

The Subprime Mortgage Collapse and Its Effects on the Economy

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### Abstract

The subprime mortgage crisis occurred due to a number of factors. Included in these factors were the issuance of subprime loans, the securitization of mortgages in the investment banking system, and the deregulation and ultimate failure of the shadow banking system. These causes were evident in both historical trends in the stock market as well as the macroeconomic data leading into the crash. They were perpetuated by investors, mortgage brokers, and banks taking on an abnormal amount of risk in the early 2000s for both psychological and behavioral reasons. These causes, while less than obvious at the time, have, with the benefit of hindsight, become clearer. Thus, the subprime mortgage crisis and subsequent recession were entirely avoidable and could have been prevented.

*Keywords:* subprime mortgage, collateralized debt obligation, mortgage backed security

## The Subprime Mortgage Collapse and Its Effects on the Economy

### **Introduction**

#### **A Year for the Record Books**

The subprime mortgage crisis was caused primarily by defaults on home mortgages, a traditionally stable investment (Demyanyk & Van Hemert, 2011). Because investment banks were heavily invested in mortgages, the investment banks began to panic. Next, commercial banks, who traded assets with the investment banks, began to shy away from accepting mortgages as collateral, causing the investment banks to panic even more (Van Doren, 2010). Finally, the stock market plummeted as banks and investors alike pulled out of investments. This spiral spawned a lackluster economy with feeble spending, which began the Great Recession.

This destructive loss in capital was unforeseen and caught most Americans unprepared. Indeed, the dramatic loss in value of the stock market from 2007-2009, in conjunction with the failure of the subprime loan market, is responsible for the bankruptcy of numerous small businesses, thousands of home foreclosures, and the collapse of Lehman Brothers and Bear Stearns, two of Wall Street's most well respected investment banks (Nicholls, 2011).

#### **Post-Recession Boom**

The next few years, however, saw the recovery of the economy. As the Obama-era reforms were implemented, the economy began to grow once again (Peschek, 2011). As of 2017, the markets have more than doubled in value since their low point in 2007, with the Dow recently passing the 20,000 threshold. However, corresponding earnings have not doubled since 2007, nor have company assets. In fact, the past 10 years have

been filled with the slowest economic recovery of all time. U.S. gross domestic product growth has hovered around a paltry 1.5%, while average take-home income has stagnated and home ownership has shrunk (Aguirre & Reese, 2014). However, investors and, to some extent, the American people believe that the markets are on solid footing. Based on this evidence, there are two likely situations. Either the markets are solid and there is some cause for the rapid market growth of the last decade which needs to be factored in, or the current conditions are strikingly similar to the circumstances which contributed to the horrific subprime mortgage crisis. Because of this, it is important to understand the context of the subprime mortgage crisis and the events leading up to it. Thus, it is useful to investigate the actions that were taken by both the federal government, and the banks leading up to the subprime mortgage crisis, the factors which contributed to the stock market's rapid recovery, and the differences between the market conditions in 2007 and now.

### **Historical Trends**

#### **Economic Measures**

It is difficult to understand the macroeconomic trends of 2007-2010 without first understanding some basics about the stock market and the American Economy. In calculating the growth of the economy, there are several indicators to evaluate. Most important is the growth rate of the gross domestic product (GDP) of the United States. Other indicators of the health of the economy include the consumer price index (CPI), the unemployment rate, the federal funds rate, and the average take-home pay. These factors, when interpreted together, give a fairly accurate picture of the overall performance of the economy. However, in evaluating the stock market and growth trends within it, it is

important to recognize that while the stock market is somewhat correlated to the overall economy, it operates on a lag and lacks complete correlation (Chen, 2009). Growth in the economy does not translate immediately into growth in the markets, nor vice versa. This is not to say, though, that the two are not related. In fact, the stock markets, and specifically, the S&P 500 are considered leading indicators of economic trends.

