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*Past behavior suggests
that housing markets'
adjustment to more
realistic lending
standards is likely
to be prolonged.*

The Rise and Fall of Subprime Mortgages

by Danielle DiMartino and John V. Duca

After booming the first half of this decade, U.S. housing activity has retrenched sharply. Single-family building permits have plunged 52 percent and existing-home sales have declined 30 percent since their September 2005 peaks (*Chart 1*).

A rise in mortgage interest rates that began in the summer of 2005 contributed to the housing market's initial weakness. By late 2006, though, some signs pointed to renewed stability. They proved short-lived as loan-quality problems sparked a tightening of credit standards on mortgages, particularly for newer and riskier products. As lenders cut back, housing activity began to falter again in spring 2007, accompanied by additional rises in delinquencies and foreclosures. Late-summer financial-market turmoil prompted further toughening of mortgage credit standards.

The recent boom-to-bust housing cycle raises important questions. Why did it occur, and what role did subprime lending play? How is the retrenchment in lending



activity affecting housing markets, and will it end soon? Is the housing slowdown spilling over into the broader economy?

Rise of Nontraditional Mortgages

Monitoring housing today entails tracking an array of mortgage products. In the past few years, a fast-growing market seized upon such arrangements as “option ARMs,” “no-doc interest-onlys” and “zero-downs with a piggyback.” For our purposes, it’s sufficient to distinguish among prime, jumbo, subprime and near-prime mortgages.

Prime mortgages are the traditional—and still most prevalent—type of loan. These go to borrowers with good credit, who make traditional down payments and fully document their income. Jumbo loans are generally of prime quality, but they exceed the \$417,000 ceiling for mortgages that can be bought and guaranteed by government-sponsored enterprises.

Subprime mortgages are extended to applicants deemed the least credit-worthy because of low credit scores or uncertain income prospects, both of

which reflect the highest default risk and warrant the highest interest rates. Near-prime mortgages, which are smaller than jumbos, are made to borrowers who qualify for credit a notch above subprime but may not be able to fully document their income or provide traditional down payments. Most mortgages in the near-prime category are securitized in so-called Alternative-A, or Alt-A, pools.

Some 80 percent of outstanding U.S. mortgages are prime, while 14 percent are subprime and 6 percent fall into the near-prime category. These numbers, however, mask the explosive growth of nonprime mortgages. Subprime and near-prime loans shot up from 9 percent of newly originated securitized mortgages in 2001 to 40 percent in 2006.¹

The nonprime boom introduced practices that made it easier to obtain loans. Some mortgages required little or no proof of income; others needed little or no down payment. Homebuyers could take out a simultaneous second, or piggyback, mortgage at the time of purchase, make interest-only payments for up to 15 years,

skip payments by reducing equity or, in some cases, obtain a mortgage that exceeded the home’s value.

These new practices opened the housing market to millions of Americans, pushing the homeownership rate from 63.8 percent in 1994 to a record 69.2 percent in 2004. Although low interest rates bolstered homebuying early in the decade, the expansion of nonprime mortgages clearly played a role in the surge of homeownership.

