they experiencing the subsequent house-price collapse and the resulting foreclosure crisis. These markets include cities such as Atlanta, Charlotte, Chicago, Denver, and Detroit.

But during the most recent housing boom a third type of market materialized—cities with modest restrictions on building new supply, and in fact experienced a dramatic growth in supply, but which nonetheless saw dramatic increases in home prices. These markets can be characterized as “late-boom” markets and include cities such as Las Vegas, Miami, Phoenix, and Tampa.⁵⁷ These markets began the housing boom resembling the second type of cities—demand growth manifested itself in rapid increase

⁵⁶ *Id.*

⁵⁷ Presumably this list would also include areas like the distant suburbs of Northern Virginia and California that saw rapid construction of new bedroom communities outside the traditional metropolitan areas and which experienced a very rapid boom and bust price cycle culminating in widespread foreclosures. In particular, many of these markets sprung up outside traditional cyclical markets, thereby adding a late-boom element to a traditional cyclical market (and perhaps exacerbating the price swings in both).

in supply, rather than a rapid increase in prices. But toward the end of the boom, these markets also saw a dramatic run-up in prices as well. Unlike the traditionally volatile markets, the price appreciation in these markets occurred toward the end of the boom, rather than the beginning, even though this was the period when interest rates were rising rather than falling. Moreover, this rapid price appreciation appears to lack plausible grounding in underlying economic logic—prices were rising, even as both supply and interest rates were rising as well.

The results have been catastrophic—the artificially high prices have collapsed, as prices have come to reflect the supply and demand dynamics of the massive expansion of new housing that was constructed during the boom. Prices have fallen toward their equilibrium levels, and given the huge expansion of housing supply in those markets in recent years, there is little expectation of a major price recovery in the near future. Moreover, slowing of the economy has also slowed population immigration into these markets (both legal and illegal). Thus, these markets have experienced dramatic drops in home prices with little expectation of price recovery in the near future. Foreclosures skyrocketed in these markets as home prices plunged.

The rapid house price appreciation in the “late-boom” cities closely matches the timing of the second stage of the mortgage crisis. In fact, some commentators have suggested that rather than the spread of subprime lending fueling the house-price boom in many markets, the house-price boom fueled a rise in subprime lending as buyers rushed in to gain a piece of the action.⁵⁸ Such speculative motivation would be consistent with the high penetration of adjustable-rate mortgages in the subprime market, which would

⁵⁸ Mayer & Pence, for instance, find that areas with high house price appreciation saw a rise in the following year in subprime mortgage originations. See Christopher J. Mayer & Karen M. Pence, *Subprime Mortgages: What, Where, and to Whom?* NBER Working Paper W14083 (2008) available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1149330.

generally be preferred by less risk-averse borrowers and speculators with a short-term time horizon.⁵⁹ Finally, the possible presence of substantial speculation in these markets is consistent with overheated activity in the real estate market in these cities being in properties such as new condominiums and new suburban homes, that are standardized products (in terms of style, quality, and neighborhood quality) that are amenable to rapid flipping.

Although the story is oversimplified, a general picture begins to emerge. The first phase of the housing price boom was driven principally by traditionally volatile markets responding to the various incentives created by low interest rates and other policies that promoted homeownership and home investment. During this phase of the boom, much mortgage activity was to refinance for lower interest rates and many home equity loans were to fund home improvements (often because consumers wanted to move to larger homes but price appreciation precluded them from doing so, so they responded to the provided incentives by increasing the value of their own home).⁶⁰ Price appreciation in these traditionally volatile markets roughly reflected some degree of underlying supply and demand dynamics. Increased demand in other markets was channeled into new home construction. Families in those markets responding to the same dynamics still had a tendency to increase their investments in residential real estate and the subprime market was born. Price appreciation relieved homeowners of the incentives to exercise their option for foreclosure. Those who were overextended or suffered economic distress could sell or refinance their home in a rising market, rather than exercising foreclosure.

⁵⁹ Stan Liebowitz, Op-Ed, *The Real Scandal*, N.Y. POST, Feb. 5, 2008.