### **The Great Depression and the Economics of Recessions**

In 1929, the stock market experienced one of the worst days of all time. It is now known as the Wall Street Crash of 1929, or simply, Black Tuesday. Following World War 1, enthusiasm was high, and spending was obscene. The Roaring Twenties ushered in an era of decadence and excess, mostly financed by debt (Garrison, 1993). As post-war confidence grew, so did investment opportunities. This created a period of dramatic economic growth. The Federal Reserve, attempting to keep the growth period alive, cut interest rates. However, all was not well in the American economy. Due to the artificially low interest rates, investment became a more attractive alternative to saving (Garrison, 1993). Thus, dramatic amounts of borrowed money were injected into an economy with nowhere to send the money. As production growth tapered off and debt rose, some investors began to suspect that the economic growth was unsustainable (Garrison, 1993).

On March 25, 1929, investors became aware that the markets were due for a correction when the Federal Reserve warned that speculation had led to significant overvaluation of stocks. After an initial loss in market value, however, investors declined to heed this warning, and continued to pour money into the stock market. In the following three months, market value increased by over 20%. Unfortunately, the growth period was short lived, and by mid-September of 1929, investors began unloading their positions.

The growth cycle was broken, and prices began to drop drastically. By October, the market was losing value nearly every day. The selloff reached its peak on October 29, 1929, when the market lost an additional 12% of its value. This horrible period on Wall Street kicked off the Great Depression (Garrison, 1993).

The Great Depression marks a low point of the American economy. Rarely has the Federal Reserve been so wrong and failed so spectacularly (Klein, 2001). However, it is far from the only time that the economy has struggled for positive growth. Between 1899 and 2004, the American economy has experienced 22 recessions, or nominal declines in GDP lasting two or more quarters (Sam Stovall, 2004). This averages to a recession around every five years. These recessions were typically accompanied by a drop in stock market value, whether or not the recession preceded or proceeded the stock market correction.

### **Subprime Mortgage Crisis: Far from Unpredictable**

#### **The Housing Market**

The Subprime Mortgage Crisis and the subsequent Great Recession were preceded by the collapse of one specific sector: housing. There were a number of factors that contributed to the housing crisis and collapse that began in 2007, but the most significant factor was the growth of subprime mortgage loans. Alan Greenspan, the former chairman of the Federal Reserve, said of the mortgage market of the early 2000s “where once marginal applicants would have simply been denied credit, lenders are now able to quite efficiently judge the risk posed by individuals and price that risk appropriately” (Burry, 2010, p. WK10). These subprime loans are a finance agreements in which loan applicants lack the credit history, income, or assets traditionally required to

qualify for a loan (Keys, Mukherjee, Seru, & Vig, 2010). Due to the lack of income, credit, or assets, these loans are inherently much riskier than traditional loans, which forces the loan issuer to increase the yield on the loan. This yield increase causes the loan to be more difficult to pay off, which makes the borrower's default rate higher, which in turn increases risk. Thus, the loans are known as subprime, with the borrower being below the requirements for a prime rate loan. Because of their inherent riskiness, subprime mortgage loans historically account for a small portion of the lending market (Coleman, Little, & Vandell, 2008).

