

The Mortgage Crisis and Credit Crunch:

From Housing Losses to Balance Sheet Analysis to Diminished Economic Growth

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Economics and Finance Tracks

Abstract

The mortgage crisis makes headline news by the day. This paper was written in the summer of 2008, prior to the Lehman credit shock. While not cutting edge any more, it is very useful to review the economic story of that day as it is quite informative. TARP is not yet in the air. The broader economy is not yet damaged. At this point in time, what do we see? At this point in time, the talking heads were talking about Structured Investment Vehicles (SIVs) and off-balance sheet accounts. Every day another bank announces \$2 Billion dollars in losses written off the books. Then prices on these assets fall still further and other banks are forced to reevaluate their balance sheets with these new lower prices in place. What caused the mortgage crisis? What is the credit crisis? How has the crises impacted the broader economy? By studying the past five year history, we can see that a lack of regulation, poor investment decisions, major shocks to the economy, and historically low interest rates all played a part in the crisis. This paper will show the links between the credit crisis, firm balance sheets, and the damage we can expect to the macro economy. With a case study on Countrywide Financial Corporation's balance sheets, we can track the firm's failure and see the credit crisis' major effect on firms. We can expect continued declines in the GDP growth rates and the stock market until this credit environment is restored to health.

I. Introduction

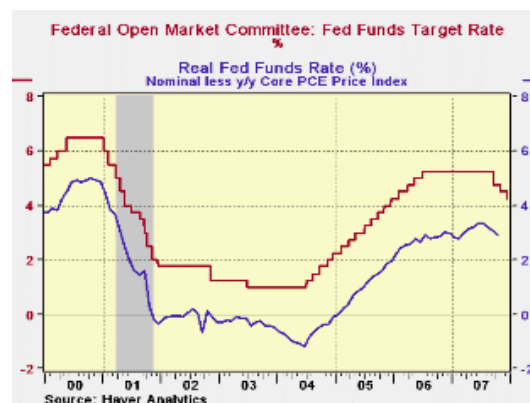
The mortgage crisis makes headline news by the day. The talking heads refer to Structured Investment Vehicles (SIVs) and Collateralized Debt Obligations (CDOs) and off-balance sheet accounts. Every day another bank declares \$2 Billion dollars in losses written off the books. Then, it appears, that prices on these assets fall still further and other banks are forced to reevaluate their balance sheets with these new lower prices in place. It all sounds bad. But how bad is it? How does one put these events into perspective? How does the action of a single bank affect the macro economy? That part is not in the news. That is the goal of this paper. We will investigate a few major questions related to this crisis and attempt to place them in a single economic narrative. First, we will ask what caused of the mortgage crisis and the credit crunch? Second, we will investigate bank behavior at the micro level by investigating bank balance sheets. Finally, we will measure the extent of this crisis at the national level and estimate the impact on the macro economy. How large is this crisis? How many people will be affected by it? How will it impact economic growth? We will answer these questions by following this ongoing narrative and by using the economic tools provided by the discipline.

II. What caused the credit crisis?

According to many experts, initially there was a lack of regulation on banks between the 1980's and 1990's. For example, under the Basel II Act, "banks are able to reduce their capital requirements by packaging up assets, securitizing them and holding investment-grade rated tranches 'slices' of the securitization rather than the whole loans."¹ In addition, there were also five major shocks to the economy between 2000 and 2005: mini recession (2001-2003), 9/11

¹ Beach, P, Heap, A, & Smith, D Risk Transparency in the Aftermath of the Credit Crisis. *Atos Consulting*

(2001), War on Terror (2001-present), Dot Com Bubble (1995-2001), Housing Bubble (2001-2005). To recover from these shocks, the Federal Reserve printed more money and lowered the federal funds rate 11 times between May 2000 at 6.5% to December 2001 at 1.75%. The increase in money supply and the lower federal funds rate caused market interest rates to also decline in turn. Banks began to use these lower interest rates to their advantage and start lending with adjustable rates. Also, Firms began “buying billions of dollars’ worth of subprime loans from nonblank mortgage lending firms.”² Thus, investors were buying subprime loans in the early 2000’s, revealing that everyone had bought into this new type of financial product and invested in these subprime loans.³



Not only did banks lend out high risk loans to gain profits, but they also had political pressure to make homes more affordable to people. Regulation on lending loans was not as strict, allowing banks to lend money to high risk borrowers. For the first time ever, borrowers were able to borrow without making a down payment. But, one key variable that had been overlooked made a grand appearance on the financial stage. Housing prices began to dip. People began to

² Muolo, P., & Padilla, M. *Chain of Blame*. Hoboken: (John Wiley & Sons, Inc., 2008) 7.

