

A Summary of the Primary Causes of the Housing Bubble and the Resulting Credit Crisis: A Non-Technical Paper

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A recession began in December of 2007. The general consensus is that the primary cause of the recession was the credit crisis resulting from the bursting of the housing bubble. This paper discusses the four primary causes of the housing bubble—low mortgage interest rates, low short-term interest rates, relaxed standards for mortgage loans, and irrational exuberance. This paper concludes that the combination of these factors caused the housing bubble to be more extreme and the resulting credit crisis to be more severe.

Keywords: leveraging, subprime mortgages, irrational exuberance

I. Introduction

On December 1, 2008, the National Bureau of Economic Research announced that the economy had entered into a recession in December of 2007. Real GDP increased by only 0.4 percent for the year 2008, and it decreased at annual rates of 5.4 percent in the 4th quarter of 2008 and 6.4 percent in the 1st quarter of 2009. The unemployment rate increased from 4.9 percent in December of 2007 to 9.5 percent in June of 2009. The Dow Jones Industrial Average (DJIA) reached a peak of 14,279.96 on October 11, 2007, and then fell to 6,440.08 on March 9, 2009, a drop of almost 55 percent from the peak.

The general consensus is that the primary cause of the current recession was the credit crisis arising from the bursting of the housing bubble. Numerous commentators have weighed in on the causes of the housing bubble and the resulting credit crisis. Bernanke (2009) emphasized the inflow of foreign saving into the U.S. economy and especially to the U.S. mortgage market.

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Demyanyk and Van Hemert (2008) found that the quality of subprime loans deteriorated for six consecutive years before the crisis and that the problems could have been detected long before the crisis, but—they were masked by rapidly rising home prices.

Liebowitz (2008) emphasized the government's role in weakening mortgage underwriting standards. The relaxed standards encouraged speculation, which led to a rapid rise in mortgage defaults when home prices stopped rising. Sowell (2009) also emphasized the government's role in creating the housing bubble. The housing markets that had the largest home price increases were generally markets where the local government imposed land use restrictions that limited the supply of land available for housing. Relaxed mortgage lending standards were primarily the result of government influence. Krugman (2009) emphasized that much of the financing that fed the housing bubble came from the unregulated "shadow banking system" (investment banks, hedge funds, structured investment vehicles, etc.). The shadow banking system became highly leveraged, and the bursting of the housing bubble set off a cycle of deleveraging in the shadow banking system, which contributed to the credit crisis. Gorton (2009) described the credit crisis as a banking panic involving

the shadow banking system. Zandi (2009) emphasized how the increased securitization of home mortgage debt contributed to relaxed mortgage lending standards. Keys, Mukherjee, Seru, and Vig (2008) found that existing securitization practices adversely affected the screening incentives of lenders. Piskorski, Seru, and Vig (2008) found that loans that were securitized had a higher foreclosure rate than loans held by a bank. Mian and Sufi (2008) found a close correlation between the expansion in mortgage credit to subprime zip codes and the increase in securitization of subprime mortgages. Gwartney, Macpherson, Sobel, and Stroup (2008) identified four factors leading to the housing bubble and credit crisis: (1) relaxed mortgage lending standards, (2) low short-term interest rate policy of the Fed, (3) increased leveraging by investment banks, and (4) increased debt-to-income ratio for households. Shiller (2008) emphasized irrational exuberance as the cause of the housing bubble.

However, to the best knowledge of the author, no study so far has provided a simple explanation of the housing bubble and the credit crisis. This paper will summarize the primary causes of the housing bubble and the resulting credit crisis. Section II of this paper is devoted to the primary causes of the housing bubble. Section III deals with the bursting of the housing bubble and the resulting credit crisis. Section IV provides some concluding remarks.