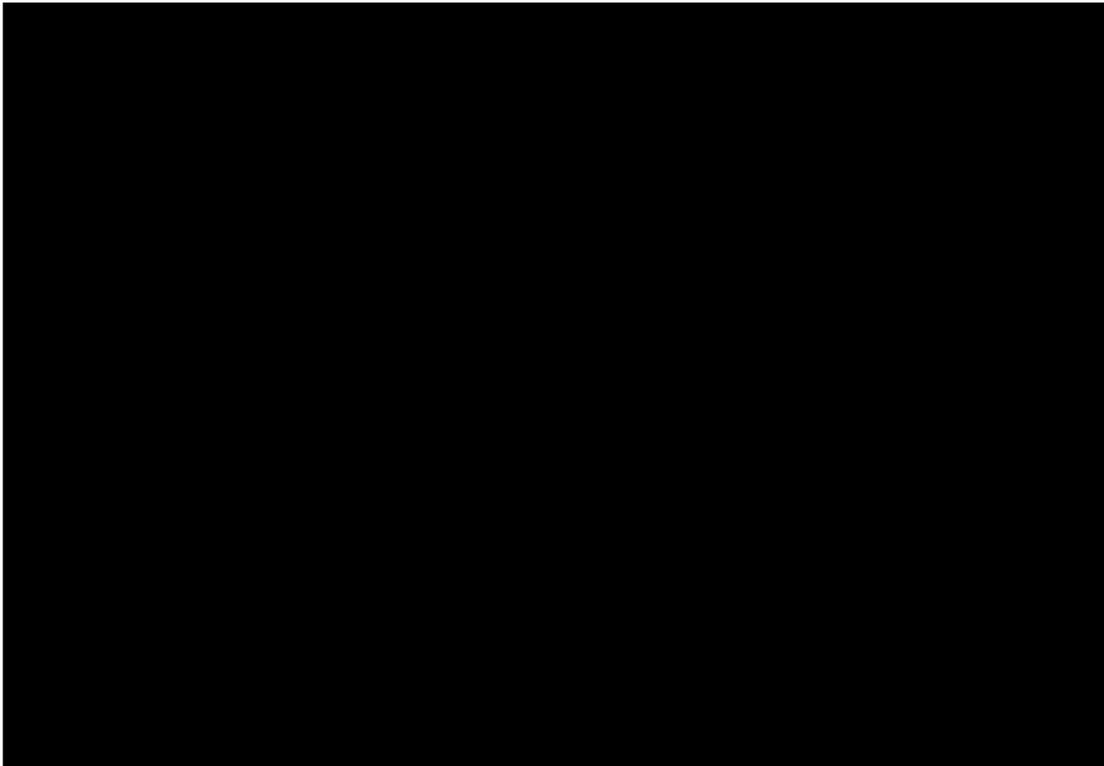
### **Brave New World**

Historically, new subprime mortgages accounted for around 8% of the mortgage market. However, from 2004-2006, subprime mortgages made up 20% of the market (Coleman, Little, & Vandell, 2008). At that time, "subprime mortgages featured a unique security design that depended on home price appreciation; the mortgages were essentially short maturity, requiring refinancing" (Gorton, 2009, p. 567). Furthermore, in 2006, 35% of tracked loans were interest only loans (Immergluck, 2008). This entire mortgage system worked only in a housing market in which home prices were rising; the moment home prices dropped, subprime mortgages would begin to default (Gorton, 2009).

Not only were subprime adjustable rate mortgages in abundance preceding the subprime mortgage crisis, general requirements for taking on debt were unprecedentedly low (Coleman, Little, & Vandell, 2008). This led to an overall increase in consumer debt. "U.S. households had become increasingly indebted, with the ratio of debt to disposable personal income rising from 77% in 1990 to 127% at the end of 2007" (University of North Carolina, 2012). As debt increased, risk in lending also increased. As the

underlying finances of the everyday family began to decay, due in part to the high amount of debt and compounded by stagnating take-home pay, the credit risk the lending institutions were taking on increased dramatically (UNC, 2012). In 2006, the housing market stalled. Conventional wisdom at the time was the market slowdown was temporary and there was no housing bubble. However, prices had peaked, and it became increasingly difficult for borrowers to favorably refinance. By 2007, the bubble had begun to collapse in on itself. As the teaser rates (initially low interest rates on adjustable rate mortgages which, after a set period, are adjusted according to the prime rate) on subprime mortgages expired and rates were hiked, delinquencies rates on mortgages began to climb (Chart 1). It is interesting to note that the delinquency rates climbed drastically for subprime adjustable rate mortgages, slightly less for subprime fixed rate, less still for prime adjustable rate, and barely at all for prime fixed rate mortgages. This is

Chart 1 (Richmond Fed, 2011)



a graphical representation of the default risk of these types of mortgages.