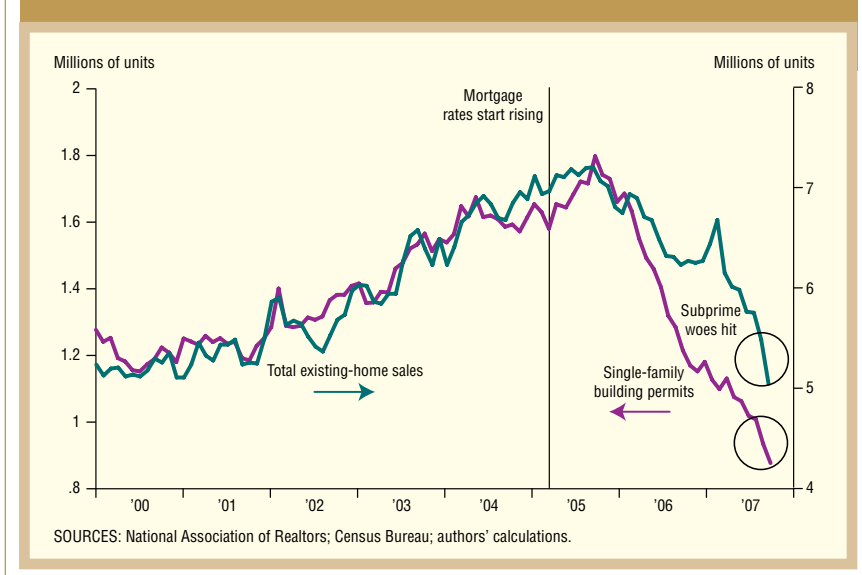
Two crucial developments spurred nonprime mortgages’ rapid growth. First, mortgage lenders adopted the credit-scoring techniques first used in making subprime auto loans. With these tools, lenders could better sort applicants by creditworthiness and offer them appropriately risk-based loan rates.

By itself, credit scoring couldn’t have fostered the rapid growth of nonprime lending. Banks lack the equity capital needed to hold large volumes of these risky loans in their portfolios. And lenders of all types couldn’t originate and then sell these loans to investors in the form of residential mortgage-backed securities, or RMBS—at least not without added protection against defaults.

The spread of new products offering default protection was the second crucial development that fostered subprime lending growth. Traditionally, banks made prime mortgages funded with deposits from savers. By the 1980s and 1990s, the need for deposits had eased as mortgage lenders created a new way for funds to flow from savers and investors to prime borrowers through government-sponsored enterprises (GSEs) (*Chart 2, upper panel*).

Fannie Mae and Freddie Mac are the largest GSEs, with Ginnie Mae being smaller. These enterprises guarantee the loans and pool large groups of them into RMBS. They’re then sold to investors, who receive a share of the payments on the underlying mortgages. Because the GSEs are federally chartered, investors perceive an

Chart 1
Housing Activity Drops Off



implicit government guarantee of them. Fannie Mae and Freddie Mac, however, haven't packaged many nonprime mortgages into RMBS.

Lacking the same perceived status, nonagency RMBS—those not issued by Fannie Mae, Freddie Mac and Ginnie Mae—faced the hurdle of paying investors extremely large premiums to compensate them for high default risk. These high costs would have pushed nonprime interest rates to levels outside the reach of targeted borrowers.

This is where financial innovations came into play. Some—like collateralized debt obligations (CDOs), a common RMBS derivative—were designed to protect investors in nonagency securities against default losses. Such CDOs divide the streams of income that flow from the underlying mortgages into tranches that absorb default losses according to a preset priority.