II. Primary Causes of the Housing Bubble

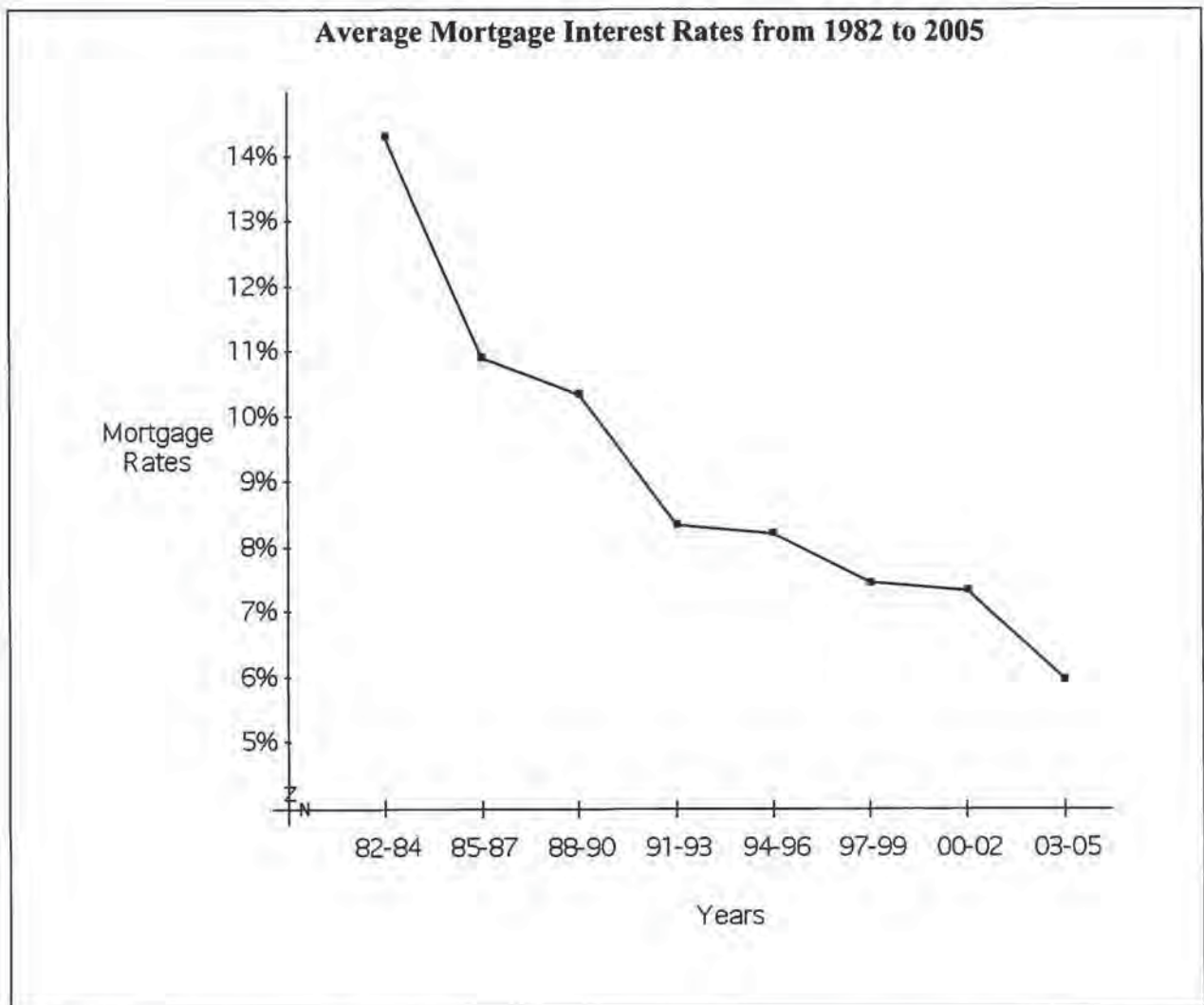
Home prices were relatively flat throughout most of the 1990s. According to the S&P/Case-Shiller Index, home prices increased by about 8.3 percent from the 1st quarter of 1990 to the 1st quarter of 1997. Then home prices began a rapid increase—peaking in the 2nd quarter of 2006 over 132 percent higher than they had been in the 1st quarter of 1997. By the 1st quarter of 2009, home

prices had decreased by over 32 percent from their 2006 peak. However, home prices were still 57 percent higher than they had been in the 1st quarter of 1997. Additional decreases in home prices were quite possible. In this section the four primary causes of the housing bubble will be discussed: (i) low mortgage interest rates, (ii) low short-term interest rates, (iii) relaxed standards for mortgage loans and (iv) irrational exuberance.