### **Delinquencies and Foreclosures**

Between 2006 and 2008, the housing market peaked and home prices began to drop (UNC, 2012). During the same period, as borrowers were unable to refinance their loans at an attractive rate, mortgages began to default at unprecedented rates. This alone, however, was not enough to bring the economy to its knees.

### **Debt and Collateral**

#### **Mortgage Backed Securities**

Mortgages are loans that are collateralized by property. They are issued by a bank or a lending organization in return for regular principal and interest payments. An individual mortgage is often traded or sold from one institution to another. “Mortgage-backed securities (MBS) are debt obligations that represent claims to the cash flows from pools of mortgage loans, most commonly on residential property” (SEC, 2010). An MBS is a bundle of separate individual mortgages structured to pay out cash flows as they are received from borrowers. In the late 1990’s and into the 2000’s mortgage-backed securities were seen as a low-risk, high-reward investment tool (Bhat, Frankel, & Martin, 2011). Furthermore, credit ratings on MBS were very high when compared to individual loans. The MBSs were rated higher than their underlying mortgages because they were considered diversified assets (Xudong, et al., 2015). In reality, they were only as diversified as the underlying loans, but few people bothered to look at the underlying loans, and the ratings remained high. Because of the high credit ratings and relatively high returns on MBS, the MBS began to increase in popularity throughout the 2000’s,

especially with banks, which used the debt instrument to increase financial leverage (Bhat, et al., 2011).

In the mid 2000's, the prevailing wisdom was that the markets were solid and that there was little to no chance of mortgage bonds defaulting (Crouhy, Jarrow, & Turnbull, 2008). Because of this overconfidence, the markets continued to grow at unprecedented rates. Following the market crash in the late 1990's and early 2000's, investors felt that the markets were due for a growth period. While they were right, the market did grow, they were wrong in the long term (Morris & Alam, 2012). When forecasting the future performance of the markets, investors used past growth rates as their basis. However, when predicting the market's growth, people tend to ignore the bad years and glorify the good years. In fact, by 2005, the dot-com bubble was a distant memory, and investors subscribed to the belief that the bubble was a one-time mistake that would not be repeated (Morris & Alam, 2012).

### **Collateralized Debt Obligation**

The mortgage backed security was the beginning of a long list of instruments which could be used to hold mortgage debt and collect the ensuing cash flows. However, very quickly, more sophisticated methods emerged.

A Collateralized Debt Obligation is an asset backed security whose underlying collateral is typically a portfolio of (corporate or sovereign) bonds or bank loans. A CDO cash flow structure allocates interest income and principle repayments from a collateral pool of different debt instruments to a prioritized collection of CDO securities, which we call 'tranches.' (Duffie & Garleanu, 2001, p 40)

Through the CDO and its cousin, the synthetic CDO, investors were able to invest in the mortgage backed securities without actually investing in the mortgages themselves. This enabled investors and banks to multiply their capital by betting on securities *apart* from actually investing in those securities. If it seems senseless, rest assured, it is. “In perfect capital markets, CDOs would serve no purpose; the costs of constructing and marketing a CDO would inhibit its creation... ..the [real world] value lies in reducing the amount of (expensive) regulatory capital [banks] must hold” (Duffie & Garleanu, 2001, p. 41). The CDO as a wraparound for MBS is cost-ineffective. However, banks wanted a way to transfer risk and increase required reserve capital. Because of this, they sold CDOs to transfer capital and ensure they remained within Federal guidelines for capital requirements. This was just one way of increasing leverage within an investment bank while making it seem like the bank was not acting speculative (Duffie & Garleanu, 2001).