³ Iacono, T. The Mortgage Crisis According To Alan Greenspan. *Seeking Alpha*, Retrieved July 2008, from <http://seekingalpha.com/article/57147-the-mortgage-crisis-according-to-alan-greenspan>

speculate and become anxious about the housing market, causing prices to go down. For many analysts, the fact that the Federal funds rate was set at 1% in 2003 showed that the rates stayed too low for too long, igniting a housing bubble that began to burst in the summer of 2005. This bubble was due to over-building of homes because, before 2005, the housing market was booming with profits. In addition, many investors bought into mortgages they could not afford. As seen in figure above, the Federal Funds Rate began to increase in 2005, causing interest rates to also rise and because many of the the loans were adjustable, banks were able to raise interest rates on those loans, causing mortgage payments to be unaffordable. ⁴

III. SIV Story

SIV's, or structured investment vehicles are a major story:

A pool of investment assets that attempts to profit from credit spreads between short-term debt and long-term structured finance products such as asset-backed securities (ABS). Funding for SIVs comes from the issuance of commercial paper that is continuously renewed or rolled over; the proceeds are then invested in longer maturity assets that have less liquidity but pay higher yields. The SIV earns profits on the spread between incoming cash flows (principal and interest payments on ABS) and the high-rated commercial paper that it issues. SIV's often employ great amounts of leverage to generate returns.

SIVs are less regulated than other investment pools, and are typically held off the balance sheet by large financial institutions such as commercial banks and investment houses. They gained much attention during the housing and subprime fallout of 2007; tens of billions in the value of off-balance sheet SIVs were written down as investors fled from subprime mortgage related assets.

Many investors were caught off guard by the losses because little is publicly known about the

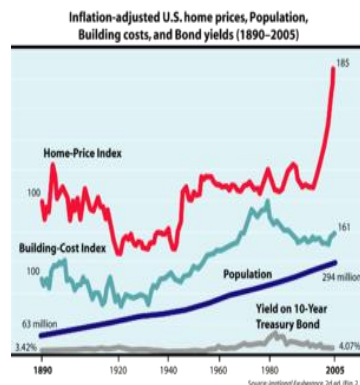
⁴ Unknown, (May 2008). Subprime Crisis Impact Timeline. Retrieved June 2008, from Wikipedia Web site: http://en.wikipedia.org/wiki/Subprime_crisis_impact_timeline

*specifics of SIVs, including such basics as what assets are held and what regulations determine their actions. SIVs essentially allow their managing financial institutions to employ leverage in a way that the parent company would be unable to due to capital requirement regulations.*⁵

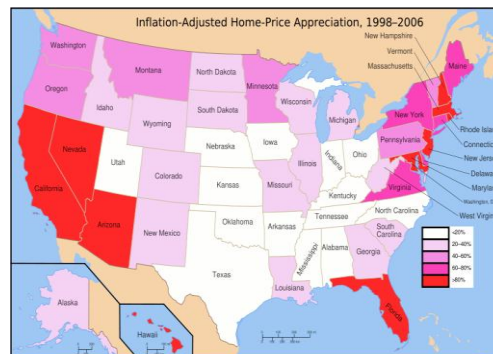
The SIV's cause uncertainty in the true value of the mortgage debt. When housing prices fall, the credit shrinks up because of the uncertainty, causing the falling in prices. The SIV's began to fail in 2007.

IV. The Housing Bubble

The low Fed interest rates and lack of regulation allowed banks to make higher risk loans, which made purchasing homes more attractive. Prices on homes began to sky rocket as demand surged, but in 2005, the housing bubble burst. The graphs below reveal the major increase in housing prices.