(i) Low mortgage interest rates. Even though the U.S. savings rate was low during the housing bubble, an influx of saving entering the U.S. economy from countries such as Japan and China helped to keep mortgage interest rates low. Investors in these countries sought investments providing relatively low risk and good returns. As Wall Street developed new ways to funnel savings from worldwide sources to the U.S. mortgage market (e.g., mortgage-backed securities), U.S. mortgage interest rates were kept low. Mortgage interest rates in the U.S. peaked at 18 percent in 1982, as the Federal Reserve drove interest rates skyward in a successful attempt to squeeze inflation out of the economy. Mortgage interest rates generally fell over the next twenty years, with the rate on a 30-year fixed mortgage falling below 6 percent late in 2002. The rate stayed below 6 percent most of the time through 2005. Figure 1 depicts the historical evolution of the average 30-year fixed mortgage interest rates from 1982 to 2005.

Mortgage interest rates were falling despite the low savings rate in the U.S. because of an influx of saving entering the U.S. from other countries. Most of this saving came from countries with high savings rates such as Japan and the United Kingdom and from countries with rapidly growing economies such as China, Brazil, and the major oil-exporting countries. According to Bernanke (2009), the net inflow of foreign saving to the U.S. increased from about 1.5 percent of GDP in 1995 to about 6 percent in 2006.

Figure 1:



Investors in these countries sought investments providing low risk and good returns. Initially, they focused on U.S. government securities. Seeking better returns, they branched out into mortgage-backed securities issued by Fannie Mae and Freddie Mac, two enormous government-sponsored enterprises (GSEs). Foreign investors assumed that these securities were low-risk because, if trouble arose, the federal government would step in to bail out Fannie and Freddie.

Eventually, the foreign investors grew bolder, investing in mortgage-backed securities issued by Wall Street firms. These mortgage-backed securities appeared to be

low-risk because they had received favorable ratings issued by highly respected credit rating agencies such as Moody's and Standard & Poor's. The low mortgage interest rates contributed to the housing bubble by keeping monthly mortgage payments affordable for more buyers even as home prices rose.

(ii) Low short-term interest rates. From 2002 to 2004, the Federal Reserve pushed the federal funds rate down to historically low levels in an attempt to strengthen the recovery from the 2001 recession. The U.S. economy entered into a recession in March of 2001. Over the course

of 2001, the Federal Reserve lowered the federal funds rate eleven times, from 6.50 percent to 1.75 percent. When the economic recovery proved sluggish and no sign of significant inflation appeared, the Fed continued its low interest rate policy, lowering the federal funds rate to 1.25 percent in November of 2002 and to 1.00 percent in June of 2003. The Fed began gradually increasing the rate in June of 2004, but the rate remained at 2.00 percent or lower for more than three years.

The low short-term interest rates contributed to the housing bubble in two primary ways. First, the low short-term interest rates encouraged the use of adjustable rate mortgages (ARMs). As home prices rose faster than household incomes, many prospective home buyers were unable to afford house payments under fixed rate mortgages. But ARMs could provide the buyer with a lower monthly payment initially since short-term interest rates were lower than long-term interest rates. For example, the monthly principal and interest payment on a \$200,000 30-year fixed rate mortgage with an interest rate of 6 percent would be about \$1,200. The monthly principal and interest payment on a \$200,000 30-year ARM with an initial interest rate of 4 percent would be only about \$950.