The problem was because so many separate investments were being made all collateralized by mortgages, the initial value of the mortgages was expanded into a bond and security market much larger than the mortgages themselves. As the housing market grew, the MBS market grew exponentially, and the CDO market grew exponentially to that (UNC, 2012). By 2006, the home equity asset backed security (MBS) market had grown to \$630 billion, with an additional \$258 billion in CDOs and collateralized loan obligations (Thompson, Callahan, O’Toole, & Rajendra, 2007). In 2005, the issuance of mortgage backed CDOs grew by 100%. The banks were betting big on mortgages.

### **Credit Default Swap**

Credit default swaps “are contracts in which one party sells protection to another against a failure (by a third party) to make contractual debt repayments; they are said to

be naked if the protection buyer does not also hold the underlying security” (Che & Sethi, 2014, p. 2). These swaps were created as a sort of insurance policy against defaults on mortgage bonds. A bank issues them to individuals or banks which wish to bet against a certain bond or security. Many banks in 2006-2008 both issued and bought these swaps, leading to hedging of bets and multilateral positions. However, because owning the security in question is not necessary to a credit default swap, much of the market surrounding the swap was speculative. In fact, the actual value of credit default swap contracts in the United States before the subprime mortgage crisis was estimated to be as high as ten times higher than the value of the underlying bonds upon which the swaps were based (Che & Sethi, 2014).

### **Speculation**

Speculation was a critical aspect of the markets leading into the subprime mortgage crisis, and when the crash happened, the amplification of the underlying bonds by credit default swaps made the crash exponentially worse. At the time, however, none of this was worrisome to investors.

One argument for the benefits of credit derivatives to borrowers stems from the observation that they facilitate the separation of funding from exposure to credit risk. This allows borrowers to raise funds even from those who are relatively pessimistic about their ability to repay, since this group of investors can shed credit risk by purchasing protection. Meanwhile, those who are most optimistic about future borrower revenues can sell protection, and thereby expose themselves to credit risk on a scale that would not be possible without derivatives.

These effects should shift the terms of financing in favor of borrowers while broadening the range of assets available to investors (Che & Sethi, 2014, p. 2).

The problem with this logic is that it assumes that consumer choice is always a good thing. At its core, this argument suggests everyone should have the ability to borrow money, regardless of their ability to pay it back (as long as someone is willing to take on the risk of a failed investment). However, through diversification, risk in the credit default swap was masked, so that investors were unable to see that not only were the loans upon which the swap was based likely to fail, but also that the entire financial industry had been swept up in a massive bubble which must inevitably pop.

### **Secondary Markets**

#### **ABX.HE**

When the housing market finally did begin to fail, and home prices fell, no one really knew what to expect. Because home mortgages experience a lag related to housing price changes, there was a period in which home prices fell without large amounts of mortgage defaults. Furthermore, due to the nature of securitization tranches, CDO liabilities, and other structured liability vehicles, there are no secondary markets available to investors for these products (Gorton, 2009). However, in 2006, dealer banks launched a synthetic index of subprime risk, the ABX.HE. The ABX.HE is a derivative referencing an index linked to 20 subprime residential mortgage securitization transactions which had been issued in the six months prior and equally weighted (Gorton, 2009). When the lag finally caught up to the mortgages, and they began to default, faith in the securitization instruments on mortgage debt failed. The ABX.HE index lost value, and faith in the underlying mortgages faltered as well. “The decline in the ABX prices revealed the shock

to the valuation of subprime risk, but it did not reveal where these risks resided. That uncertainty caused a loss of confidence in credit” (Gorton, 2009, p 572).