The graph above shows the housing bubble, as building costs are lower than housing prices.



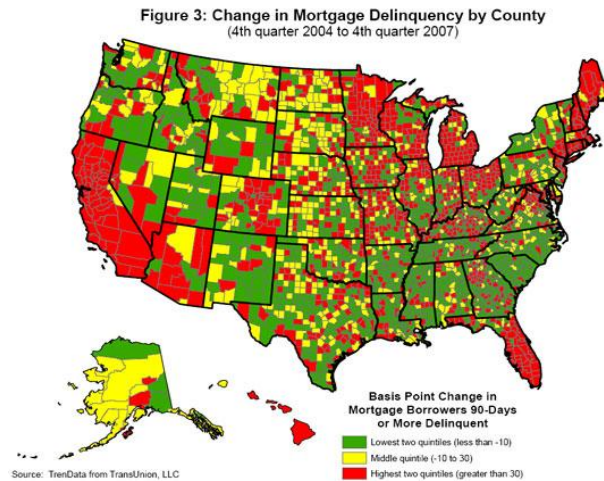
⁵ Forbes, (2008). Structured Investment Vehicle- SIV. Retrieved July 2008, from Investopedia Web site: <http://www.investopedia.com/terms/s/structured-investment-vehicle.asp>

The chart above reveals home price appreciation by state. Notice that the bubble affected most states dramatically by 2006. Banks and other mortgage lenders noticed weakness in the housing market. New houses sit unsold and foreclosures rise as people who bought homes with adjustable-rate mortgages see sharp spikes in their monthly payments. Central bankers and other watchdogs are caught by surprise. The question in many boardrooms became: What else is at risk? (Washington Post, 06.16.08) Editing this paragraph in summer of 2009, it appears that this was indeed the question.

V. The Housing Bubble Bursts and the Damage Begins

In 2006, prices are flat and home sales fall, causing a major build up in inventory. Home construction also began to fall. By mid August, the U.S. Home construction Index was down by over 40% compared to August of 2005. Major foreclosures are occurring as seen in the figure below. By the fourth quarter of 2007, 2% of all mortgage borrowers were delinquent. This rate is almost twice as much as the rate from the end of 2008.⁶ Yet very few are able to extrapolate from this sector's damage to a full blown credit crisis.

⁶Bernanke, B. (May 05, 2008). Mortgage Delinquencies and Foreclosures. *Board of Governor's of the Federal Reserve System*, June 2008, from <http://www.federalreserve.gov/newsevents/speech/Bernanke20080505a.htm>



VI. Balance Sheets: What a Credit Crisis looks like from the Inside

“At the top of the credit cycle, the income statement for a financial institution shows ‘the best of times’ – but buried in the balance sheet is ‘the worst of times’ to come.” –Minyan Peter

According to The New York Times Dictionary of Money and Investment, a balance sheet is “A summary of a company’s assets, liabilities, and net worth at a moment in time.” A bank’s balance sheet reveals all of its financial successes, or rather, its losses. The balance sheet tells the story of the crisis from the inside, where banks are writing off billions of dollars by the quarter. Where did it all go wrong?

In 2005, Countrywide Financial became the largest mortgage lender in the United States.⁷ As indicated by Paul Muolo and Mathew Padilla’s book “Chain of Blame,” the CEO of Countrywide, Angelo Mozilo, made Countrywide dominate the mortgage market and wrote more

⁷ Julio Rotemberg, Subprime Meltdown: American Housing and Global Financial Turmoil (Harvard Business School: 2008) 4.

subprime loans than any other firm. Countrywide even ranked as the fourth largest public firm by market capitalization earning \$19,588.1 in millions in market capitalization and \$13,469.3 in millions according to reports on 7/7/04, which are up from the results of 7/7/03 where Countrywide has \$9,469.3 in millions in market capitalization and \$10,663.1 in millions in revenues.⁸ So, what happened to Countrywide's success?

