

Implications of the Housing Market Bubble for Sustainable Homeownership

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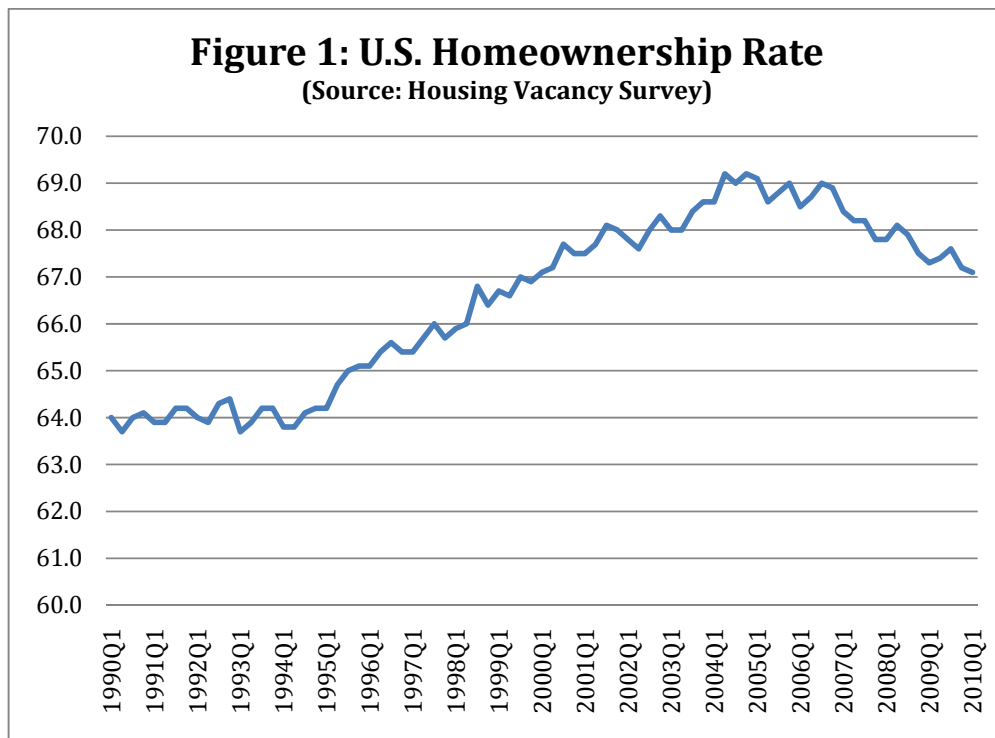
The recent housing market bubble and subsequent meltdown dealt a triple blow to sustainable homeownership in the U.S. First, the rapid rise in housing prices that characterized the period 2004 through 2006 reduced housing affordability as traditionally measured. Second, an expansion of high risk mortgage lending helped fuel or at a minimum helped sustain the rise in house prices, facilitated the drawing out by households of accumulated home equity, and left homeowners at greater risk of default. The subsequent meltdown generated the ongoing wave of foreclosures that has further eroded homeownership. Third, although affordability has recovered, the episode has reduced household creditworthiness and prompted a procyclical response—increased capital assessments and tightened credit standards in mortgage credit markets—making entrance or return to homeownership more difficult for many families.

This paper presents preliminary evidence on the impact of the housing bubble, flood of high risk mortgage lending, and subsequent meltdown on homeownership. The paper then reviews the developing literature on the factors behind the expansion of high risk lending which played such an important role in the bubble and meltdown. We then discuss how policymakers, by being conscious of these factors, may be able to mitigate potential recurrence of this episode and more successfully promote sustainable homeownership.

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In our discussion of the factors driving the expansion of high risk lending, we emphasize agency or information problems in the mortgage origination and securitization market; incomplete risk transfer; and underassessment of systemic risk. We argue that policymakers must take into account these factors and their relationship to exaggerated house price dynamics or housing bubbles, which are clearly harmful to the objective of sustainable homeownership. We highlight several matters requiring increased attention from policymakers, including consumer protection and education; potentially misaligned incentives of mortgage originators and other market participants; capital requirements for mortgages, and improved financial and regulatory data.



1. Impact of the bubble and meltdown on homeownership

The housing market bubble, accompanying surge in high risk lending, and subsequent meltdown in the mortgage market has coincided with a substantial decline in the homeownership rate for U.S. households. As seen in Figure 1, the U.S. homeownership rate peaked in 2004 at an annual average rate of 69.0 percent, following a steady increase over the

previous decade. It fell back a bit in 2005 and 2006, and then began a steady decline to its current level of 67.1 percent (as of the first quarter of 2010). The peaking of the homeownership rate in 2004 may in part reflect demographic factors, such as rates of household formation. Still, it is somewhat puzzling given the greatly expanded availability of mortgage credit during the housing market boom of 2004 through 2006.¹

It is also worth noting that while homeownership rates fell from 2004 to 2008, the size of the US housing stock increased by 6 million new home completions (including 5 million single-family units), representing an estimated 5 percent of the housing stock. This additional housing stock was absorbed not by new homeownership but by rentals, vacancies, and vacation or second homes. Thus, much of the run up in the housing stock and in house prices during the height of the housing boom reflected investment motives.

Further evidence on growth in demand for investment and vacation properties as a driver of the housing boom is provided in Figure 2, derived from Home Mortgage Disclosure Act (HMDA) data.² As seen in the figure, the percentage of mortgages for the purchase of 1-4 family properties in metropolitan areas that were associated with a non-primary residence, increased steadily from 2003 through 2006. Moreover, cities with larger increases in share of home purchase loans associated with non-primary residences tended to have steeper declines in affordability. Figure 3 displays this relationship in a scatter plot for the 75 largest U.S. metropolitan areas, relating the change in affordability between the first quarter of 2005 and first quarter of 2007 to change in the non-primary residence share of home purchase loans between first quarter of 2004 and first quarter of 2006.³

¹ In this paper, we restrict attention to a limited number of housing and mortgage market factors, because of sample size and data limitation. Consideration of demographic trends is outside the scope of this study.

² Attention is restricted to metropolitan areas because reporting of occupancy status is voluntary for loans originated outside of metropolitan areas. Comparison between 2003 and later years may be slightly affected by changes in metropolitan area definitions after 2003 and by exclusion of second lien mortgages after 2003 (these were not distinguished in HMDA data until 2004.)

³ The correlation is 28 percent.