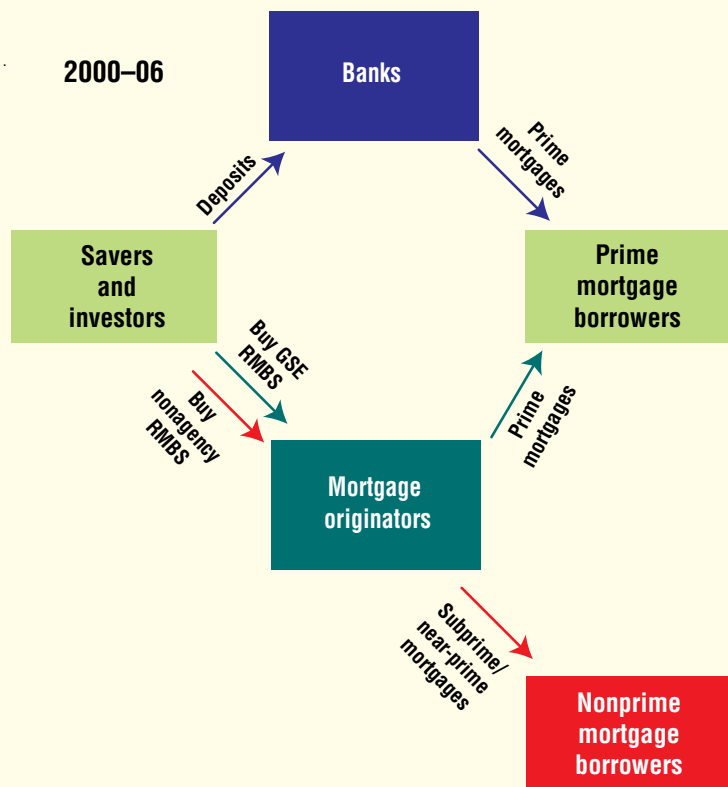
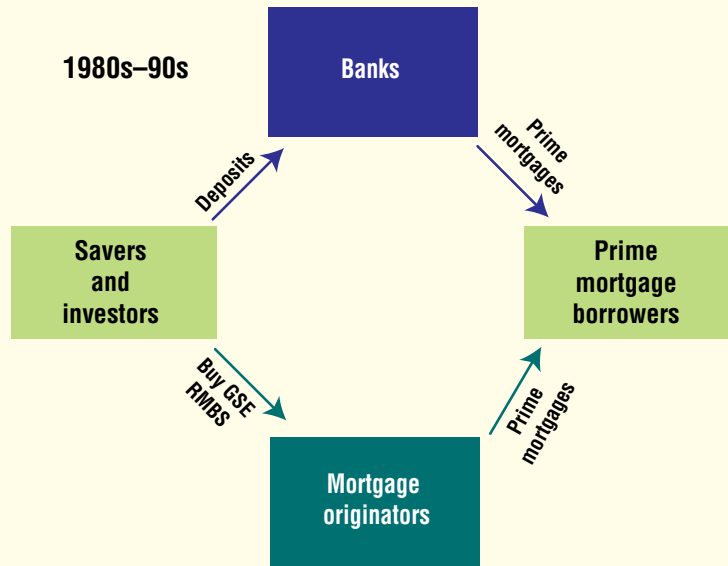
The lowest-rated tranche absorbs the first defaults on the pool of underlying mortgages, with successively higher ranked and rated tranches absorbing any additional defaults. If defaults turn out to be low, there may be no losses for higher-ranked tranches to absorb. But if defaults are much greater than expected, even higher-rated tranches may face losses.

Having confidence in the ability of quantitative models to accurately measure nonprime default risk, a brisk market emerged for securities backed by nonprime loans. The combination of new credit-scoring techniques and new nonagency RMBS products enabled nonprime-rated applicants to qualify for mortgages, opening a new channel for funds to flow from savers to a new class of borrowers in this decade (Chart 2, lower panel).

Nonprime Boom Unravels

As problems began to emerge in late 2006, investors realized they had purchased nonprime RMBS with overly optimistic expectations of loan quality.² Much of their misjudgment plausibly stemmed from the difficulty of forecast-

Chart 2
Mortgage Financial Flows





Failure to appreciate the risks of nonprime loans prompted lenders to overly ease credit standards. The result was a huge jump in origination shares for subprime and near-prime mortgages.

ing default losses based on the short history of nonprime loans.

Subprime loan problems had surfaced just before and at the start of the 2001 recession but then rapidly retreated from 2002 to 2005 as the economy recovered (Chart 3). This pre-2006 pattern suggested that as long as unemployment remained low, so, too, would default and delinquency rates.

This interpretation ignored two other factors that had helped alleviate subprime loan problems earlier in the decade. First, this was a period of rapidly escalating home prices. Subprime borrowers who encountered financial problems could either borrow against their equity to make house payments or sell their homes to settle their debts. Second, interest rates declined significantly in the early 2000s. This helped lower the base rate to which adjustable mortgage rates were indexed, thereby limiting the increase when initial, teaser rates ended.