“By the second quarter of 2007, loan delinquencies were rising to 20 year highs. Subprime borrowers were defaulting on their payments. Since 2002, subprime lending accounted for 20% of new mortgages written in the US. In the past 5 years, home lenders originated \$2.6 trillion in mortgages to people with bad credit. Home prices were falling to 5-year lows. Countrywide wrote more subprime loans than anyone else, and became part of the story when there were doubts about the ability for subprime borrowers to pay on mortgages backed by homes that were now worth less.”

“Countrywide's earnings were down by 1/3 to \$400 million by the second quarter results of 2007. Fifteen out of every 100 loans in the US were closed by Countrywide, which measures the size of loans made by Countrywide. Mozilo, CEO of Countrywide, made comments in a press conference in 2007; “We are experiencing a huge price depression, one we have not seen before-not since the Great Depression.” These comments caused damage to the stock market, as people feared another crash and the Dow Jones Industrial Average decreased by 226 points. Within a month, the average would fall by 1000 points. Kenneth Bruce wrote a research report on Countrywide and predicted with enough “financial pressure” it could go bankrupt. People began to pull money out of Countrywide because of a fear of bankruptcy, even though

⁸ http://findarticles.com/p/articles/mi_m5072/is_29_27/ai_ni14864352

Countrywide had \$190 billion in loans it could lend out. Countrywide was able to borrow this money from other Wall Street firms.”

“Because of the fear of bankruptcy, investors in Countrywide’s stock had seen billions of dollars in value disappear. Countrywide could go belly-up because of the mortgage market meltdown- 20% of home borrowers were subprime borrowers and the market seized up- home prices were falling and defaults were rising. Because of Bruce’s comments about bankruptcy, Countrywide was facing major damage, even though it had earned almost \$2 billion the year before. Countrywide’s shares kept decreasing in value- Bank of America invested \$2billion in preferred stock that was convertible to common stock which paid a 7.25% dividend. But by January 2008, Countrywide’s shares were down to \$8, causing Bank of America to also have losses of well over \$1 billion.”⁹ On January 11, 2008, Bank of America bought Countrywide for \$4 billion after its shares plunge 48%.¹⁰

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In Millions Segment	Pre-tax Earnings
PRODUCTION	\$ -737
SERVICING	-243
CLOSING SERVICES	86
■ MORTGAGE BANKING	\$ -894
BANKING	\$ 10
CAPITAL MARKETS	-103
INSURANCE	429
GLOBAL	19
OTHER	-64
■ OTHER BUSINESS SEGMENTS	\$ 291
TOTAL	\$ -602
9 Months Ended 9/30/07	

By looking at key features of its balance sheet, the results show that the firm has suffered severe losses because of the choice to lead in subprime lending.. Countrywide’s total earnings

⁹ Muolo, P., & Padilla, M. *Chain of Blame*.

¹⁰ Felton, A., & Reinhart, C. (June 2008). The First Global Financial Crisis of the 21st Century. *Centre for Economic Policy Research (CEPR)*. 183-190.

¹¹ JLP, (January 08, 2008). What Does the Future Hold For Countrywide?. *All Financial Matters*, Retrieved July 2008, from <http://allfinancialmatters.com/2008/01/08/what-does-the-future-hold-for-countrywide/>



are negative, as shown in the chart above. Nearly 36% of Countrywide's subprime loans were delinquent at the end of March 2007. The firm faced a liquidity crisis; 61% of its capitalization (\$15 billion) evaporated in 2007 due to rising default rates.¹²

The stock price graph above is a one year chart for Countrywide Financial. It's stock price has gone from over \$45 per share to \$5.47 (January 07 closing price) over the last year. This chart shows Countrywide going bankrupt, as the value of its market shares are decreasing drastically.¹³ Countrywide Financial had a press release from PRNewswire on April 29, 2008 about its first quarter results. The firm reported a net loss of \$893 million. Essentially, Countrywide collapsed because the mortgage market continued to collapse and people could not pay on their mortgages. No one would buy mortgages anymore and there was no money available to make new mortgages, causing major losses. But, Countrywide is not the only firm who experienced major losses.