As the housing market heated up, mortgage lenders became more creative with ARMs, developing "option" ARMs. With an "option" ARM, the borrower could choose to make standard payments of both principal and interest (thus reducing the balance outstanding on the loan each month), or could choose to make payments of interest only (thus not changing the balance outstanding on the loan each month), or could choose to make payments of only a portion of the interest due (thus increasing the balance outstanding on the loan each month). ARMs made monthly mortgage payments affordable (at least temporarily) for more buyers

and thus contributed to rising home prices. When the interest rate on the mortgage adjusted upward (typically after two years), the higher mortgage payments proved unmanageable for many home buyers.

The second way that low short-term interest rates contributed to the housing bubble was by encouraging leveraging (investing with borrowed money). With short-term interest rates extremely low, investors could increase their returns by borrowing at low short-term interest rates and investing in higher yielding long-term investments, such as mortgage-backed securities. For example, suppose XYZ Company invests \$10 million in mortgage-backed securities paying 7 percent interest. XYZ's return on equity is 7 percent. If XYZ borrows \$100 million on short-term loans at 4 percent interest in order to invest an additional \$100 million in mortgage-backed securities paying 7 percent interest, XYZ is now leveraged at 10 to 1 (\$10 in debt for every \$1 in equity). XYZ's return on equity will now be 37 percent (profit of \$3.7 million on equity of \$10 million).

The practice of leveraging increased the financing available for mortgage lending and thus contributed to rising home prices. When the housing bubble eventually burst and home prices fell, the impact of the bursting of the housing bubble was increased by the degree of leverage in the economy. The necessity for deleveraging after the housing bubble burst is illustrated in the following example. The bursting of the housing bubble led to increased mortgage foreclosures and caused the value of mortgage-backed securities to fall. If the value of the mortgage-backed securities held by XYZ Company from the above example falls by more than \$10 million, XYZ Company becomes insolvent and will be unable to obtain new short-term financing. XYZ is forced to deleverage by selling some of its holdings of mortgage-backed securities. Many other highly-leveraged firms are going through the same

deleveraging process, driving the price of mortgage-backed securities still lower.

(iii) Relaxed standards for mortgage loans. Standards for mortgage loans were relaxed as a result of the following factors: new governmental policies aimed at fostering an increase in home-ownership rates among lower-income households, greater competition in the mortgage loan market, the increasing securitization of home mortgage debt, and the irrational exuberance that engulfed all parties involved in the mortgage lending process.

Standards for mortgage loans were fairly consistent in the decades prior to the development of the housing bubble. Most mortgages were 30-year fixed rate loans requiring a down payment of at least 20 percent or mortgage insurance if the 20 percent down payment requirement were not met. The borrowers also had to prove that their income was sufficient to ensure that the monthly mortgage payments would be manageable.

Governmental policies have long encouraged home ownership, e.g., the tax-deductibility of mortgage interest and real estate taxes. In 1997 the tax law was changed to permit homeowners to exclude from taxation a gain of up to \$500,000 from the sale of a home.

In the mid 1990s new governmental policies were enacted that contributed to a relaxing of standards for mortgage loans. In 1995 the Community Reinvestment Act was modified to compel banks to increase their mortgage lending to lower-income households. To meet the new requirements of the Community Reinvestment Act, many banks relaxed their mortgage lending standards.

Fannie Mae and Freddie Mac are government-sponsored enterprises that increase the funding available in the mortgage market by purchasing mortgages from loan originators. Fannie and Freddie buy only mortgages that conform to certain standards for down

payment requirements and income requirements. Historically, mortgages taken out by lower-income households often did not conform to these strict standards. Beginning in 1996 the Department of Housing and Urban Development began to increase the percentage of mortgage loans to lower-income households that Fannie and Freddie were required to hold in their portfolios. This caused Fannie and Freddie to relax the standards that mortgages had to meet to be classified as "conforming" and thus eligible for purchase by Fannie and Freddie. Down payment requirements and income requirements were reduced.