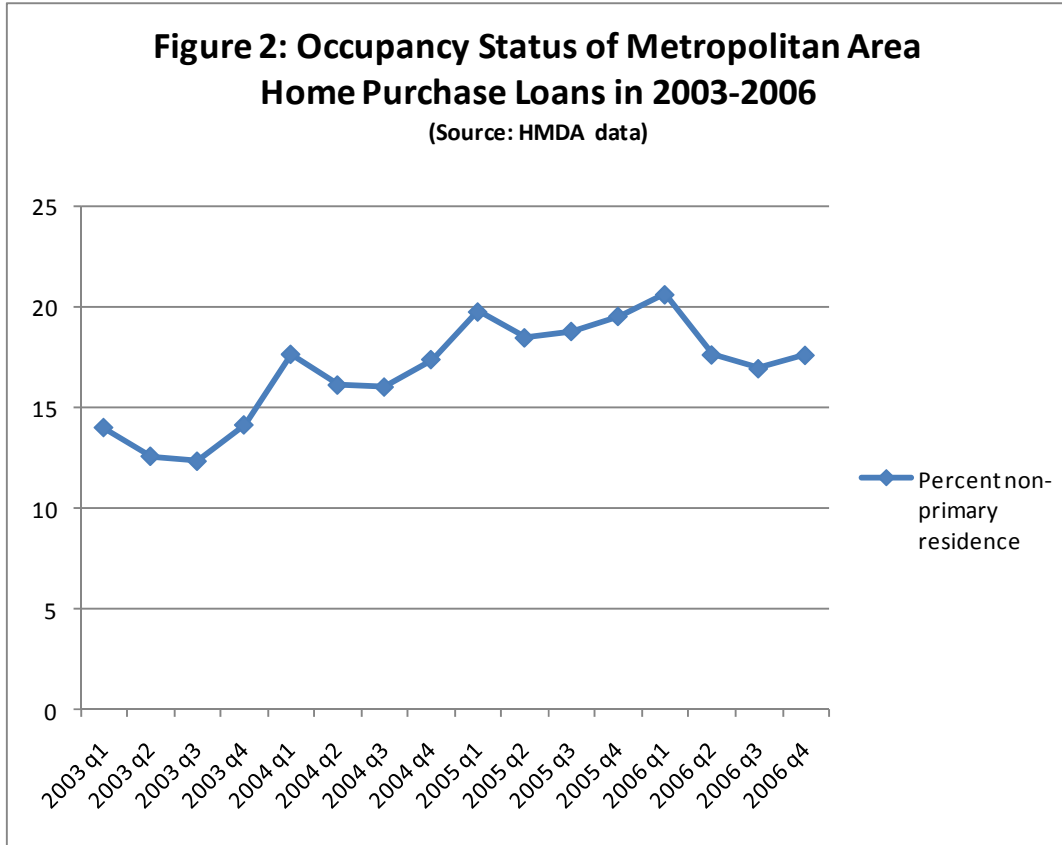
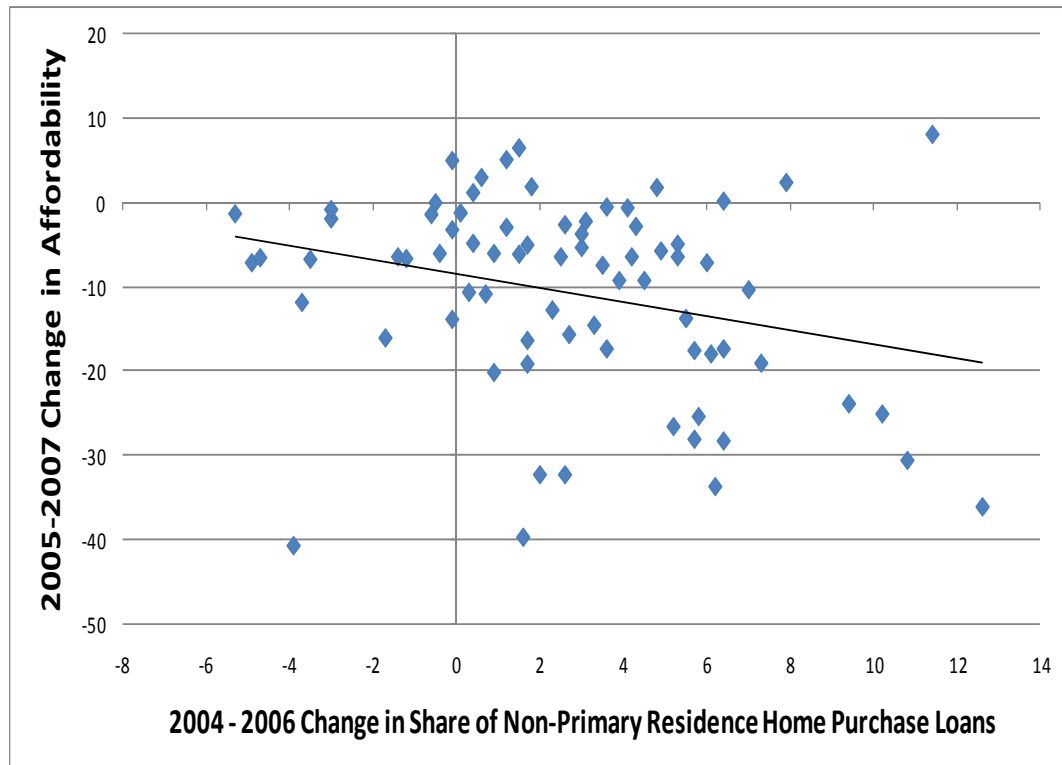
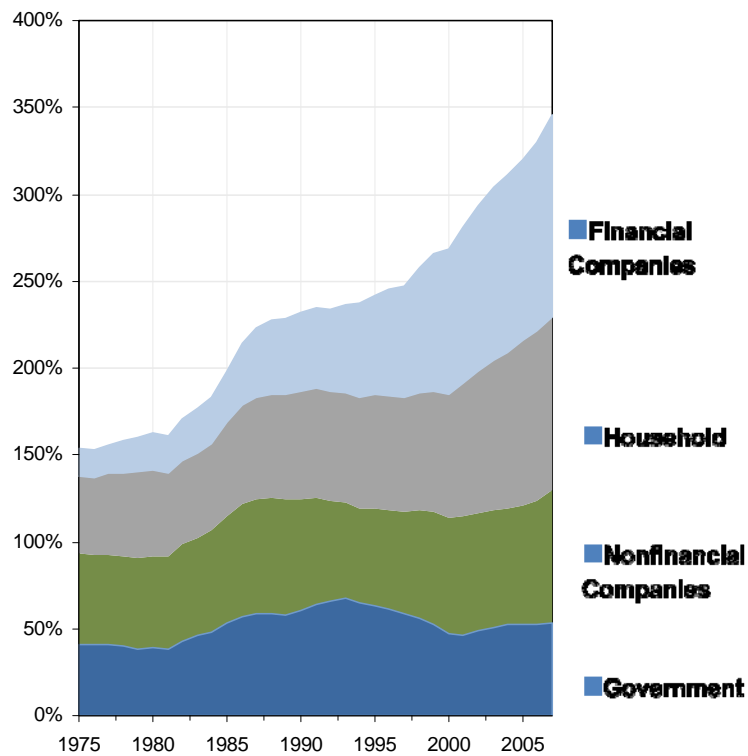


Figure 3: Change in Affordability vs. Change in Share of Home Purchase Mortgage Originations Associated with non-Primary Residence



Categories of high-risk lending. Although demand for investment properties is one explanation, that the homeownership rate stopped rising after 2004 is still somewhat surprising, given the expanded availability of mortgage credit during the housing boom. Indeed, the run-up in housing prices was accompanied by a credit expansion of historically unprecedented dimensions. Mortgage debt expanded as a share of gross national product as shown in Figure 4, largely as a result of the expansion of high risk and non-traditional credit.