VII. The Spillover of the Mortgage Crisis into the Credit Crisis: Bank Losses and Federal Reserve Actions: A Brief Timeline¹⁴

In 2006, we see the first mortgage company file for bankruptcy. On December 28, 2006, Ownit Mortgage Solutions files for bankruptcy.¹⁵ We begin to see the spillover of the mortgage

¹² JLP, What Does the Future Hold For Countrywide?.

¹³ JLP, What Does the Future Hold For Countrywide?.

¹⁴ Felton, A., & Reinhart, C. The First Global Financial Crisis of the 21st Century.

¹⁵ Felton, A., & Reinhart, C. The First Global Financial Crisis of the 21st Century.

crisis into the credit crisis. The spillover occurred when major banks began announcing major net losses, which are apparent on many of their balance sheets. Banks need positive assets to make loans. When the banks write off losses, they are unable to make loans, causing the credit crisis, thus there is no liquidity and banks are trying to gain their trust back with consumers.

In 2007, more banks begin filing for bankruptcy and the housing market begins to plummet. On April 02, 2007, New Century Financial filed for bankruptcy. Home sales fall 8.4% during March, which is the biggest decline in 18 years. All subprime businesses begin to take a turn. General Electric sells their subprime business, WMC Mortgage. Countrywide Financial, the biggest mortgage lender in 2005, is forced to sell 16% of the firm to Bank of America. Four other large financial institutions are forced to borrow a total of \$2 billion from the Federal Reserve to try to regain losses from the crisis by August 23, 2007. Then, on August 31, 2007, Ameriquest files for bankruptcy. The Federal Reserve is then forced to cut the federal discount rate by 50 points, down to 4.75%, for the first time since 2003.

More and more losses are announced including USB and Citigroup at \$3.1 billion and 3.7 billion by October 01, 2007. By October 15, Citigroup's losses had reached \$5.9 billion. Countrywide Financial reports its first loss in 25 years of \$1.2 billion in the third quarter of 2007. Merrill Lynch then announces losses of \$7.9 billion, along with the resignation of their CEO. Between October and November of 2007, the Fed cuts the Federal Funds Rate to 4.75% and injects \$41 billion into the money supply. By injecting money and lowering the federal funds rate, the Fed hoped to lower interest rates and provide liquidity to avoid more losses. Citigroup experiences more losses. Out of \$55 billion in subprime investments, the value of those investments declined in value by between \$8 and \$11 billion.

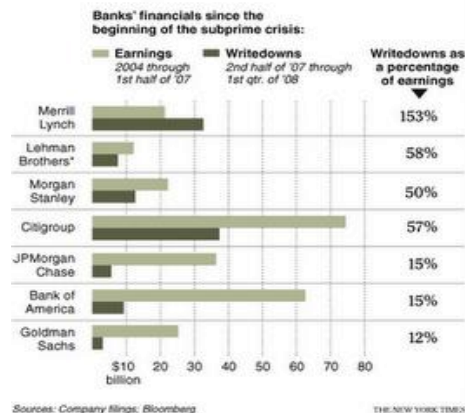
In November, Morgan Stanley announced a \$3.7 billion dollar mortgage loss; Wachovia announced another \$1.7 billion loss; Bank of America announced a \$3 billion loss in subprime alone; and Freddie Mac announced a \$2 billion loss. Again, the Federal Funds Rate was lowered by another 25 base points down to 4.25% and made \$20 billion available to commercial banks in December 2007. In December, Washington Mutual's losses reached \$1.6 billion and Citigroup took \$49 billion worth of SIV assets back on their balance sheets. Because Morgan Stanley's subprime losses reached \$9.4 billion, they were forced to sell 9.9% stake in the company. By January 2008, Bear Stearns announced \$1.9 billion in subprime losses. Merrill Lynch doubles their subprime losses to \$15 billion. Citigroup reports a \$9 billion loss for the fourth quarter, not including an \$18 billion loss in the mortgage portfolio. By February 2008, "AIG announces fourth-quarter 2007 losses of \$5.3 billion due to more than \$11 billion of losses on its credit-default swap portfolio.

