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THE U.S. HOUSING BUBBLE AND THE GLOBAL FINANCIAL CRISIS: HOUSING AND HOUSING-RELATED FINANCE

An unprecedented U.S. housing bubble began to inflate in the first quarter of 1998 and then popped in the second quarter of 2006. The subsequent deflation of housing prices has caused the delinquency and foreclosure rates for subprime residential mortgage loans to soar. Investors grew uncertain about the value of the residential mortgage-backed securities (RMBS) and the collateralized mortgage obligations (CMOs) into which many subprime residential mortgage loans had been placed. Consequently, the market liquidity for these subprime-related derivative securities shriveled.

Kindleberger asset bubble framework. After reviewing all asset bubbles from 1720 to 1999, economist Charles P. Kindleberger devised a seven-stage framework of assets bubbles.[1] The stages are:

1. Displacement of existing expectations
2. Credit expansion
3. Proclamation of a new economy
4. Swindles
5. Overtrading, revulsion, and discredit
6. Financial panic and crisis management
7. Aftermath

This framework provides an analytical tool for understanding the U.S. housing bubble and the resulting global financial crisis. This report examines stages one, two (monetary policy and other macro-economic factors), three, four, and five as they apply to the U.S. housing bubble. Future reports will investigate stages two (micro-economic factors related to financial services), six, and seven.

Displacement of existing expectations. The Great Moderation, which refers to the combination of long and strong expansions, short and shallow recessions, and low inflation since 1983, increased the propensity for risk-taking throughout the U.S. economy. After the high-tech stock bubble popped in the first quarter of 2000, many Americans saw housing as a "safe" alternative that could still produce a high rate of return.

Housing prices began their rapid ascent in the first quarter of 1998. From then until the peak of the housing bubble in the second quarter of 2006, U.S. housing prices jumped by 101 percent (or 80 percent after adjusting for inflation).[2] U.S. housing prices deviated from their long-established relationships with household income and changes in rental costs.

Over the long term, housing demand is a function of household formation and household income growth. The ratio of the median sales price of an existing single-family house to the median household income averaged 3.19 from 1969 to 1997, but increased to 4.69 in 2005.[3]

Over the long term, housing prices closely track changes in the rental costs for apartments. From 1998 to 2006, however, the median sales price of an existing single-family house ballooned by an average of 6.3 percent a year, while rental costs increased by an average of 3.4 percent a year.[4]

Credit expansion. During the last decade, the credit available to U.S. households and non-financial firms grew much faster than GDP. Total credit outstanding including total debt securities outstanding in U.S. credit markets and total loans and leases outstanding at U.S. depository institutions grew from $17.087 trillion (equal to 205.8 percent of GDP) on December 31, 1997 to $38.324 trillion (equal to 276.8 percent of GDP) on December 31, 2007.[5]

This report examines the monetary policy and macro-economic supply factors in U.S. credit markets that contributed to the credit expansion. Micro-economic factors relating to financial services will be discussed in a later report.

Economist John B. Taylor developed the widely respected Taylor rule to guide the Federal Reserve on how to change its target for the federal funds rate to maintain price stability while maximize long-term real GDP growth. Comparing actual data with data from a Taylor rule-consistent simulation, Taylor (2007) found that the actual federal funds rate was significantly below the Taylor rule-consistent target federal funds rate from the second quarter of 2002 through the third quarter of 2006. He concluded that "a higher federal funds rate path (consistent with the Taylor rule) would have avoided much of the housing boom."[6]

Monetary policy-induced low short-term U.S. interest rates decreased the cost of funds for banks, other depository institutions, and highly leveraged non-depository financial institutions.[7] In turn, low funding costs encouraged financial institutions to expand credit aggressively by extending loans and purchasing debt and derivative securities.

At the same time, two macro-economic supply factors in U.S. credit markets restrained medium- and long-term U.S. interest rates:

- Globalization greatly intensified price competition among tradable goods and services in the United States. The inflation-suppressing effects of globalization on goods and services prices as recorded by the Consumer Price Index (CPI), the GDP Deflator, and the Personal Consumption Expenditure (PCE) Deflator combined with the Federal Reserve's successful disinflationary monetary policy during the 1980s and early 1990s to foster stable inflationary expectations. This discouraged U.S. lenders from seeking high inflation premiums in medium- and long-term interest rates when monetary policy deviated from the Taylor rule.
- Since the Asian Financial Crisis of 1997-98, the People's Republic of China (PRC) has intervened heavily in foreign exchange markets to maintain a fixed exchange rate between the Chinese renminbi and the U.S. dollar through July 20, 2005 and to suppress the appreciation of the renminbi relative to the dollar thereafter. Other Asian governments mimicked the PRC's foreign exchange policy to maintain the price competitiveness of their manufactured exports with China's. By buying U.S. dollars and selling their currencies simultaneously, central banks in the PRC, India, Indonesia, Japan, Malaysia, South Korea, Taiwan, and Thailand added $2.06 trillion to their foreign exchange reserves from December 31, 1997 to the peak of the U.S. housing bubble on June 30, 2006. About 2/3 of these newly acquired foreign exchange reserves were invested in U.S. dollar-denominated debt securities, mainly U.S. Treasuries and U.S. Agencies.[8] Massive purchases by these central banks bid-up the prices of U.S. debt securities and consequently held down medium- and long-term U.S. interest rates.