Figure 4: Sectoral Contributions to U.S. Gross Debt



For understanding the role of this surge in lending, it is helpful to distinguish among three categories of higher risk lending associated with the credit expansion during 2004 through 2006: subprime, alt-A, and second-lien. While the distinction among these categories was sometimes blurry, they generally represented different sectors and served different purposes in the mortgage and housing markets.

The first category, subprime lending, primarily served borrowers with impaired credit histories or is associated with combinations or layering of risk factors. A relatively large proportion of subprime loans during this period were associated with high debt payment-to-income ratios for the borrower combined with vulnerability to future payment shocks tied to ARM or interest-only products with scheduled resets of the interest rate or monthly payment.⁴ Subprime mortgages originated with piggyback second liens and combined loan-to-value ratios of 100 percent also were common.⁵

A substantial portion of the growth of subprime lending during the housing boom was associated with borrowers cashing out home equity that accumulated as house prices rose. It is likely that an additional, substantial component consisted of borrowers who could no longer qualify for prime or near-prime because of the impact of rising house prices on their loan-to-value or debt payment-to-income ratios.

The second category, so-called alt-A lending, consisted largely of non-traditional credit products originated to prime or near-prime borrowers. These products, including interest-only and option adjustable rate mortgages and low-documentation, stated-income loans, enabled borrowers to purchase a larger home (or to cash-out a larger amount of equity in connection with a refinancing) than they could have under traditional underwriting standards. These products likely fueled demand for higher priced homes and accelerated the decline in housing affordability. Conceivably, by spurring demand for higher priced homes they may have contributed in some localities to net declines in homeownership during the housing boom.

⁴ Reeves and Weaver (2007) find that the holding the index rate constant, the bulk of securitized subprime ARM mortgages originated in 2005 and 2006 would migrate to higher debt payment-to-income ratios following the reset date, reflecting the presence of an initial teaser rate and/or interest only period. For example, more than 90 percent of mortgages with initial debt payment-to-income ratios in the 40-45 percent range would migrate to a higher debt payment-to-income bucket.

⁵ Calem, Henderson, and Liles (2010) infer on the basis of HMDA data that about half of first-lien high-cost loans originated in 2005 and 2006 had a piggyback second, representing a considerable increase compared with 2004 and even more so compared with previous years.

Many mortgages in this category were “jumbo” loans (larger than the conforming loan size limits established for Fannie Mae and Freddie Mac), and a relatively large proportion were securitized. The elevated credit risk associated with the alt-A category was a reflection of several factors, including the potential for large payment shocks, loose underwriting (in the case of low documentation loans), and adverse selection or cohort effects (borrowers willing to risk payment shocks or exaggerate their incomes).

The third category, junior lien loans, consists of closed-end home equity loans and home equity lines of credit (HELOCs). Some of these loans were issued as “piggyback” seconds in association with first-lien home purchase or refinance loans, often resulting in a combined loan-to-value ratio of 100 percent. The bulk of these loans or credit lines, however, were originated to prime borrowers with existing first lien mortgages, for the purpose of drawing out accumulated home equity.

Table 1: Mortgage Originations by Product

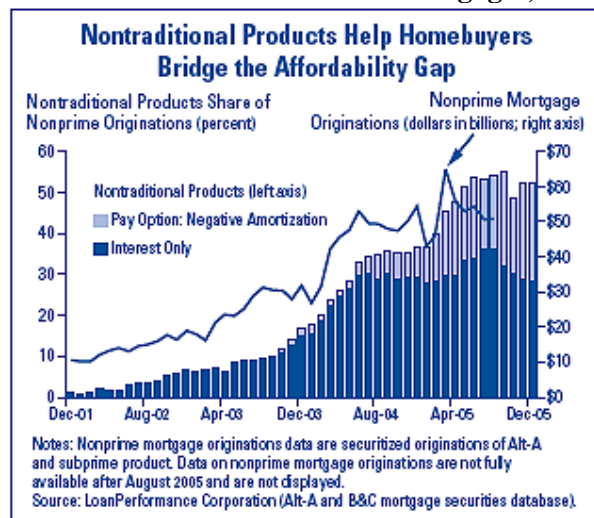
	FHA/VA ↓	Conv/Conf ↓	Jumbo ↓	Subprime ↑	Alt A ↑	HEL ↑
2001	8%	57%	20%	7%	2%	5%
2002	7%	63%	21%	1%	2%	6%
2003	6%	62%	16%	8%	2%	6%
2004	4%	41%	17%	18%	6%	12%
2005	3%	35%	18%	20%	12%	12%
2006	3%	33%	16%	20%	13%	14%
2007	4%	48%	14%	8%	11%	15%

The market share of each of these mortgage categories rose significantly during the period of the housing boom. Their combined share grew from under 15% in 2002 to almost half of originations by 2006 (the sum of the market share of HELOCs, Alt-A, and subprime, as shown in Table 1). Such mortgages also, as shown in Figure 5, had an increasing and

relatively high rate of securitization, compared to traditional, non-conforming mortgages such as prime jumbo.

The credit expansion during 2004 through 2006 was characterized by loosened underwriting standards across all mortgage categories (Table 2) In particular, borrowers' equity share of financing declined, largely a consequence of "piggyback" second liens often involving combined loan-to-value ratios at origination of 100 percent. Borrower debt payment-to-income ratios also rose during this period, and documentation and verification standards were eased.

Figure 5: Growth in Nontraditional Mortgages, 2002-2005



FDIC Outlook: Breaking New Ground in U.S. Mortgage Lending (Summer 2006), available at http://www.fdic.gov/bank/analytical/regional/ro20062q/na/2006_summer04.html.

High-risk lending and homeownership. The preceding discussion suggests that removal of traditional constraints on access to mortgage credit during this period created only an illusion of making homeownership more accessible, while helping to sustain rising house prices. Indeed, new research supports the view that the flood of high-risk mortgage credit had a feedback effect on house price growth, by helping to sustain demand as house prices rose (Coleman, LaCour-Little and Vandell 2008; Pavlov and Wachter 2009). While enabling entry into homeownership for some households despite rising prices and declining affordability,

these credit products may have encouraged purchase of larger homes by some and also kept others out by sustaining the bubble.