The investment firm, Carlyle Capital, defaults on \$17 billion of debt. The fund is leveraged more than 30:1 and invests mostly in agency-backed residential mortgage-backed securities (RMBS). The investment bank Bear Stearns is acquired by JPMorgan Chase for \$2 per share. Bear Stearns stock had been trading at \$60 the previous week before a run pushed it to near insolvency. The Federal Reserve Bank of New York agrees to guarantee \$30 billion of Bear Stearns assets, mostly mortgage-related.

The Federal Reserve cuts the federal funds rate by 75 basis points to 2.25%. JPMorgan

Profit Eraser

Six of Wall Street's largest investment banks have written down about half of their profits since the beginning of 2004 because of the subprime mortgage crisis.

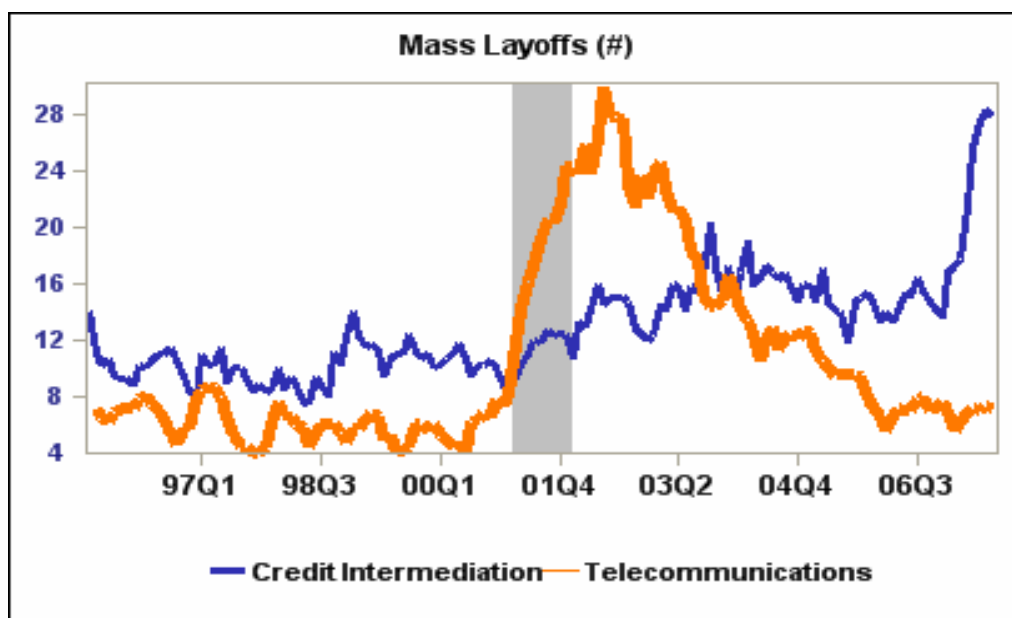


Chase raises its bid for Bear Stearns to \$10 per share and agrees to indemnify the Federal Reserve Bank of New York against the first \$1 billion of losses on the \$30 billion that it guaranteed. The IMF's Global Financial unit estimates that the total credit losses will be \$1 trillion. Citigroup announces another \$12 billion of losses related to subprime mortgages, leveraged loans, exposure to monoline insurers, auction-rate securities and consumer credit. By April, The Federal Reserve lowers the federal funds rate by 25 basis points to 2.0%."All of these facts reveal how the mortgage crisis has spilled over into a credit crisis, which causes a broader impact on the real economy. The chart above quantifies write downs versus earnings for seven major firms.

VII. What is the broader economic impact?

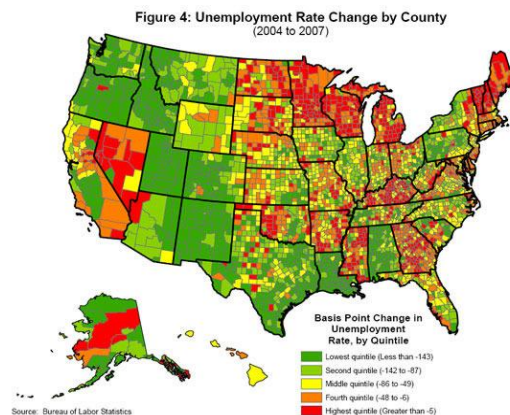
UNEMPLOYMENT

In August 2007, employment cuts reached 79,459, which is 85% higher than July's levels and 22% higher than August 2006- the financial sector accounted for nearly half of job losses. By September 2007 YTD total 125,758 jobs lost, more than double the 2006 total, as shown in the figure below.