Favorable home-price and interest rate developments likely led models that were overly focused on unem-

ployment as a driver of problem loans to underestimate the risk of nonprime mortgages. Indeed, swings in home-price appreciation and interest rates may also explain why prime and subprime loan quality have trended together in the 2000s. This can be seen once we account for the fact that past-due rates—the percentage of mortgages delinquent or in some stage of foreclosure—typically run five times higher on subprime loans (Chart 3). When the favorable home-price and interest rate factors reversed, the past-due rate rose markedly, despite continued low unemployment.

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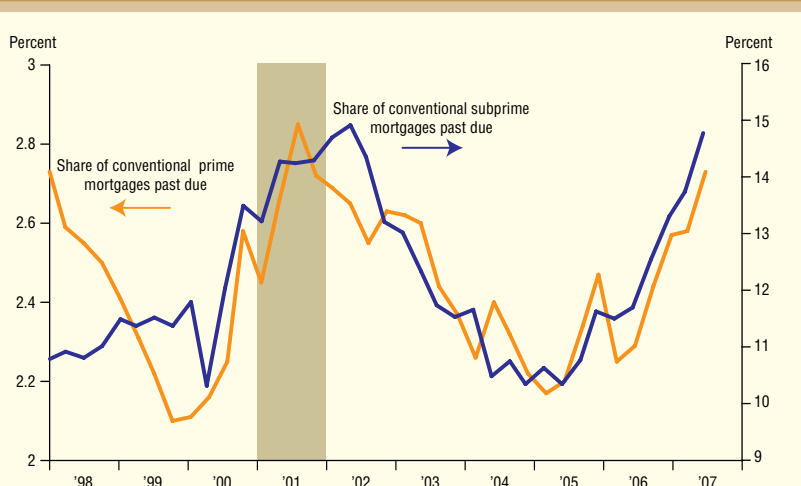
Compared with conventional prime loans in 2006, average down payments were lower, at 6 percent for subprime mortgages and 12 percent for near-prime loans.⁴ The relatively small down payments often entailed borrowers' taking out piggyback loans to pay the portion of their home prices above the 80 percent covered by first-lien mortgages.

Another form of easing facilitated the rapid rise of mortgages that didn't require borrowers to fully document their incomes. In 2006, these low- or no-doc loans comprised 81 percent of near-prime, 55 percent of jumbo, 50 percent of subprime and 36 percent of prime securitized mortgages.

The easier lending standards coincided with a sizeable rise in adjustable-rate mortgages (ARMs). Of the mortgages originated in 2006 that were later securitized, 92 percent of subprime, 68 percent of near-prime, 43 percent of jumbo and 23 percent of prime mortgages had adjustable rates. Now, with rates on one-year adjustable and 30-year fixed mortgages close, ARMs' market share has dwindled to 15 percent, less than half its recent peak of 35 percent in 2004.

Chart 3

Quality of Prime and Subprime Mortgages Deteriorates



NOTES: Conventional mortgages are those not insured by the Federal Housing Administration or guaranteed by the U.S. Department of Veterans Affairs. Data are seasonally adjusted. Shaded area indicates recession.

SOURCE: Mortgage Bankers Association.



In early 2007, investors and lenders began to realize the ramifications of credit-standard easing. Delinquency rates for 6-month-old subprime and near-prime loans underwritten in 2006 were far higher than those of the same age originated in 2004.

Other signs of deterioration also surfaced. The past-due rate for outstanding subprime mortgages rose sharply and neared the peak reached in 2002, with the deterioration much worse for adjustable- than fixed-rate mortgages. In first quarter 2007, the rate at which residential mortgages entered foreclosure rose to its fastest pace since tracking of these data began in 1970.

Lenders reacted to these signs by initially tightening credit standards more on riskier mortgages. In the Federal Reserve's April 2007 survey of senior loan officers, 15 percent of banks indicated they had raised standards for mortgages to prime borrowers in the prior three months, but a much higher 56 percent had done so for subprime mortgages. Responses to the July 2007 survey were similar.