Table 2: Deterioration in underwriting

		ARMS									
	Orig Yr	CLTV	CLTV>80	Seconds	Full Doc.	IO%	DTI	FICO<700	Investor	WAC	Spd to WAC
Prime	2002	66.4	4.1	1.9	56.0	46	31.0	20.7	0.7	5.5	-
	2003	68.2	10.1	10.9	48.6	53	31.8	21.8	1.6	4.6	-
	2004	73.5	20.7	23.1	51.2	71	33.5	22.0	2.1	4.5	-
	2005	74.1	21.7	26.8	47.3	81	33.6	18.9	1.9	5.4	-
	2006	75.3	26.2	35.3	33.6	91	37.2	19.5	2.3	6.2	-
Alt A	2002	74.3	20.8	2.7	29.3	26	35.4	46.4	9.9	6.3	0.8
	2003	78.0	33.3	23.4	28.1	56	35.3	44.7	12.9	5.6	1.0
	2004	82.6	46.9	39.1	32.6	75	36.2	44.3	15.3	5.5	1.0
	2005	83.5	49.6	46.9	28.3	83	37.0	40.5	16.5	6.0	0.6
	2006	85.0	55.4	55.4	19.0	87	38.3	44.2	13.5	6.8	0.6
Subprime	2002	81.2	46.8	3.7	66.9	1	40.0	93.4	4.7	8.5	3.0
	2003	83.5	55.6	9.9	63.5	5	40.2	91.6	4.9	7.5	2.9
	2004	85.3	61.1	19.1	59.9	20	40.6	90.6	5.3	7.1	2.6
	2005	86.6	64.4	28.1	55.9	32	41.2	89.7	5.4	7.3	1.9
	2006	86.7	64.0	31.0	54.6	20	42.1	91.8	5.7	8.2	2.0

Spreads declined

CLTV, %>80 and use of Seconds increased % Full Doc declined Not much change in FICO or DTI

Source: Loan Performance data as of November 2006. UBS, April 16, 2007, Thomas Zimmerman, "How Did We Get Here and What Lies Ahead"

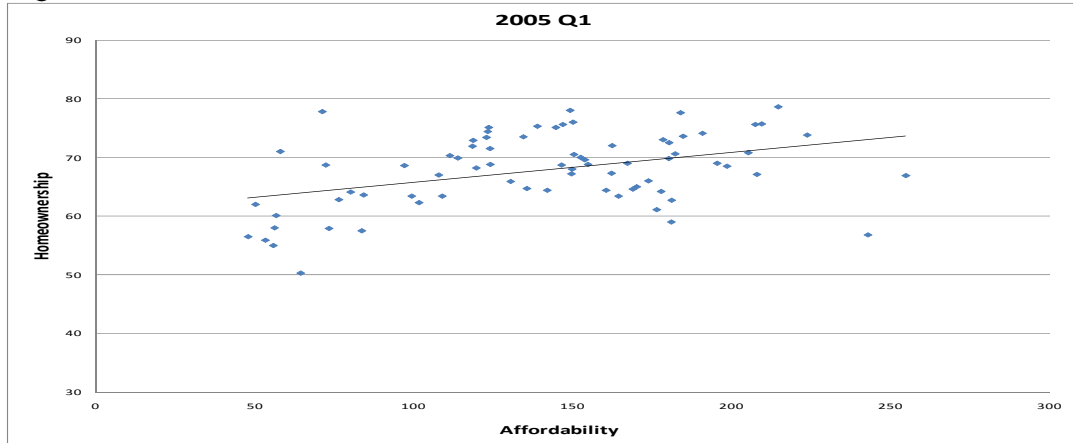
That these credit products provided an illusory or at best temporary antidote to stressed affordability can be gleaned from examining the relationship between affordability and the rate of homeownership across cities. Panels 1 and 2 of Figure 6 displays this relationship in a scatter plot for the 75 largest U.S. metropolitan areas as of the first quarters of 2005 and 2007, respectively, while panel 3 provides the corresponding scatter plot as of the last quarter of 2009.⁶ In each year, lower affordability is associated with a lower homeownership rate across large U.S. metropolitan areas. In the appendix, we establish that these relationships are statistically significant. The relationship is observably flatter in 2007 (although not to a statistically significant degree). This analysis suggests that any solution these products provided was at best short lived. Neither the lending itself nor the

⁶ The local area affordability index is from economy.com, while the local area homeownership rates are from the housing vacancy survey of the U.S. Census.

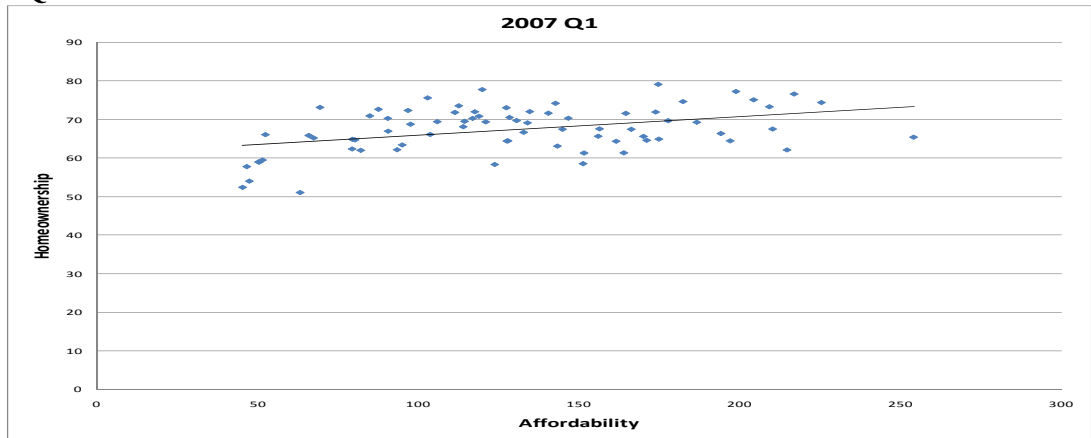
homeownership it supported has been sustainable, so that post-crisis, affordability remains a major barrier to homeownership.