⁶⁰ Alan Greenspan & James Kennedy, *Sources and Uses of Equity Extracted from Homes* (Div. of Research & Statistics & Monetary Affairs, Fed. Reserve Bd., Fin. & Econ. Discussion Series, Working Paper No. 2007-20, 2007).

The timing of the excesses of the second half of the mortgage boom also coincides with the artificial price bubble of the late-boom housing markets. Lenders erroneously extrapolated the performance of higher-risk mortgage from the first phase of the bubble to the dissimilar markets and borrowers of the second stage of the bubble. Lenders underestimated the impact of risk layering—and especially the dangers of low-downpayment, interest-only, and other mortgages that led to heightened borrower incentives to default if home prices fell. And fell they did—as was inevitable in light of the underlying supply and demand dynamics that underlay these markets.

Risk Layering

A second feature that distinguishes the late boom from the early boom is the increased presence of risk layering in the later phases of the boom. Risk layering is the practice of combining more than one risky term together in a given mortgage.

Many of the terms in loans that have drawn the most criticism, such as hybrid mortgages or low-documentation loans, do not appear to be excessively risky—when they appear in isolation. During the early part of the boom, there was little evidence to suggest that hybrid, low-documentation, low-downpayment, and other exotic mortgage terms were excessively risky, in large part due to the rising housing market, but also because certain of these terms, in isolation, may simply not be that risky.

Consider, for instance, much-maligned “low documentation” loans, sometimes referred to as “liar’s loans.” Low-documentation loans forego many of the formalities associated with a typical loan, such as an appraisal, detailed income and assets review, and a detailed loan application, in favor of a much simpler process based on a credit score

and simplified review process. Although low-documentation loans seem inherently risky, they may be completely appropriate for refinance loans based on an established track record of successfully making mortgage payments, a regular job, accumulated home equity, and a house that has had home-price appreciation. They seem less sensible for riskier purchase-money borrowers with riskier property and no equity. Even then, low-documentation loans may be sound if the borrower has sufficient equity in the property at the outset, such as an especially low loan-to-value ratio. In fact, during the first phase of the housing boom, low-documentation subprime loans performed just as well as full-documentation loans.⁶¹

In fact, it appears that non-traditional mortgages in the early phase of the boom also tended to have offsetting features that lowered the risk, such as a lower loan-to-value ratio than normal. The fact that apparently risky terms were generally confined to appropriate contexts or were offset by alternative risk-reducing features of the loan, along with the strong appreciation in house prices during this period, may account for the surprisingly strong performance of loans with these terms in the early stage of the boom.

In the later stages of the boom, however, some of this restraint was abandoned. Rather than offsetting riskier terms with other adjustments, lenders increasingly engage in risk layering of loan terms, perhaps bolstered by the early sound performance of loans with these terms present in isolation. Because low-documentation and low-downpayment mortgages in isolation were found to have modest and manageable risk associated with them, it might have been predicted that combining the two elements would increase risk, but only modestly so. Instead, it appears that combining two such terms increased the

⁶¹ Kristopher Gerardi, *et al.*, *supra* note 34.

risk of the resulting product *dramatically*—a risk that became explosive when combined with plunging home prices.

Loans with high loan-to-value ratios combined with low documentation proved to be especially prone to default.⁶² This was exacerbated by a substantial increase in loan-to-value ratios in the later stages of the boom.⁶³ The median combined LTV for subprime purchase loans rose from 90 percent in 2003 to 100 percent in 2005, “implying that in the final years of the mortgage boom more than half of the borrowers with subprime mortgages put no money down when purchasing their homes.”⁶⁴ Piggyback loans also became more common during this time,⁶⁵ although many of these loans were “silent second” that were not disclosed to the originator of the first mortgage.⁶⁶ The presence of these silent seconds increased the risk of default and foreclosure to the senior lender, but without the senior lender’s knowledge (and so without adjusting the risk premium).⁶⁷

Loans with minimal downpayments, cash-out refinancing, and aggressive use of home equity loans, became especially prone to default as the housing bubble has burst. When home prices fall, these loans quickly turn into negative equity, providing borrowers with a strong incentive to default. Interest-only and negative amortization loans create similar incentives by minimizing equity accumulation, but loans with these features appear to have been relatively rare in the subprime market although quite common in the prime mortgage market.⁶⁸ Although, subprime refinance borrowers had on average lower

⁶² *Id.* at 5.