With the Internet came greater competition in the mortgage loan market. Home buyers were no longer limited to borrowing locally but could search the Internet for the mortgage provider who would offer the most favorable terms. The increased competition in the mortgage loan market is exemplified by the drop in mortgage fees. For example, according to the Federal Housing Finance Board (2009), the average fee on a mortgage loan fell from around 1 percent of the amount of the loan in 1997 to less than .5 percent from 2002 to 2005.

The greater competition in the mortgage industry contributed to relaxed mortgage standards. Mortgage lenders who were willing to lower their standards could gain market share. Zandi (2009) points out that more conservative mortgage lenders either had to lower their standards or lose market share.

The increased securitization of home mortgage debt also contributed to relaxed mortgage standards. Zandi (2009) discusses how securitization undermines the incentive for responsibility in the mortgage market. Quoting Zandi, "No one had enough financial skin in the performance of any single loan to care whether it was good or not." When mortgage debt is securitized, the originator of a mortgage sells it to another party,

perhaps an investment bank. The investment bank buys up thousands of mortgages and places them in a pool. Then securities (bonds) are issued (sold) to investors. The investors in these mortgage-backed securities will be paid from the principal and interest payments flowing into the pool from the mortgages. The bonds are typically divided into "tranches" (slices) that have different characteristics in terms of risk and return. The senior tranches (generally about 80 percent of a bond issuance) are the lowest risk and, before the housing bubble burst, would usually receive a AAA rating.

The loan originator, who is now pursuing a practice of "originate to sell" as opposed to the traditional practice of "originate to hold," has little incentive to worry about the quality of any single mortgage since the mortgage will soon be sold. The investment bank also has little incentive to worry about the quality of any particular mortgage since default on one mortgage loan will have little effect on the quality of the pool of mortgages. The credit rating agencies evaluated an issuance of mortgage-backed securities not based on the quality of each individual mortgage but based on historical mortgage default rates for similar mortgage pools. These historical default rates would become irrelevant in the event of an unprecedented increase in defaults.

As irrational exuberance caused the housing market to overheat, lenders relaxed their mortgage standards even further. This was particularly true for loan originators who practiced "originate to sell" and thus felt little concern for the long-term creditworthiness of the borrowers. The practice of "originate to sell" became more common with the increasing purchases of mortgages by investment banks. The investment banks, caught up in irrational exuberance, were increasing their purchases of mortgages to enable them to issue more and more of the

highly profitable mortgage-backed securities.

The relaxing of mortgage standards is exemplified by the increase in subprime mortgages. Subprime mortgages are home loans given to persons who are considered a poor credit risk. Historically, subprime mortgages have had a foreclosure rate about ten times higher than prime mortgages. Subprime mortgages charge a higher interest rate than conventional mortgages to offset the greater risk of default. Subprime mortgages increased from 5 percent of new home loans in 1994 (MacDonald, 2004) to 20 percent in 2006 (Trehan, 2007).

(iv) **Irrational exuberance.** Irrational exuberance played a key role in the housing bubble, as with all bubbles, when all parties involved in creating the housing bubble became convinced that home prices would continue to rise. What does "irrational exuberance" mean? Robert Shiller (2005), who wrote a book titled "Irrational Exuberance," defines the term as "a heightened state of speculative fervor." The term became famous when, in a speech given on December 5, 1996, Alan Greenspan hinted that stock prices might be unduly escalated due to irrational exuberance. The Dow Jones Industrial Average fell 2 percent at the opening of trading the next day.

All the participants who contributed to the housing bubble (government regulators, mortgage lenders, investment bankers, credit rating agencies, foreign investors, insurance companies, and home buyers) acted on the assumption that home prices would continue to rise. For example, *BusinessWeek* (2005) quoted Frank Nothaft, chief economist of Freddie Mac, as saying, "I don't foresee any national decline in home price values. Freddie Mac's analysis of single-family houses over the last half century hasn't shown a single year when the national average housing price has gone down."