However, in the October 2007

survey the share of banks tightening standards on prime mortgages jumped to 41 percent, while 56 percent did so for subprime loans. Many nonbank lenders have also imposed tougher standards or simply exited the business altogether. This likely reflects lenders' response to the financial disruptions seen since last summer.

The stricter standards meant fewer buyers could bid on homes, affecting prices for prime and subprime borrowers alike. Foreclosures added to downward pressures on home prices by raising the supply of houses on the market. And after peaking in September 2005, single-family home sales fell in September 2007 to their lowest level since January 1998.

The number of unsold homes on the market has risen, sharply pushing up the inventory-to-sales ratio for existing single-family homes from their low in January 2005 to their highest level since the start of this series in 1989 (*Chart 4*). Condominium supply, which is reflected in the all-home numbers, has experienced an even sharper increase since early 2005.

In the absence of home-price appreciation, many households are finding it difficult to refinance their way out of adjustable-rate mortgages.

These high inventories will likely weigh on construction and home prices for months to come. After peaking in early 2005, the Standard & Poor's/Case-Shiller index of year-over-year home-price appreciation in 10 large U.S. cities was down 5 percent in August—its biggest drop since 1991. While a Freddie Mac gauge of home prices posted a small year-over-year gain in the second quarter, the pace was dramatically off its highest rate, reported in third quarter 2005 (*Chart 5*).

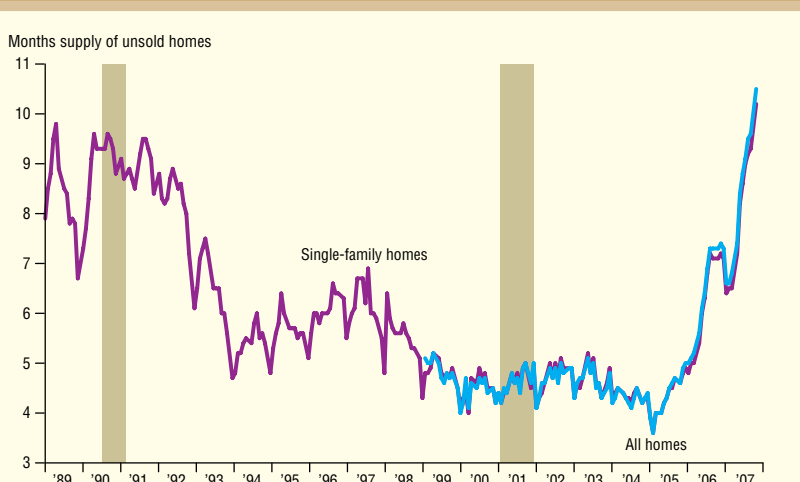
In the absence of home-price appreciation, many households are finding it difficult to refinance their way out of adjustable-rate mortgages obtained at the height of the housing boom. Larger mortgage payments could exacerbate delinquencies and foreclosures, especially with interest rate resets expected to remain high for the next year (*Chart 6*). This suggests mortgage quality will likely continue to fall off for some time.

Financial Turmoil

By August 2007, the housing market's weaknesses were apparent: loan-quality problems, uncertainty about inventories, interest rate resets and spillovers from weaker home prices. These, coupled with ratings agencies' downgrading of many subprime RMBS, led to a dramatic thinning in trading for subprime credit instruments, many of which carried synthet-