Housing is the most interest rate-sensitive sector of the U.S. economy. Low long-term U.S. interest rates during the first half of this decade further stimulated the already strong demand for housing among households, while financial institutions enthusiastically supplied the necessary residential mortgage credit. Thus, an overly accommodative monetary policy and macro-economic supply factors in U.S. credit markets fueled a massive credit expansion that helped to inflate an unsustainable bubble in U.S. housing prices.

New economy. Both major political parties have promoted home ownership among financially marginal and minority households. The Clinton administration pressed depository institutions and mortgage banks to lower their credit standards and reduce down payment requirements. It also promoted exotic alternatives to traditional fixed-rate fully amortizing residential mortgage loans, such as interest-only residential mortgage loans and negatively amortizing residential mortgage loans. These policies were intended to help financially marginal and minority households that could not qualify for traditional residential mortgage loans under normal credit standards to buy homes and thereby to increase the home ownership rate. The Bush administration did not change these policies.

Under provisions of the GSE Act, the Department of Housing and Urban Development has issued three sets of progressively more ambitious affordable housing regulations for Fannie Mae and Freddie Mac: December 1, 1995 for the years 1996-2000; October 31, 2000 for the years 2001-2004; and November 2, 2004 for the years 2005-2008.[9]

Before the 2000 regulations, Fannie Mae and Freddie Mac purchased relatively few subprime residential mortgage loans for securitization. To meet their more ambitious affordable housing goals under the 2000 regulations, Fannie Mae and Freddie Mac stepped-up their purchases of the AAA-rated subprime-related RMBS and tranches of subprime-related CMOs issued by investment banks. By increasing the demand for subprime-related RMBS and subprime-related tranches of CMOs, Fannie Mae and Freddie Mac unwittingly encouraged the origination of subprime residential mortgage loans by mortgage banks and accelerated the private issuance of subprime-related RMBS and subprime-related CMOs by investment banks.

Collectively, these federal policies encouraged many financially marginal and minority households to buy homes during the bubble. The home ownership rate, which had averaged 64.3 percent of all households from 1982 to 1997, climbed to a peak of 69.0 percent in 2004.[10] As early as 2000, economist Robert Shiller voiced warnings about the inflation of an unsustainable housing bubble.

Moreover, an explosion of television shows and even entire cable networks (e.g., *Flip This House* and *Sell This House* on A&E, *Flip That House* on the Learning Channel, and the Home and Garden Network) promoted home-buying, remodeling, and speculation in housing. This convinced many households that:

- Housing was a “safe” investment because housing prices never go down;
- Leverage increased the potential for high rates of return;
- Households could safely stretch their finances to buy or remodel housing; and
- “Flipping” was a good strategy to make money.

Swindles. Not surprisingly, swindlers took advantage of the unsuspecting during the housing bubble. The swindles included:

- Households that misrepresented their financial condition or committed other frauds to qualify for residential mortgage loans;
- Mortgage bankers that knowingly extended residential mortgage loans to unqualified households because securitization transferred the likely losses from poor credit standards and risky underwriting practices to the buyers of the derivative securities into which these loans were placed;
- Mortgage bankers that earned higher fees from issuers by pushing households that could qualify for prime residential mortgage loans to take out subprime residential mortgage loans instead; and
- Home builders and realtors that boosted their sales by encouraging households to take out subprime residential mortgage loans to speculate on housing units.

Overtrading, revulsion, and discredit. Since the 1930s, financially marginal households that could not qualify for prime residential mortgage loans – due to their inability to make a substantial down-payment, their high debt service-to-income ratios, their limited net worth, or their poor credit histories – have obtained insured residential mortgage loans through the Federal Housing Administration (FHA) program. During the housing bubble, the overall share of residential mortgage loans going to financially marginal households remained stable. However, the market share of private subprime residential mortgage loans grew from 3.8 percent of all residential mortgage loans serviced in the fourth quarter of 2002 to a peak of 14.0 percent in the second quarter of 2007 before falling to 12.7 percent in fourth quarter of 2007, while the FHA market share fell from 20.8 percent in the first quarter of 1998 to a trough of 6.9 percent in the fourth quarter of 2007.[11]

To qualify as many financially marginal households as possible, mortgage bankers promoted adjustable-rate subprime mortgage loans with “teaser” provisions to reduce initial monthly payments. Teasers included periods of low fixed interest rates, interest-only payments, or negative amortization. Adjustable-rate subprime residential mortgage loans increased from 20.6 percent of all subprime residential mortgage loans serviced in the first quarter of 1998 to 50.4 percent at the peak of the housing bubble in the second quarter of 2006.[12] As a result, interest rate risk became concentrated among financially marginal households that were least able to shoulder it.