Since home prices had not fallen nationwide in any single year since the Great Depression, most people assumed that they would not fall. This almost universal assumption of rising home prices led the participants who contributed to the housing bubble to make the decisions that created the bubble. Government regulators felt no need to try to control rising home prices, which they did not recognize as a bubble. Mortgage lenders continued to make increasing numbers of subprime mortgages and adjustable rate mortgages. These mortgages would continue to have low default rates if home prices kept rising. Investment bankers continued to issue highly leveraged mortgage-backed securities. These securities would continue to perform well if home prices kept rising. Credit rating agencies continued to give AAA ratings to securities backed by subprime, adjustable rate mortgages. These ratings, again, would prove to be accurate if home prices kept rising. Foreign investors continued to pour billions of dollars into highly rated mortgage-backed securities. These securities also would prove to be deserving of their high ratings if home prices kept rising. Insurance companies continued to sell credit default swaps (a type of insurance contract) to investors in mortgage-backed securities. The insurance companies would face little liability on these contracts if home prices kept rising. Home buyers continued to purchase homes (often for speculative purposes) even though the monthly payments would eventually prove unmanageable. They assumed that they would be able to "flip" the home for a profit or refinance the loan when the adjustable rate increased. This too would work if home prices kept rising.

Actually, home prices kept rising for a long time. Warnings of a housing bubble were issued as early as 2002. By the 1st quarter of 2003, home prices had risen by about 59 percent from the 1st quarter of

1997. Yet it would not have been wise for the average homeowner to bail out of the housing market at this point to avoid being caught up in the housing bubble. For example, if the average homeowner had sold his or her home in the 1st quarter of 2003, for fear of the housing bubble bursting, he or she would have sold it for 28 percent less than he or she could have received in the 2nd quarter of 2007, one year after home prices peaked. The S&P/Case-Shiller Index was at 130.48 in the 1st quarter of 2003 and was at 183.03 in the 2nd quarter of 2007.

The irrational exuberance that occurs during price bubbles is hard to recognize, hard to avoid, and not necessarily advantageous to avoid. Housing was a good investment up until just before the peak of the housing bubble. Likewise, stocks were a good investment up until just before the dot-com bubble burst in 2000. For example, at the time Alan Greenspan made his "irrational exuberance" comment, the Dow Jones Industrial Average had risen by an incredible 364 percent over the previous nine years and stood at 6437.10. However, this would not have been a good time for an investor to bail out of the stock market. The DJIA would increase by another 75 percent over the next three years.

III. The Bursting of the Housing Bubble and the Credit Crisis

This section of the paper examines the bursting of the housing bubble and the resulting credit crisis. Home prices reached their peak in the 2nd quarter of 2006. They did not fall drastically at first. Home prices fell by less than 2 percent from the 2nd quarter of 2006 to the 4th quarter of 2006. According to Liebowitz (2008) foreclosure-start rates increased by 43 percent over these two quarters, and increased by 75 percent in 2007 compared to 2006. This implies that

mortgage default rates began to rise as soon as home prices began to fall.

Speculators who bought homes (often with no money down) simply walked away from the property when the home price fell. Many never made even the first monthly payment. Homeowners with adjustable rate mortgages found that they could not refinance because the decrease in home prices meant that they had negative equity in their homes. When their rates adjusted upward, their monthly payment was no longer manageable. Foreclosure rates for adjustable rate mortgages increased much more than foreclosure rates for fixed rate mortgages. According to Liebowitz (2008), from the 2nd quarter of 2006 to the end of 2007, foreclosure rates for fixed rate mortgages increased by about 55 percent (prime) and about 80 percent (subprime). During this same time period, foreclosure rates for ARMs increased by about 400 percent (prime) and about 200 percent (subprime).

Just as rising home prices reinforced the continuing rise in home prices, falling home prices reinforced the continuing fall in home prices. The increase in foreclosures added to the inventory of homes available for sale. This further decreased home prices, putting more homeowners into a negative equity position and leading to more foreclosures.

The increase in foreclosures also decreased the value of mortgage-backed securities. This made it difficult for investment banks to issue new mortgage-backed securities, eliminating a major source of financing for new mortgage loans and contributing to the continuing decline in home prices.