Chart 4

Existing-Home Inventories Rise from Late-2004 Lows



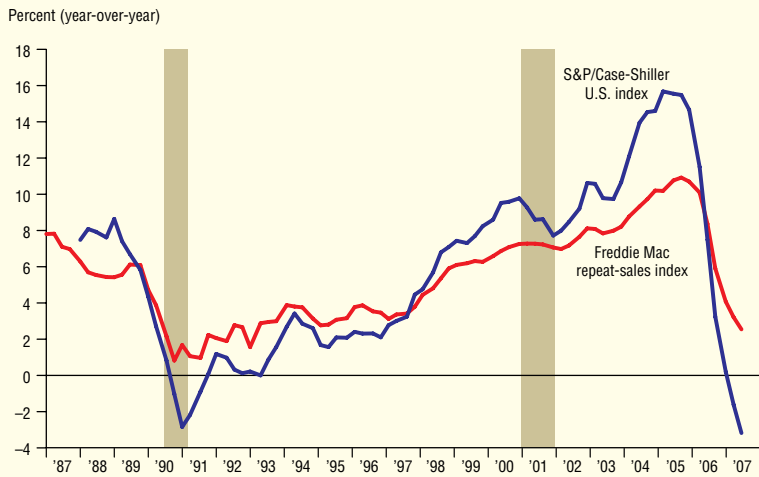
NOTE: The all-homes category covers single-family homes, condominiums and nonrental apartments. Shaded areas indicate recession.

SOURCE: National Association of Realtors.



Chart 5

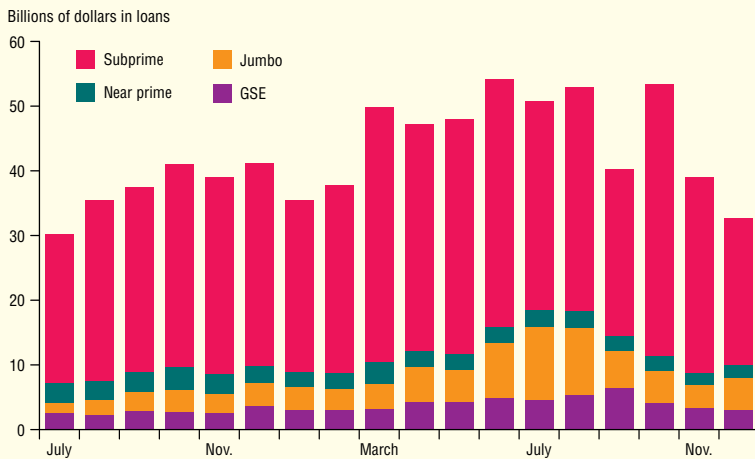
Home-Price Appreciation Plunges into Negative Territory



NOTE: Shaded areas indicate recession.
SOURCES: Freddie Mac; Standard & Poor's/Case-Shiller.

Chart 6

Scheduled Resets on Adjustable-Rate Mortgages Remain High



SOURCE: Bank of America estimates based on LoanPerformance data.

ic, rather than market, values based on models because of the instruments' illiquidity.

On Aug. 14, the paralysis in the capital markets led three investment funds to halt redemptions because they couldn't reasonably calculate the prices at which their shares could be valued. This event triggered widespread concern about the pricing of many new instruments, calling into question many financial firms' market values and disrupting the normal workings of the financial markets.

Investors sought liquidity, putting upward pressure on overnight interest rates and sparking a sharp upward repricing of risk premiums on assets, particularly those linked to nonprime mortgages. One outcome was an interest rate spike for both mortgage-backed commercial paper and jumbo mortgages, which heightened financial market uncertainty. In this environment, nonagency RMBS were viewed as posing more liquidity and default risk than those packaged by Fannie Mae and Freddie Mac.

Facing greater perceived default risk, investors began demanding much higher risk premiums on jumbo mortgage securities, pushing up the cost of funding such loans via securitization and encouraging lenders to incur the extra cost of holding more of these loans in their portfolios. This contributed to a 1 percentage point jump in jumbo interest rates between June and late August, an especially important increase given that jumbos accounted for about 12 percent of mortgage originations last year.

Although spreads between jumbo and conforming loan rates have fallen off their late-summer highs, they're still elevated. The higher rates have dampened the demand for more expensive homes, just as tighter credit standards reduced the number of buyers for lower-end homes.