Source: Moody's Economy.com

The next figure also shows the unemployment effects of the credit crisis. Many parts of the country show increases in unemployment rates and mortgage delinquencies. “The data suggest that increases in unemployment rates account for at least some of the recent increases in mortgage delinquencies.”¹⁶



STOCK MARKET LOSS

According to the S&P 500, as of September 2007, the financial service sector became largest sector moving ahead of both technology and energy - it increased from a weight of roughly 5% in 1980 to nearly 22% currently. “As interest rates reflect the cost of credit, falling interest rates have led to an increase in the demand for credit as it has become cheaper to borrow, which fueled the growth of the financial sector.”¹⁷ Refer to Figure 1 which shows the growth of the financial sector.

¹⁶Bernanke, B. (May 05, 2008). Mortgage Delinquencies and Foreclosures.

¹⁷Puplava, C. (September 05, 2007). Will Financials Be to This Bull Market and Economy. *Financial Sense Wrap-Up*, Retrieved June 2008, from <http://www.financialsense.com/Market/cpuplava/2007/0905.html>

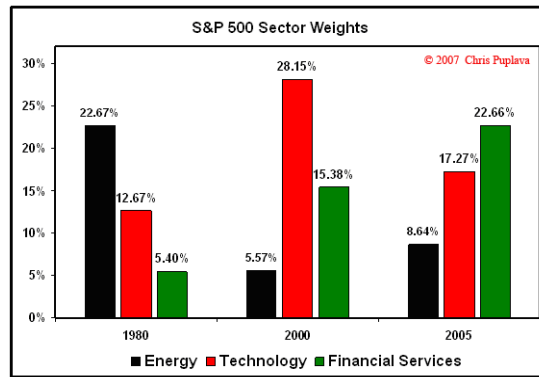
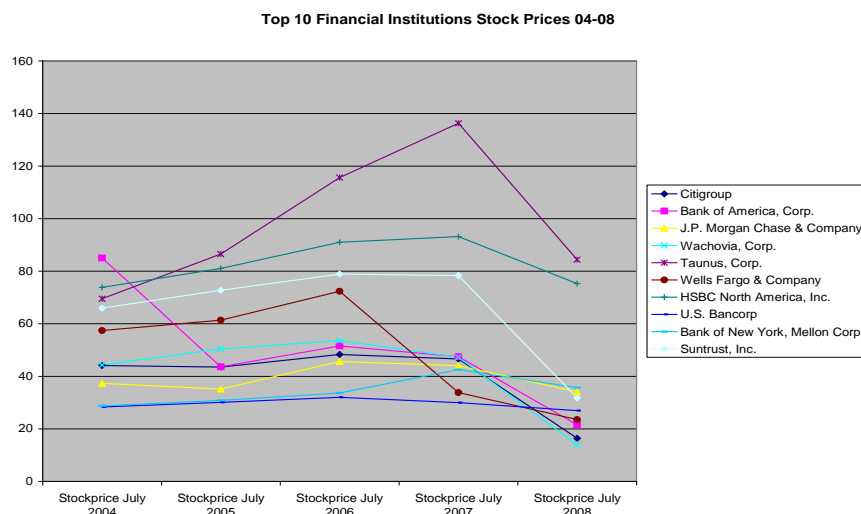


Figure 1 Source: [Barra](#)

As of September 2007, the Dow Jones Industrial Average fell 143.39 points to close at **13305.47** (-1.07%), the S&P 500 lost 17.13 points to close at 1472.29 (-1.15%), and NASDAQ gave up 24.29 points to close at 2605.95 (-0.92%).¹⁸ The stock market indicates the expected future value of the general market, or at least of the stock in their pool. When the stock prices are low, it shows that the general market's value is also low. Refer to the next graph. It shows the top ten financial institutions in the country in terms of profit.¹⁹ As you can see, the impact of the bubble bursting has spilled over into a major credit crisis because the value of the stocks for