Figure 6: Homeownership Rate vs. Affordability in 75 Largest U.S. Metropolitan Areas

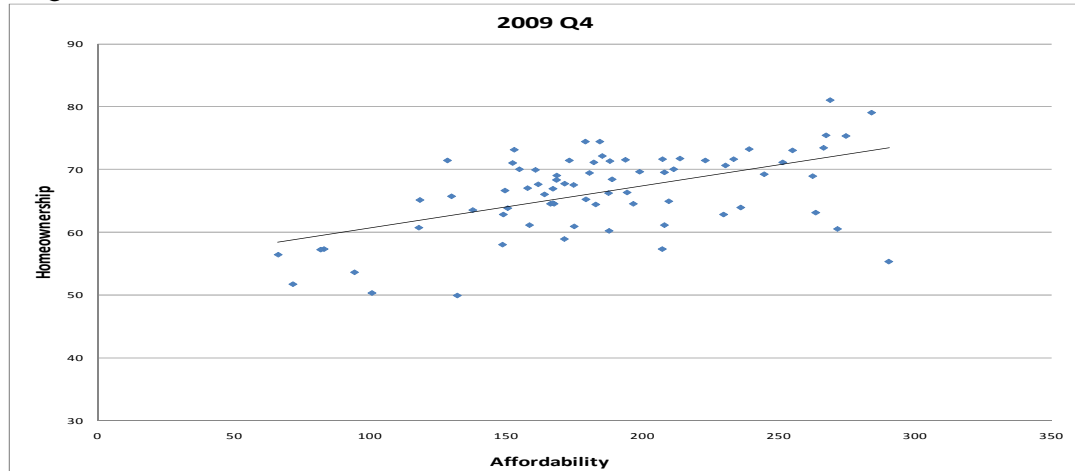
Panel 1: Q1 2005



Panel 2: Q1 2007



Panel 3: Q4 2009



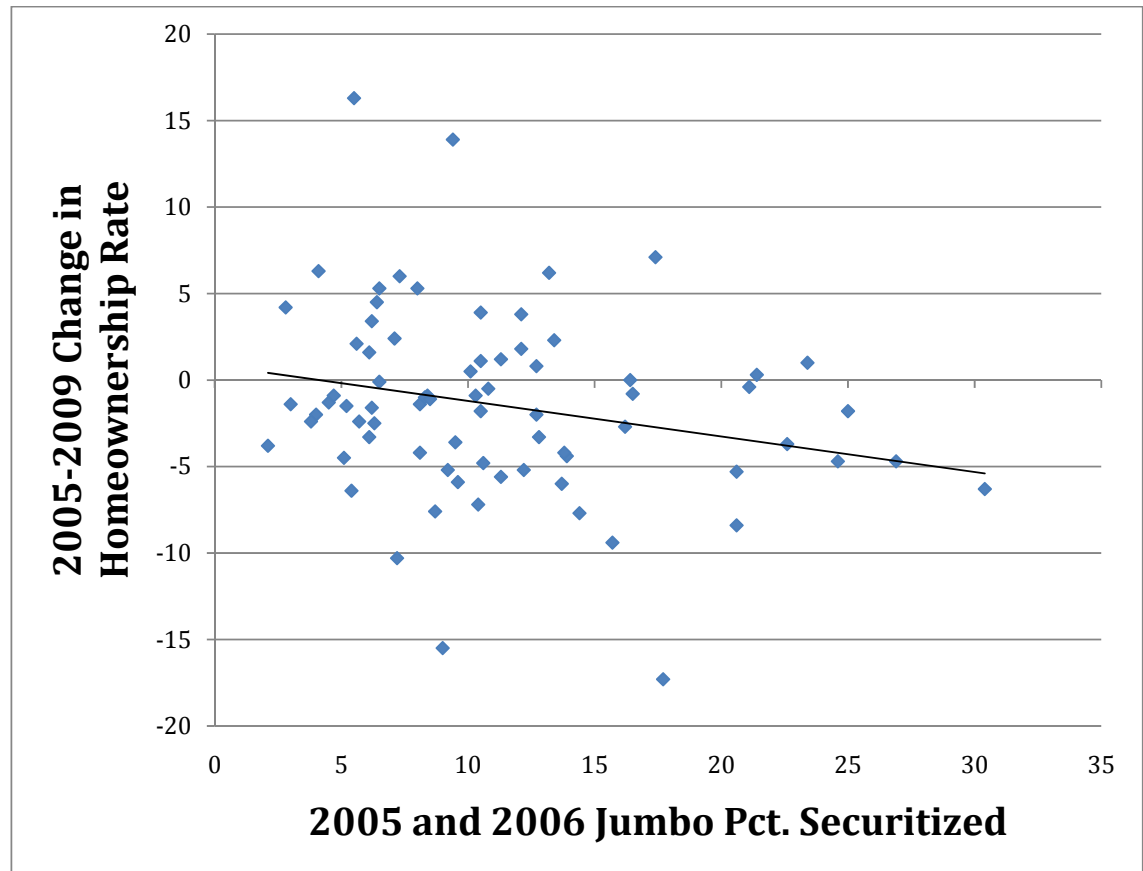
Indirect evidence on the potential role of non-traditional mortgage products is provided by a cross-city analysis of the drop in homeownership rates since 2005 in relation to the percent of jumbo mortgage originations in 2005 and 2006 that were securitized. Securitized jumbo mortgages are a proxy for non-traditional products including interest-only, option-ARM, and low documentation loans. Figure 7 displays this relationship in a scatter plot, again for the 75 largest U.S. metropolitan areas.⁷ Clearly, a larger share securitized of jumbo loans originated in 2005-2006 is associated with a larger drop in homeownership between 2005 and 2009, consistent with the view that these products fueled demand for higher priced homes, thereby contributing to a net decline in homeownership in some localities. In the appendix, we establish that this relationship is statistically significant and it remains significant controlling for housing market affordability.⁸

Impact of the mortgage meltdown on homeownership. Cyclical fluctuations—periods of rising house prices, increased sales of new homes, and increased credit availability, followed by periods of contraction—commonly occur in mortgage and housing markets, both in the U.S. and internationally. The recent cycle, however, was unique, at least in the U.S., with respect to the rate and geographic scope of house price appreciation; the accompanying surge in high risk lending during the peak years of the boom in 2004 through 2006; and the severity of the subsequent contraction (Abraham Pavlov Wachter 2008).

⁷ Share of securitized jumbo mortgages is obtained from HMDA data.

⁸ An alternative interpretation is that a larger share of non-traditional mortgages (as represented by securitized jumbo share) reflects reduced affordability not captured by the housing affordability measure due to measurement error.

Figure 7: Securitized Share of Jumbo Loans vs. Change in Homeownership Rate in 75 Largest U.S. Metropolitan Areas



As we now know, the mortgage meltdown that ensued when the housing boom subsided and prices receded was closely linked to the expansion of high risk lending. There are several aspects to this linkage. First, as previously noted, the high risk mortgage products helped to sustain the rise in house prices, causing the market to be less stable and more dependent on continued supply of such credit. Second, the risk factors associated with these products, including little or no borrower equity for home purchase or drawing out of existing equity through cash-out refinance and second liens; high debt payment to income ratios; low documentation, and general lax underwriting as well as adverse selection effects, directly led to extremely high default rates when house values declined. Third, the risks (and subsequently, the credit losses) associated with these loan products were spread throughout

the financial system through securitization and related structured finance activities such as credit default swaps. Moreover, with hindsight it is now clear that the system held far too little capital against these risks. The consequences have been severe, not only for the mortgage market, which suffered a loss of liquidity and greatly reduced credit availability (particularly in the jumbo market), but also for the economy as a whole.