Before housing prices peaked, subprime borrowers could generally sell their homes at a profit or refinance them with another mortgage loan before their interest rate adjusted and their monthly payments increased. Essentially, both subprime borrowers and their creditors relied on ever increasing housing prices rather than the borrower's income to repay subprime mortgage loans.

After the peak, this was no longer possible. When the initial teasers expired, interest rates increased, monthly payments spiked, and the delinquency and foreclosure rates for subprime residential mortgage loans soared. From the fourth quarter of 2004 to fourth quarter of 2007, the delinquency rate for adjustable-rate subprime residential mortgage loans exploded from 9.83 percent to 20.02 percent, while the delinquency rate for fixed-rate subprime residential mortgage loans rose from 9.72 percent to 13.99 percent.[13]

The foreclosure initiation rate on fixed-rate subprime borrowers increased from 1.05 percent in the fourth quarter of 2005 to 1.52 percent in the fourth quarter of 2007. More ominously, the foreclosure initiation rate for adjustable rate subprime borrowers jumped from 1.55 percent in the fourth quarter of 2005 to 5.29 percent in the fourth quarter of 2007.[14]

Extent of the fallout. Greenlaw et al. (2008) used a variety of methods to estimate the global credit losses from subprime mortgage loans, subprime-related RMBS, and tranches of subprime-related CDOs. The authors projected that global subprime-related credit losses will be $400 billion.[15] The OECD (2008) used a default loss model to estimate global subprime-related credit losses. Assuming a 40 percent recovery, the OECD forecast global subprime mortgage-related credit losses will be $422 billion.[16]

The estimates from the Greenlaw et al. and OECD studies include only subprime-related credit losses. The IMF (2008 A), which does not break out subprime-related credit losses, forecasts the global credit losses of $565 billion from all residential mortgage loans and related securities.[17]

As housing prices neared their top, sales of new single-family homes peaked at a seasonally adjusted annual rate of 1.389 million in July 2005 and have subsequently fallen by 62.1 percent to a seasonally adjusted annual rate of 526,000 in March 2008.[18] Existing single-family home sales peaked at a seasonally adjusted annual rate of 6.340 million in September 2005 and have subsequently fallen by 31.4 percent to a seasonally adjusted annual rate of 4.350 million in March 2008.[19]

New housing starts also peaked at a seasonally adjusted annual rate of 2.273 million in January 2006 and have subsequently fallen by 58.0 percent to a seasonally adjusted annual rate of 954,000 in March 2008.[20] As a result, payroll employment in residential construction and related specialty trades peaked at 3.444 million in March 2006 and has subsequently fallen by 13.6 percent to 2.977 million in April 2008.[21]

During 2007, at least twenty-five mortgage bankers that had specialized in originating subprime mortgage loans filed for bankruptcy. On April 2, 2007, New Century Financial, reportedly the largest mortgage banker that had specialized in originating subprime residential mortgage loans, filed for bankruptcy.

However, failures and near failures among mortgage banks were not confined to those that specialized in the subprime segment. American Home Mortgage Investment Corporation, the tenth largest mortgage bank with a 3 percent share of the origination market, filed for bankruptcy on August 6, 2007. Soon afterwards, Countrywide Financial, which operated the largest mortgage bank with a 17 percent share of the origination market, a federal savings bank, an investment bank affiliate (which is a primary dealer),[22] and insurance affiliate, came under extreme financial stress as a run began on its savings bank. On August 16, 2007, Countrywide narrowly avoid bankruptcy after securing an emergency $11.5 billion line of credit from a consortium of forty commercial banks. On January 11, 2008, Bank of America agreed to buy Countrywide for $4.1 billion, about one-sixth of its market value one year earlier.