The bursting of the housing bubble led to enormous losses. Some of those losses were incurred by homeowners, particularly those who bought their homes or who took out home equity lines of credit against the value of their homes too close to the peak.

Most of the losses were not incurred by homeowners but by the financial system. Large losses were incurred by the following groups:

1. Mortgage lenders. According to Zandi (2009), since the bubble burst a third of the top 30 mortgage lenders have either been acquired (e.g., Countrywide Financial by Bank of America), have filed for bankruptcy (e.g., New Century Financial), or have been liquidated.

2. Investment banks. Since the housing bubble burst, the five largest U.S. investment banks have either filed for bankruptcy (Lehman Brothers), been acquired by other firms (Bear Stearns and Merrill Lynch), or become commercial banks subject to greater regulation (Goldman Sachs and Morgan Stanley).

3. Foreign investors (mainly banks and governments) who had invested in mortgage-backed securities.

4. Insurance companies (e.g., AIG) who had sold credit default swaps. Credit default swaps are a type of contract that insures against the default of debt instruments, such as mortgage-backed securities.

The bursting of any housing bubble would be expected to have a negative effect on the economy for two reasons: First, home construction is an important economic activity, and the decline in home construction would reduce GDP. Second, the decrease in home prices would also reduce household consumption due to the wealth effect. But the bursting of this housing bubble caused more severe and widespread harm than would be predicted from just these two reasons. As mentioned previously, most of the losses were suffered by the financial system, not by the homeowners. The bursting of the housing bubble sent a shock through the entire financial system, increasing the perceived credit risk throughout the economy, as indicated by the TED spread (the difference between the interest rate on three-

month U.S. treasury bills and the interest rate on three-month interbank loans as measured by the London Interbank Offered Rate (LIBOR)).

The TED spread is considered a good indicator of the perceived credit risk in the economy. Historically, the TED spread has ranged between 0.2 percent and 0.5 percent. In August of 2007 the TED spread jumped above 1 percent and generally stayed between 1 percent and 2 percent until mid-September of 2008, when it began spiking upward, reaching a record level of over 4.5 percent on October 10, 2008. The TED spread finally fell back below 0.5 percent in June of 2009.

The increased perceived credit risk throughout the economy meant that not only home buyers but also commercial real estate investors, corporations seeking financing for investment, municipalities seeking to issue new bonds, and others would find it more difficult to obtain financing. As a result of the credit crisis, real investment spending decreased by 32 percent from the third quarter of 2007 to the second quarter of 2009.

IV. Concluding Remarks

The severe recession that began in December of 2007 was caused by the bursting of the housing bubble and the resulting credit crisis. This paper has summarized the primary causes of the housing bubble and the resulting credit crisis. Each of the four primary causes played an important role in creating the housing bubble and the credit crisis. The combination of all four causes created a type of "perfect storm" causing the housing bubble to be extreme and the resulting credit crisis to be severe.

Three of the causes, though they contributed to the housing bubble, were not essential to the development of the bubble. Low mortgage interest rates, low short-term interest rates, and relaxed mortgage lending

standards all contributed to the housing bubble. But the absence of any of these three causes would not necessarily have prevented the housing bubble. For example, if mortgage interest rates had not been at historically low levels, a housing bubble still could have happened. A housing bubble occurred in the late 1980s at much higher mortgage interest rates. Likewise, without low short-term interest rates or relaxed mortgage lending standards, a housing bubble still could have occurred though it would have been less extreme.

The one essential cause of the housing bubble was irrational exuberance. The housing bubble would not have occurred without the widespread belief that home prices would continue to rise. Irrational exuberance contributed to the other three causes. Mortgage interest rates would not have been so low if foreign investors and credit rating agencies had not believed that U.S. home prices would keep rising. Low short-term interest rates would not have led to such extensive use of ARMs and such a high degree of leveraging without irrational exuberance. And relaxed standards for mortgage loans would not have led to such a large increase in subprime mortgages without irrational exuberance.

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