Thus, it is not surprising that the homeownership rate has been declining during the recent contraction in the housing market, and it likely will continue to decline into the near future. The declining homeownership rate likely reflects the combined impact of tighter mortgage credit markets; hesitancy on the part of potential new homeowners due to concerns about the stability of house values; the general economic recession; and loss of ownership through foreclosure. Quantifying the impact of each of these potential factors on the recent decline in homeownership is beyond the scope of this paper. Moreover, it is too early to assess the impact of the spike in delinquencies and foreclosures, many of which have not yet been resolved. These can take many months to resolve, all the more so given the widespread efforts now underway (through various loan modification initiatives) to “rescue” distressed homeowners.

2. Factors driving the expansion of high risk lending

The collapse of subprime lending and private label securitization and beginning of the foreclosure crisis in 2007, and the subsequent turmoil in mortgage and housing markets have spurred a variety of research on problems in the nonprime or broader mortgage market that were at the root of the crisis. Much of this research has focused on the deterioration of underwriting standards and the house-price run-up and subsequent decline as primary factors (Smith 2007; Demyanyk and van Hemert (2009); Gerardi, Shapiro, and Willen 2007; Hahn and Passell 2008; Sherlund 2008). Haughwout, Peach, and Tracy (2008) focus on early

payment default and emphasize that only part of the increase in default during 2007 is attributable to these factors. Demyanyk and van Hemert (2009) argue that the decline in underwriting standards prior to the crisis could have been detected but was masked by rapid house-price appreciation. Coleman, LaCour-Little, and Vandell (2008) and Pavlov and Wachter (2009a) present evidence that the expansion of credit resulting from looser underwriting standards contributed to the rise in house prices.

The role of securitization and associated moral hazard problems has also garnered attention, with several researchers pointing to securitization as the principal culprit in the crisis. Ashcraft and Schuermann (2008) identify a number of market frictions affecting the subprime mortgage origination and securitization process and argue that the associated misaligned incentives and adverse selection were largely responsible for the market's collapse. A partial list includes agency problems associated with mortgage brokers, such as incentives to misrepresent borrower credit quality; cream-skimming by portfolio lenders; and rating agency conflicts of interest.⁹ Golding, Green, and McManus (2008), Hull (2009) also focus on misaligned incentives of market participants, while Wray (2007) adds lax regulation to the mix. Specific problems discussed include compensation of loan originators and security traders disassociated from subsequent credit performance of the loans, and ratings agencies being paid by the issuers of the securities being rated. These authors put forth recommendations aimed at increasing transparency and reducing moral hazard in both the primary and secondary mortgage markets.

Calem, Henderson, and Liles (2010) find evidence that sale of nonprime loans by depository institutions during 2005 and 2006 was associated with "cherry picking;" that is, transfer of risk along dimensions that investors were likely to disregard or where risks were likely to be undervalued. They argue that such inattention to or misperception of risk by the

⁹ Ernst, Bocian, and Li (2008) argue that mortgage brokers also often exploit an information advantage relative to the borrower to engage in predatory lending.

securitization market was a primary cause of the subprime lending boom and subsequent market collapse.

Rajan, Seru, and Vig (2009) draw a distinction between the “hard information” relied on by investors to value securitized loans and “soft information” accessible to originators but not verifiable by a third party. They argue that securitization of subprime mortgages reduced the incentive to collect soft information, resulting in less effective credit screening. Keys, et al. (2010a, 2010b) provide an important contribution to this line of argument by finding that lenders apply less effort to screen soft information in the low documentation subprime loan market based when originating loans that can more easily be sold to investors. They identify a key point of discontinuity around the FICO score threshold of 620, such that lenders securitized more low-documentation loans with scores above this threshold and screened them less aggressively.

However, hard information was often less informative than it appeared to be. Appraisals were typically upwardly biased as a matter of industry practice as first pointed out in Cho and Megbolugbe (1996) and discussed in Nakamura (20010a). These biases were apparently exacerbated by the willingness of lenders to tolerate misrepresentation of transaction prices. Ben-David (2007) focuses on the propensity to overstate collateral values by borrowers, intermediaries, and originators when it is advantageous to do so in the presence of asymmetric information. In particular, originators are able to expand their business by securitizing more loans as house prices rise.

Moreover, as Lang and Nakamura (1995) have shown, appraisals have an inherent procyclical bias – during housing booms, large numbers of housing transactions occur, resulting in relatively high precision of measured housing price estimates. As a result, appraisals are more likely to be relied upon in booms, whereas in the subsequent downturns, appraisers may find it difficult to find relevant recently completed home transactions upon

which to base their home prices estimates, causing mortgage applications to be declined. Indeed, Blackburn and Vermilyea (2007) found relatively strong evidence of that these informational factors were important in thin housing markets,

White (2009) emphasizes the role of overly optimistic evaluations of the credit risk of mortgage-backed securities, in part due to agency problems and in part to inadequate information and “carelessness.” Coval, Jurek, and Stafford (2009a, b) point to the amplification of errors in evaluating the risk of the underlying securities of structured finance products and in the mispricing of these products. They emphasize the concentration of systemic risk that occurred through these structured products and the mispricing of this risk. While these instruments appeared to be paying a high rate of return, they were, in fact, earning a negative return because of the failure to price “tail” risk.

Four culprits can be drawn from this research: incomplete risk transfer, moral hazard and incentive problems, regulatory limitations, and the undervaluation of systemic risk in structured finance. The growth of private-label securitization and increasingly complexity of structured finance products underlies many of these potential market failures. As explained in Belsky and Wachter (2010), the “housing finance revolution” exacerbated the asymmetric information problems that affect mortgage credit markets, and regulatory responses had been inadequate.

While securitization of mortgages by the government-sponsored enterprises Fannie Mae and Freddie Mac has long played a major role in housing finance in the U.S., investors in MBS backed by the credit guarantees of Fannie Mae or Freddie Mac generally were exposed only to interest rate risk. With the growth of the private-label securitization market, investors were additionally exposed to mortgage default risk which was neither contained by underwriting nor adequately priced. Defaults were initially low, due to inflated asset prices,

shrouding the growing risk. The short run incentives to securitize these loans continued even though systemic risk was not priced.

Investors could hedge their risk also. With the purchase of newly available credit default swaps, their positions could be insured against possible loss. There was counterparty risk to be considered, but if this was evaluated, investors might have concluded that these instruments had to be backed up or the entire system would fail. The providers of the credit default swaps perhaps likely had been viewed as—and certainly in this event were—“too big to fail.” The difficult issue of “too big to fail” is one where regulators come to realize that the failure of a financial firm will lead to further contagion and risk of failure for a large part of the financial sector. If a firm is perceived as being too big to fail, then other counterparties may treat it as if it were riskless – and thus financially reward it by being more willing to trade with it at lower prices.