Macroeconomic Effects

A housing slowdown mainly affects gross domestic product by curtailing



housing construction and home-related spending. It also reins in spending by consumers who have less housing wealth against which to borrow.⁵

Residential construction likely exerted its largest negative effect in third quarter 2006, when it subtracted 1.3 percentage points from the annual pace of real GDP growth. Last year, many forecasts predicted home construction would stop restraining GDP growth by the end of 2007 and the industry would start recovering in 2008. These predictions were made before the tightening of nonprime credit standards began in late 2006. The change in standards will likely prolong the housing downturn and delay the recovery, although it's hard to tell precisely for how long. Since single-family permits have already fallen 52 percent from their September 2005 peak, however, the worst of the homebuilding drag may be behind us.

The same may not be true for housing's indirect effect on consumption. Since the late 1990s, many homeowners have borrowed against housing wealth, using home equity lines of credit or cash-out refinancing or not fully rolling over capital gains on one house into a down payment or improvements on the next one. These mortgage equity withdrawals gave people access to lower cost, collateralized loans, which bolstered spending on consumer goods. By one measure, these withdrawals were as large as 6 to 7 percent of labor and transfer income in the early to mid-2000s.

The magnitude and timing of these withdrawals may have changed in hard-to-gauge ways. New research suggests housing wealth's impact on consumer spending grew as recent financial innovations expanded the ability to tap housing equity.⁶ This is consistent with prior research on housing's connection to U.S. consumer spending.⁷ Aside from the interest-rate-related refinancing surge of 2002 and 2003, mortgage equity-withdrawal movements have become increasingly sensitive to swings in home-price

appreciation since a 1986 law granted a federal income tax deduction for home equity loans (*Chart 7*).

Compounding the uncertain outlook for consumption is the likely reversal of the early 2000s' mortgage credit liberalization.⁸ This will put further downward pressure on home prices and housing wealth and may curtail home equity loans and cash-out refinancings. Finally, the homebuying enabled by the easing of credit standards in recent years may have been at the expense of later sales, further dampening the market going forward.

The timing of housing wealth's impact on consumption may have also changed. For example, before the advent of equity lines and cash-out refinancings, housing wealth increases may have affected U.S. consumption mainly by reducing homeowners' need to save for retirement. Since then, such financial innovations have enabled households to spend their equity gains before retirement. It's unclear how much this may be

reversed by the 2007 retrenchment in mortgage availability.

Looking Ahead

The rise and fall of nonprime mortgages has taken us into largely uncharted territory. Past behavior, however, suggests that housing markets' adjustment to more realistic lending standards is likely to be prolonged.⁹

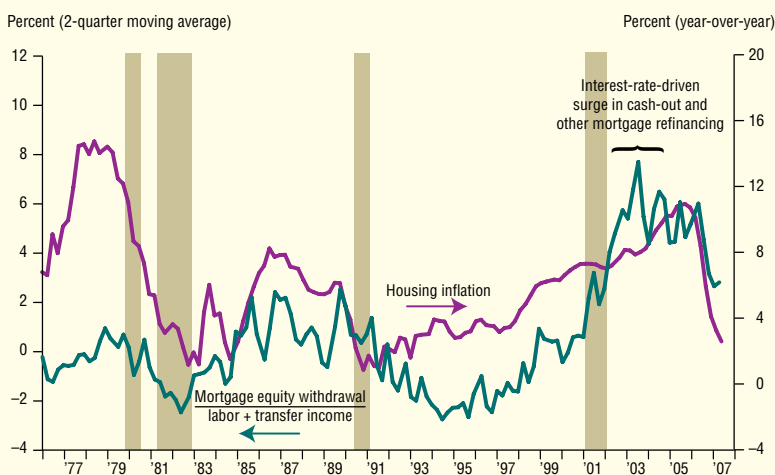
One manifestation of the slow downward adjustment of home prices and construction activity is the mounting level of unsold homes. The muted outlook for home-price appreciation, coupled with the resetting of many nonprime interest rates, suggests foreclosures will increase for some time.

The sharp reversal of trends in home-price appreciation will also dampen consumer spending growth, an effect that may worsen if the pullback in mortgage availability limits people's ability to borrow against their homes.

Although recent financial market turmoil will likely add to the housing slowdown, there are mitigating factors.