⁶³ *Id.* at 1.

⁶⁴ Mayer, Pence & Sherlund, *The Rise in Mortgage Defaults*, *supra* note 17, at 31.

⁶⁵ *Id.*; see also Gerardi et al. *supra* note 34 at 10 (noting dramatic rise in number of mortgages with second liens).

⁶⁶ Between 1999 and 2006 the percentage of subprime loans with silent seconds rose from 1 percent to over 25 percent and for Alt-A loans the rates rose from 1 percent to nearly 40 percent of securitized Alt-A mortgages.

⁶⁷ Empirical evidence has found that holding combined LTV constant, borrowers who reached that LTV through a home equity loan are more likely to default than an identically-leveraged borrower who reached that LTV through a purchase or refinance loan, see Gerardi et al., *supra* note 34.

⁶⁸ Mayer, Pence & Sherlund, *The Rise in Mortgage Defaults*, *supra* note 17. Mayer, et al., find that 40 percent of Alt-A mortgages

FICO scores than purchase-money borrowers (19–35 points lower), average credit scores were relatively constant over the duration of the housing boom.⁶⁹ This suggests that the risk of negative equity is more important than the risk profile of the borrower in predicting whether the mortgage eventually would default.

Thus, the fundamental problem on this score may not have been excess “greed” or recklessness of sophisticated lenders making inherently crazy loans. Instead, if there was a flaw, it was likely that lenders extrapolated too aggressively from too small of a sample of loans, especially in the subprime market. Had the initial ventures into the subprime market turned out to have been a failure rather than a success, it is likely that the market would have been nipped in the bud and would never have expanded. The pattern that thus emerges is a somewhat surprising one—the seeds of the mortgage crisis were not grounded in inherently risky lending to unusually risky borrowers.⁷⁰ Instead, it appears that lenders simply underestimated the likelihood of an extended and dramatic home price collapse like that which actually occurred.⁷¹

This over-optimism by lenders was mirrored by over-optimism on the part of many buyers that home prices would increase without interruption. Many otherwise-homeowners essentially became *de facto* real estate market speculators through interest-only and low-downpayment mortgages that resulted in borrowers with minimal equity positions that seemed predicated on the assumption that housing prices would rise.⁷² Lenders underestimated that likelihood that so many borrowers would end up in such

had interest-only features, compared to 10 percent of subprime; 30 percent of Alt-A mortgages permitted negative amortization, subprime loans did not have these features.

⁶⁹ *Id.*, at 17.

⁷⁰ As Gerardi et al., *supra* note 34, put it, “These results are consistent with the view that a factor other than underwriting changes was primarily responsible for the increase in mortgage defaults.”

⁷¹ Gerardi et al., *supra* note 34, at 36.

⁷² See Monika Piazzesi & Martin Schneider, *Momentum Traders in the Housing Market: Survey Evidence and a Search Model*, NBER Working Paper 14669 (Jan. 2009) (noting rise of “momentum traders” in the housing market in the later stages of the boom).

severe negative equity positions that would provide such strong incentives for so many borrowers to allow foreclosure or simply walk away from their mortgages. This dramatic increase in the default rate may have been either because homeowners as a group became unusually responsive to home price declines or because home prices declined much more than expected and homeowners responded as would have been predicted in such an unlikely and catastrophic scenario—or both.

Securitization

Many commentators have charged that the rapid spread of securitization of mortgage debt, especially subprime mortgages, explains the underlying mortgage crisis. The basic story is that over time, securitization of mortgage debt, especially subprime mortgages, rose dramatically. This is certainly true.⁷³ From 2000–2005, for instance, the volume of subprime mortgages securitized by Wall Street rose almost tenfold, from about \$56 billion annually to \$508 billion and the percentage of subprime loans that were securitized rose from about 50 percent to over 80 percent during that same time frame, a time period that correlates with the expansion of the subprime market.