The increasingly complex process of housing finance introduced new principal-agent problems, or exacerbated existing ones, that regulators did not address. Banks’ capital requirements depended on the grade their mortgage-backed securities received from rating agencies, but the agencies were paid by the very banks they were judging. Traders set the price of their new securities and derivatives, but they were paid for quantity, not quality. Internal risk managers oversaw the traders’ decisions, but they were discouraged from disrupting the profit flow by executives with an eye toward stock options. Executives had the final say over their mortgage department’s strategy, but their bonuses came in the form of cash and options that could be sold before the housing market deflated (Bebchuk, Cohen, and Spamann, 2010). Originators lowered lending standards and expanded their product offerings in response to an increasing demand for mortgage-backed securities, but consumers often had little understanding of the new, complicated products and loan terms.

As Pavlov and Wachter (2004, 2006, and 2009b) have documented, these institutional failures guaranteed an undervaluation of risk. Because mortgages are non-recourse loans, they can be priced like put options. If the homeowner defaults, they simply “put” the house back to the bank. The bank’s gain or loss is equivalent to the difference between the exercise price of the option and the market price of the underlying security. Using the Black-Scholes formula, these studies demonstrate that the increase in the price of mortgage-backed securities corresponded with a decrease in their yield rates, which proxy as a price of risk. Although the riskiness of mortgage pools was increasing, Wall Street was not appropriately pricing the higher risk. Regression analyses in these studies shed light on the crisis by revealing that such misjudgment and mispricing of risk in financial markets is associated with economies that experienced the worst market crashes in the preceding decades.

3. Policy Discussion

The run up in housing prices and its subsequent decline was clearly exacerbated by powerful procyclical drivers that exaggerated underlying housing demand during the boom and whose absence will tend to drive house prices below equilibrium in the boom’s aftermath. Ex post, asset price cycles are more likely to have ex ante bubble-like properties and ex post harsh economic consequences to the extent that procyclical factors are allowed to multiply.

Gallin (2008) has argued that in the US house prices, measured on a regional basis, typically overshoot in booms. It may prove very difficult to end this cyclical behavior entirely. Nevertheless, if policymakers and regulators can moderate the influence of procyclical factors, this may lead to moderated asset booms and busts.

Our discussion has highlighted a series of private behaviors that have had procyclical effects. A fundamental problem is that backward-looking risk parameterizations (such as

those embedded in empirical Value at Risk models) will tend to be excessively lenient in upswings and excessively tight in the subsequent downturns. However, to the extent that forward-looking macroeconomic factors can be included in these risk rules, these procyclical effects will be minimized.

As Nakamura (2010a) has emphasized, appraisals that were biased during the upturn are now facing stronger scrutiny and regulation, and likely exacerbating the difficulty for home purchases and refinancing.

In order to take action to avoid property market bubbles induced by procyclical erosion in credit standards it is necessary to observe that this is occurring. Without market indicators, regulators will not be prompted to take appropriate prudential action. There is now an emerging consensus that balance sheets of banks and large non-bank entities must be kept well capitalized. But how is it to be known that capital that includes value deriving from property is sufficient?

The recent housing market “bubble” highlights the issue of procyclicality of economic capital as it concerns the mortgage market. Appreciating house values were reflected in overly optimistic assessments of exposure to credit risk from mortgages held on book as well as from securitizations, which would imply reduced economic and (under the current, Basel 2 rule, regulatory) capital. The subsequent collapse of the market brought a dramatic reversal of credit risk assessments, implying large increases in economic (and Basel 2 regulatory) capital. Recent research on the sources of the housing bubble highlights an additional concern, which is that assessments of credit risk (and of economic capital based on credit value at risk) helped perpetuate the rise in house prices. Thus, these assessments became endogenous.

Procyclical effects are to some extent an unavoidable tradeoff to maintaining a risk sensitive approach to bank capital. However, consideration may be warranted toward ways to

mitigate procyclicality of economic and Basel 2 regulatory capital assessments. Moreover, there is a natural inclination to draw on the recent collapse in house prices for applying stress tests to mortgage portfolio and as a source of data for recalibrating economic capital models or, at some point, the Basel 2 regulatory capital formula for mortgages. In light of the potential endogeneity of credit value-at-risk assessments, such inclinations may lead to excessive tightening of mortgage credit. From this perspective, capital regulation might be usefully required to have a countercyclical component, rising above normal requirements during housing booms.

As noted above, the proliferation of risk, masked by a cloak of opacity, began at the ground level: mortgage origination. As early as 2002, observers noticed a decline in lending standards and an increasing in nonstandard mortgages, especially to unsophisticated consumers. Only in retrospect have researchers documented the connection between this trend and the decline in homeownership, increase in foreclosures, and magnification of systemic risk.

From originator to securitizer, the lack of transparency only darkened. Banks had an incentive to transform loans into securities to minimize capital requirements (and thus maximize profits). The measurement of capital requirements itself required sophisticated risk analysis, a duty which regulators often delegated to the banks' internal risk managers. For other banks, rating agencies used models to grade the default probability of different tranches within the securities. Both methods represented an agency problem, as the arbiters were compensated by the very entities they supposedly judged. The models they used, moreover, often assumed an incorrect probability distribution and failed to account for correlation among tranches (JEP article). When the new securities did not benefit their balance sheets, banks shifted them to structured-investment vehicles or conduits.

Thus the financial crisis of 2007-2009 also revealed regulatory weakness. Multiple market failures proliferated to a degree that surprised most observers upon discovery. Had regulators known the extent of risky behavior, they would have been better positioned to protect, and later to rescue, the system. That such a proliferation of risk could go unnoticed should alert us to a dangerous information asymmetry in the regulation of financial markets. Regulators had difficulty monitoring the degeneration of lending standards, growing complexity of securitization, mispricing of risk, manipulation of balance sheets, increasing use of “shadow banking,” and accelerating speculation of real estate.¹⁰ When prices finally collapsed, both market participants and regulators suffered from this lack of transparency, as high counterparty risk spiraled into a liquidity crisis.

As any financial historian can testify, there is no sure way to predict or prevent an asset price bubble. Yet many of the weak spots in regulatory law had been clear in economic literature for decades preceding this particular bubble. Pending legislation will likely rectify some of those gaps, but a law is only as good as its enforcement. It would be an abuse of experience to repeat the same mistakes because we did not give our enforcers the proper tools to do their job. Regulators need real-time information on financial innovation and how it affects individual firms and the financial system. They need the knowledge to monitor risk, including its holder and originator and the pricing, modeling, accounting, and covariance relationships of that risk. If a systemic regulator is to fortify the system, it will need to underpin Flow of Funds financial aggregates with microdata that can pinpoint growing dangers and, if necessary, shield the market from their collateral damage.