Chart 7

Mortgage Equity Withdrawals Increasingly Move with Housing Inflation and Mortgage Refinancings



NOTE: Shaded areas indicate recession.

SOURCES: Freddie Mac; Bureau of Economic Analysis; Federal Reserve, flow of funds data; authors' calculations.

First, the effect of slower home-price gains on consumer spending is likely to be drawn out, giving monetary policy time to adjust if necessary.

Second, the Federal Reserve has been successful in slowing core inflation while maintaining economic growth. This gives policymakers inflation-fighting credibility, which enables them to coax down market interest rates should the economy need stimulus.

Third, even if the tightening of mortgage credit standards undesirably slows aggregate demand, monetary policy could still, if need be, help offset the overall effect by stimulating the economy via lower interest rates. This would bolster net exports and business investment and help cushion the impact of higher risk premiums on the costs of financing for firms and households.¹⁰

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Notes

The authors thank Jessica Renier for research assistance.

¹ See “The Subprime Slump and the Housing Market,” by Andrew Tilton, *US Economics Analyst*, Goldman Sachs, Feb. 23, 2007, pp. 4–6. Securitized mortgages account for roughly 70 to 75 percent of outstanding, first-lien U.S. residential mortgages, according to estimates in “Mortgage Liquidity du Jour: Underestimated No More,” Credit Suisse, March 13, 2007, p. 28.

² See, for example, Federal Reserve Chairman Ben Bernanke’s remarks, “Housing, Housing Finance, and Monetary Policy,” at the Federal Reserve Bank of Kansas City’s Economic Symposium, Jackson Hole, Wyo., Aug. 31, 2007.

³ Part of the reason lenders eased credit standards was that they planned to sell, rather than hold, the mortgages. The earlier easing of standards may have partly owed to the potential moral hazard entailed when nonconforming loans

are originated with the intent to fully sell them to investors. Bernanke discusses this in his remarks at the 2007 Jackson Hole symposium (note 2).

⁴ The figures are for securitized mortgages. See “Mortgage Liquidity du Jour” (note 1).

⁵ “Making Sense of the U.S. Housing Slowdown,” by John Duca, Federal Reserve Bank of Dallas *Economic Letter*, November 2006.

⁶ See “How Large Is the Housing Wealth Effect? A New Approach,” by Christopher D. Carroll, Misuzu Otsuka and Jirka Slacalek, National Bureau of Economic Research Working Paper no. 12746, December 2006; and “Housing, Credit and Consumer Expenditure,” by John Muellbauer, paper presented at the Federal Reserve Bank of Kansas City’s Economic Symposium, Jackson Hole, Wyo., Aug. 31–Sept. 1, 2007. Also see “Booms and Busts in the UK Housing Market,” by John Muellbauer and Anthony Murphy, *Economic Journal*, vol. 107, November 1997, pp. 1701–27; and “House Prices, Consumption, and Monetary Policy: A Financial Accelerator Approach,” by Kosuke Aoki, James Proudman and Gertjan Vlieghe, *Journal of Financial Intermediation*, vol. 13, October 2004, pp. 414–35.

⁷ “Estimates of Home Mortgage Originations, Repayments, and Debt on One-to-Four-Family Residences,” by Alan Greenspan and James Kennedy, Finance and Economics Discussion Series Working Paper no. 2005-41, Board of Governors of the Federal Reserve System, September 2005; and “Mutual Funds and the Evolving Long-Run Effects of Stock Wealth on U.S. Consumption,” by John V. Duca, *Journal of Economics and Business*, vol. 58, May/June 2006, pp. 202–21.

⁸ This is a possibility to which Muellbauer (2007, note 6) alludes.

⁹ See Duca (note 5).

¹⁰ For a discussion of the channels of monetary policy, see “Aggregate Disturbances, Monetary Policy, and the Macroeconomy: The FRB/US Perspective,” by David Reifschneider, Robert Tetlow and John Williams, *Federal Reserve Bulletin*, January 1999, pp. 1–19.

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