The link between securitization and risky mortgage underwriting, it is argued, is a chain of agency cost relationships generated by securitization.⁷⁴ In particular, securitization is said to have given rise to an “originate to distribute” model of mortgage lending, where the originating lender does not bear the risk that the loan will fail. Thus, mortgage brokers originate the loan, but resell it to the wholesale supplier of money,

⁷³ Kathleen C. Engel & Patricia A. McCoy, *Turning a Blind Eye: Wall Street Finance of Predatory Lending*, 75 *FORDHAM L. REV.* 2039, 2045 (2007). Gary B. Gorton, *The Subprime Panic* 6 tbl.4 (Nat'l Bureau of Econ Re-search, Working Paper 14398 Oct. 2008), available at <http://www.nber.org/papers/w14398>.

⁷⁴ Engel & McCoy, Christopher L. Peterson, *Predatory Structured Finance*, 28 *CARDOZO L. REV.* 2185, 2200–06 (2007)

which then in turn bundles the loans, subdivides them into tranches, and resells those bundles to investors. It is argued that this creates a series of agency relationships, all of whom have incentives to maximize loan volume and ignore heightened risk and deteriorating underwriting standards so long as they can pass on these loans (and their risk) to subsequent holders.

Plainly, there seems to be a correlation between the rise of securitization and the subprime lending boom and housing price bubble. But it is doubtful that the growth of securitization can provide a convincing causal explanation. First, securitization has been a well-established model of lending for years in other consumer credit markets (such as credit cards, auto loans, and prime mortgages). Scholars also have noted that other countries have seen a dramatic rise in home prices and a deterioration of underwriting standards, most notably England, even though securitization remains nonexistent.⁷⁵ Second, many of those who either sold or bought these securities were highly-sophisticated investors such as Bear Stearns, Merrill Lynch, or Citibank, who were likely well aware of the risks and protected against them. Furthermore, the investment banks that supposedly orchestrated this Ponzi scheme are now either bankrupt or have been merged into other financial institutions as a result of investing in securities backed by subprime loans, a reality that is difficult to square with the purported incentives of the originate-to-distribute model.

Other considerations contribute to skepticism about the role of securitization in fueling the mortgage crisis. For instance, as noted above, the subprime mortgage boom appears to have two distinct phases; securitization, however, grew steadily throughout both periods. Thus, the incentives created by securitization were constant during this

⁷⁵ Ellis, *supra* note 43, at 6-7.

period, suggesting that some factor *other than securitization* intervened between the first and second periods to lead to the dramatically worse performance of the mortgages originated in the second period. Thus, although the role of securitization in creating agency costs is theoretically possible as a major cause of the subprime mess, it seems doubtful that the incentives created by securitization was an important contributor to the mortgage crisis—although, of course, simple errors and miscalculations are possible for reasons unrelated to the incentives created by securitization.⁷⁶

Conclusion

By observing consumer behaviors and homeowners' responses to various incentives during the mortgage crisis, observers can glean a picture of some of the primary causes of the meltdown. Specifically, low short-term interest rates encouraged consumers to switch from fixed-rate to adjustable-rate mortgages or hybrid mortgages and also motivated purchases of real estate as a speculative activity. Keeping in mind the structure of this borrowing and the little equity homeowners held in new properties, along with various the reasons for consumer foreclosure, one can observe that a rapid decline in housing prices presented a strong incentive for property owners to exercise their foreclosure options.

This analysis also points out that there was likely no sharp decline in individuals' abilities to afford their homes, nor is an inability of families to keep up with their mortgage payments the culprit behind the current mess. Instead, the rise in foreclosures that has had adverse affects throughout the credit markets and he economy has likely

⁷⁶ Gerardi, et al.,*supra* note 34, also doubt the importance of securitization in explaining the subprime boom and bust suggesting that there is no inherent link between them.

resulted from consumers' rational responses to certain incentives that arose during the two phases of the crisis. Certainly, the full implications of the events unfolding have yet to be realized, however this general understanding of the mortgage meltdown can help pinpoint some of the fundamental causes and shed more light on the future of the crisis.