Conclusion. This report examined the causes of the U.S. housing bubble and the economic stress that the popping and deflation of this bubble has inflicted upon the housing sector and housing-related finance. Weakness in the U.S. housing sector ignited a global financial crisis on August 9, 2007, that will be explored in a future report. The IMF (2008 A) estimates the global credit losses from the financial crisis will be $945 billion.[23] The IMF (2008 B) forecasts that the U.S. housing prices will fall another 12 percent in 2008.[24] The IMF (2008 B) concluded that the combination of the aftermath of the housing bubble and the credit crunch arising from the global financial crisis has tipped the U.S. economy into a recession.[25] Whether or not this IMF forecast proves correct, economic growth in the United States slowed dramatically during the last the two quarters.

[1] See generally, Charles P. Kindleberger, *Manias, Panics, and Crashes: A History of Financial Crises* (1978; 4th ed., New York: John Wiley & Sons, 2000).
[2] S&P/Case-Shiller Home Price Index: U.S. National/Haver and Consumer Price Index-U: All Items/Bureau of Labor Statistics/Haver. Author calculated real index by adjusting nominal index by CPI. Author calculated percentage changes.
[3] Median Sales Price: Existing Single-Family Homes, United States (Current Dollars)/National Association of Realtors/Haver and Median Income of Households (Current Dollars)/Census Bureau/Haver. Author calculated ratios and standard deviations. N.B., 2006 is the latest year in which annual household income data are available.
[4] Consumer Price Index-U: Rent of Primary Residence, Percent Change - Year to Year/Bureau of Labor Statistics/Haver and Median Sales Price: Existing Single-Family Homes, United States (Current Dollars) Percent Change - Year to Year/National Association of Realtors/Haver.
[5] Credit market data are from U.S. Department of Treasury, Federal Reserve System, Federal Agencies, Thomson Financial, Bloomberg, Securities Industry and Financial Market Association estimates. Nominal GDP data are from Bureau of Economic Analysis. Author calculated credit market data as a percent of GDP.
[6] John B. Taylor, "Housing and Monetary Policy," Presentation to Jackson Hole Conference (September 2007). Found at http://www.stanford.edu/~johntayl/Housing%20and%20Monetary%20Policy--Taylor--Jackson%20Hole%202007.pdf.
[7] Highly leveraged non-depository financial institutions (HLNDFIs) are discussed in detail in a later report. HLNDFIs include finance companies, financial government-sponsored enterprises (GSEs), hedge funds, investment banks, and bank-sponsored off-balance sheet entities (OBSEs).
[8] For an extensive discussion, see: Robert P. O'Quinn, *Chinese FX Interventions Caused International Imbalances, Contributed To U.S. Housing Bubble* (Prepared for Joint Economic Committee, 110th Cong., 2nd sess., March 2008). Found at: http://www.house.gov/jec/studies/2008/Chinese%20FX%20Interventions%20Caused%20International%20Imbalances%20Contributed%20to%20U%20S%20%20Housing%20Bubble%20(2).pdf.
[9] Fannie Mae is commonly used name for the Federal National Mortgage Association, and Freddie Mac is the commonly used name for the Federal Home Loan Mortgage Corporation.
[10] Census Bureau/Haver.
[11] Mortgage Bankers Association/Haver.
[12] Mortgage Bankers Association/Haver.
[13] Mortgage Bankers Association/Haver.
[14] Mortgage Bankers Association/Haver.
[15] David Greenlaw, Jan Hatzius, Anil K. Kashyap, and Hyun Song Shin, *Leveraged Losses: Lessons from the Mortgage Market Meltdown*, Presented at the U.S. Monetary Policy Forum Conference (February 29, 2008).
[16] *The Subprime Crisis: Size, Deleveraging, and Some Policy Options* (Paris: Organization for Economic Cooperation and Development, April 2008), pp. 7-11.
[17] *World Economic and Financial Surveys, Global Financial Stability Report: Containing Systemic Risk and Restoring Financial Soundness* (Washington, D.C.: International Monetary Fund, April 2008), pg. 50.
[18] Census Bureau/Haver. Author calculated percent change.
[19] National Association of Realtors/Haver. Author calculated percent change.
[20] Census Bureau/Haver. Author calculated percent change.
[21] Bureau of Labor Statistics/Haver. Author calculated percent change.
[22] A primary dealer is a bank or securities broker-dealer that may trade directly with the Federal Reserve. A primary dealer is required to make bids or offers when the Federal Reserve conducts open market operations, provide information to the Federal Reserve's trading desk, and to participate actively in Treasury auctions.
[23] *Global Financial Stability Report* (2008), pg. 10.
[24] *World Economic and Financial Surveys, World Economic Outlook: Housing and the Business Cycle* (Washington, D.C.: International Monetary Fund, April 2008), pg. 68. Author subtracted the decline in the S&P/Case-Shiller Index in 2006 and 2007 from the IMF forecast for the peak to year-end 2008 decline in this index to isolate the decline in 2008.
[25] *World Economic Outlook* (April 2008), pg. 65.