Nakamura (2010b) proposes one possible way to mitigate some of these problems in the form of a financial monitoring database that can be built upon the Federal Reserve’s Flow of Funds, the U.S. Treasury’s Survey of Cross-Border Derivatives, the U.S. Survey of Terms

¹⁰ Adrian, Aschraft, Boesky, and Pozsar provide a concise overview of the shadow banking system in their July 2010 Federal Reserve Bank of New York Staff Report No. 458, “Shadow Banking.”

of Bank Lending, and many sources within the private and academic spheres. The database would need to be versatile and compatible with many different inputs. Data would be cross-referenced for quick access and easy recognition of related risks. For example, by cross-referencing mortgage datasets with credit bureau data, the financial dataset might readily indicate the extent to which speculative investors are buying multiple homes for investment purposes when they appear to be buying them as owner-occupiers.

The database would of necessity need to encompass all financial instruments that are claims against nonfinancial institutions and would need to utilize a variety of data gathering options, including frequent surveys of financial institutions and aggregation of third-party registries. This system would provide regulators with the information which might be used to detect the buildup of systemic risks, including ability to relatively quickly analyze procyclical moral hazard problems such as arose during the recent crisis. It should also provide an ability to detect the buildup of risks within specific financial entities – risks that are removed from the balance sheet of highly regulated financial intermediaries on to the balance sheets of less-closely regulated entities could be more readily detected, for example. And the system could assist regulators in providing alternative pricing benchmarks, which would aid in the detection of systematic mispricing of risk. Regulators also could compile reports and analyses that the public could read (without confidential identifying information).

Consider the difficult issue of “too big to fail.” Part of what makes it difficult is that policymakers may protect a firm – as they did with AIG – on an ad hoc basis, because it has come to play a systemically important role and they are not aware of this until it actually is about to fail. As a consequence, they protect the firm because they are not prepared to shield other financial firms from the fallout of the bankruptcy. A financial database that captures the full range of risks held by financial firms could conceivably help policymakers to be more

alert to the firms that occupy such systemically important roles, and either force them to divest the crucial securities in question or subject them to greater capital requirements.

Such a data system has now been included in the recently passed Dodd-Frank Financial Regulatory Reform bill as the responsibility of the novel Office of Financial Research. If a systemic regulator is to fortify the system, it will need microdata that can pinpoint growing dangers and, if necessary, shield the market from their collateral damage. To quote Chairman Bernanke, “The events of the past year or two have highlighted regulatory gaps and deficiencies that we must address... As we recover from the current crisis, it will be important to address these issues as soon as possible, to develop a regulatory structure that will better respond to future economic challenges.” (*Wall Street Journal*, October 14, 2008) There is much work yet to be done.

In addition to improved financial and regulatory data, there must be a greater focus on strengthening regulatory oversight in general and consumer protection in particular. Recent policy responses include the establishment of a Consumer Protection Bureau by the Dodd Bill, which attempts to thwart deception and unfair business practices within financial markets. However, consumers also need to be better informed throughout the homeownership process. Increased consumer education through pre-purchase counseling, especially for borrowers who have lower credit scores, and post-purchase counseling for those with declining credit scores could help to ensure that consumers understand their mortgages. Rules-based lending standards could be part of the discussion as well, such as verification of income and employment or maximum LTVs. Finally agency conflicts and misaligned incentives and such as though involving mortgage brokers should be specifically addressed in the public policy discussion.

All of these steps are important tools to correct the lack of safeguards that led to the Great Recession and had such a negative impact on American homeownership. The goal now

is not simply to recoup the losses in homeownership, but to ensure sustainable homeownership, where the mortgage product and economic conditions of the homebuyer are conducive to long-term financial stability. Such a condition will enable homeowners to weather future, inevitable economic storms. The regulatory steps outlined above are designed to moderate procyclicality, one of the results of the financial crisis that had the most deleterious effect on sustainable homeownership. With procyclicality in check, homeownership is poised to become a lasting feature of American life in the 21st century.

Appendix: Regression Analysis

First, we examine the relationship between affordability (denoted AFFORD) and homeownership rate (OWN_RATE) across the 75 largest U.S. metropolitan statistical areas (MSAs), controlling for the percent of housing units in the MSA classified as single-family units based on the 2000 Census (%SF2000). This control variable is included to broadly represent long-term demographic or housing market related conditions other than affordability that might impact the homeownership rate.

Separate equations are estimated for the average homeownership rate during the first two quarters of 2005, the first two quarters of 2007, and the last two quarters of 2009. The two quarter average was used to reduce noise in data; similar results are obtained when only a single quarter's observation was used (the first quarter of 2005 or 2007 or the last quarter of 2009), but the model fit (R-squared) is lower. Affordability is measured as of the first quarter of 2005 and 2007 and as of the last quarter of 2009, respectively. The regression results are summarized in the following table:

Dependent Variable: OWN_RATE (t-statistics in parenthesis)

	2005 Q1	2007Q1	2009Q1
Intercept	45.9 (9.0)*	44.9 (9.0)*	41.4 (8.7)*
AFFORD	0.039 (2.9)*	0.027 (2.1)**	0.045 (3.5)*
%SF2000	0.249 (2.9)*	0.289 (3.5)*	0.259 (3.1)*
R-squared	0.306	0.287	0.386

*statistically significant at the 1% level; **statistically significant at the 5% level

Next, we examine the relationship between the drop in homeownership rates since 2005 in relation to the percent of jumbo mortgage originations in 2005 and 2006 that were securitized, again across the 75 largest MSAs. Specifically we regress the average homeownership rate during the last two quarters of 2009 (OWN_RATE09) on affordability as of the fourth quarter of 2009 (AFFORD); average homeownership rate during the first two quarters of 2005 (OWN_RATE05), and percent of jumbo mortgages in 2005 and 2006 that were securitized (JUMBO_PCT_SECURITIZED). The latter is measured using HMDA data, where the proxy for securitized is sold to investment banks. We also estimate a second specification that includes the percent of HMDA-reported 2005 and 2006 mortgage originations that were high cost (PCT_HIGH_COST). The regression results are summarized in the following table:

Dependent Variable: OWN_RATE09 (t-statistics in parenthesis)

	(1)	(2)
Intercept	27.8 (4.7)*	27.9 (4.8)*
AFFORD	0.022 (2.0)**	0.026 (2.2)**
OWN_RATE05	0.546(6.3)*	0.558 (6.3)*
JUMBO_PCT_SECURITIZED	-0.203 (2.4)**	-0.196 (2.3)**
PCT_HIGH_COST		-0.087 (0.9)
R-squared	0.596	0.601

*statistically significant at the 1% level; **statistically significant at the 5% level

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