¹⁸ Puplava, C. (September 05, 2007). Will Financials Be to This Bull Market and Economy

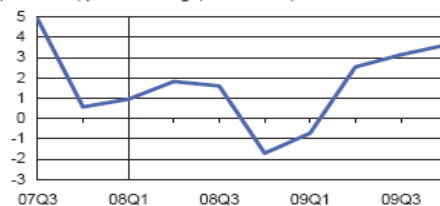
¹⁹ Yahoo Financial

these major financial institutions has plummeted, which in turn means their market value is also down.

GDP

According to Global Insight, “The decline in real GDP that we feared for the first half of the year has been avoided—but we believe it has merely been postponed. Overall, our GDP growth forecast for 2008 is higher than last month (at 1.6%, rather than 1.4%), helped by a better-than-expected first half, but we have cut our growth forecast for 2009 (to 0.9%, from 1.3%).” The GDP rate is supposed to be at 3% historically and the economy is forecasted to be less than 1% in 2009, as seen in the graph below. The executive summary explains, “Housing remains the biggest drag on growth. The excess supply of homes for sale—expressed as a monthly selling rate—has not yet turned down. We expect housing starts to hit bottom only in the fourth quarter of 2008, at just 818,000 units (annual rate). House price declines have accelerated, and we expect the OFHEO house price index to drop 10.6% from the first quarter of 2008 to the first quarter of 2009.”²⁰

GDP Decline Postponed, Not Avoided
(Real GDP, percent change, annual rate)



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Global Insight Web Site, <http://www.globalinsight.com>

²⁰ U.S. Economic Service Global Insight. (2008). *U.S. Executive Summary: The Outlook is Darkening*

The Executive Summary also explains that “The Deflationary Impact of the Housing/Subprime Crisis Will Linger Through Next Year: Despite early evidence that the worst of the housing-related credit crunch may be behind us, financial markets and the economy are not out of the woods yet. Home prices and housing activity continue to fall. Housing starts and residential construction are unlikely to hit bottom until the end of this year or early next year. Similarly, home prices will probably keep falling through early 2009. The harsh reality that banks are being hit with a double whammy—a stock market that is in bear territory and mortgage-backed securities whose value keeps plummeting—is making the hunt for new capital that much tougher. In other words, the financial sector continues to struggle, and credit remains tight.”²¹

VIII. Conclusion and Future Work

Initially, this was going to be a paper investigating the ethics of the financial crisis. Unfortunately, at this time, (August 2008) very few authors have written on the subject and there was not enough source material to pursue a summer research project in this area. Revising this paper for submission in August of 2009, it appears that both the economic forecasters and the ethics forecasters were asleep at the wheel.

Knowing that ethics has to be based on a factual foundation, we instead decided to trace the evolution of the mortgage crisis into what was to become a major credit crisis. We have shown some of the major causes of the crisis. We linked the crisis to the micro foundations of bank balance sheets and we took a closer look at Country Wide to see what transpired in a typical firm which speculated in a highly leveraged sector. We then started to enter some ethical

²¹ U.S. Economic Service Global Insight. (2008).

territory by trying to assess the damage done to the broader economy by the innovative mortgage products and the new taste for risk and leverage the market seemed willing to absorb. The major forecasting houses have done their best to assess the damage to GDP, employment and the stock markets. In hindsight, the forecasters missed the mark by plenty. The Dow was still at 13,000 and no one knew the pain ahead. At the time of this writing, ethics was in the air, but by the summer of 2009, it is very interesting that the ethics have faded from conversation and now politics is in the air. The talk is all about government intervention and regulation. It will be very interesting to see how we assess this crisis when we can look back with solid data and when hopefully the Dow is back to at least 12,000. We would like to be optimistic and hope that an ethical assessment would be forthcoming in the future but the winds are not blowing in that direction at the moment. We will do our best to follow the story and deliver an ethical assessment at next year's Informs.

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