### **Shadow Banking System**

In 1999, the Clinton administration repealed the Glass-Steagall Act, the bill passed in 1933 to prevent future collapses in the banking industry. The bill certainly had flaws, for example, at one point it prohibited the paying of interest on deposit accounts (this clause was repealed in the 1980’s) (Lucas, 2013). However, there was one particular provision in the law which could have prevented the subprime mortgage crisis. The Glass-Steagall act put a barrier in place between investment banks and depository institutions. However, in 1999, the act was repealed, allowing for the mixing of investment and traditional banks. This created what is known as the shadow banking system, in which “excess corporate and investor cash is ‘deposited’ in (what used to be called) investment banks. Because those banks were outside the regulated deposit-insurance commercial banking system, the investment banks supplied collateral to the depositors to ‘guarantee’ the deposits” (Van Doren, 2010). These loans are known as repo agreements. The investment bank would be required to pay back the depository institution by the end of a certain period, often only a day or two. If the investment bank did not repay the money, the depository institution would simply take possession of the collateral. Initially, the collateral was limited to federally insured securities, such as Treasury Bonds. However, as the market grew and demand increased, securitized loans began to be issued as collateral. In 2007, the repo market was estimated to be around \$12 trillion (Gorton, 2009). These loans often took the form of CDOs and MBSs. When the market for these bonds began to fail in 2007 and 2008, the institutions holding them

began to demand their cash, resulting in what can only be described as a run on shadow banks. However, because banks were no longer interested in issuing loans with securities as collateral (because of the falling market for the securities), there were no new collateralized loans. Furthermore, the market for the underlying bonds had completely disappeared. Due to the deleveraging going on among investment banks, no one was interested in buying bonds securitized by mortgages. This lack of interest in purchasing bonds led to a lack of prices for the securities. If the value of the asset cannot be calculated due to a lack of liquidity, then the lender has no interest in the security, and will not engage in the repo. (Gorton, 2009). This is what led to the massive drop in price in the ABX.HE index, which represented the underlying mortgage bonds. The bonds were no good to investment banks, because they could not be used as collateral with a depository institution. Their lack of value as a collateral was, of course, due to the lack of marketability of the bonds, which stemmed from their massive underlying risk. Thus, the failure of the subprime mortgages led to the failure of the entire shadow banking industry (Gorton, 2009).

### **Hot Hand Fallacy**

#### **Lying vs. Being Wrong: The Difference is Intent**

There is a distinct difference between an incorrect statement stemming from a lack of knowledge and a statement delivered by someone knowing the statement to be false. The former is merely a case of poor judgement, whereas the latter is a flat out lie. While both have the potential to damage, one is intentional, and thus is more egregious of an offence. To that point, lying is systemically condemned within society. However,

speculating on events which are unknowable is not condemned, but employed by almost every industry in the world.

On one end of the spectrum, marketing divisions make assumptions about a population based on data sets not completely represented of the whole. On the other side, middle aged men travel to Vegas to bet large amounts of money on events completely beyond their control or knowledge. However, both examples display individuals making choices stemming from information which is impossible to know completely. These choices are necessary because of the unknowability of the future. It is impossible to know and accurately predict the future. This idea, known as the uncertainty principle, is the foundation upon which every forecasting model is based. Forecasting models are necessary because the future is unknowable. Once the future becomes the past, the model is must be modified to accurately reflect the reality of the facts. This happens until the model is able to accurately predict the future, within acceptable error margins. However, predicting the future is an arduous task (Cranford, 2010).

### **“They Wanted to be Right”**

In the years leading up to 1999, the market seemed unstoppable. Markets were up, especially in the technology sector, and it seemed that all was well (Growing pains: dot-com bubble 2.0, 2013). Everyone was riding the dot-com bubble, betting that each new tech company was going to be the next big thing. This was the new broker’s chance to show everyone he was a big-shot, so they bet on the hot new company. They bet big. However, as so often is the case, the analysts were wrong, and the technology sector experienced a devastating crash. “There were, of course, those that saw it coming, and refused to believe that the fundamentals of valuation had changed” (Growing pains: dot-

com bubble 2.0, 2013). Some investors recognized that a massive growth in a stock price unaccompanied by an increase in earnings, revenue, or any other metric is unsustainable. Of course, in 2000 the bubble burst, and those who had looked deeper were proven right. Numbers don't lie (Growing pains: dot-com bubble 2.0, 2013).

### **Speculation Fuels the Fire**

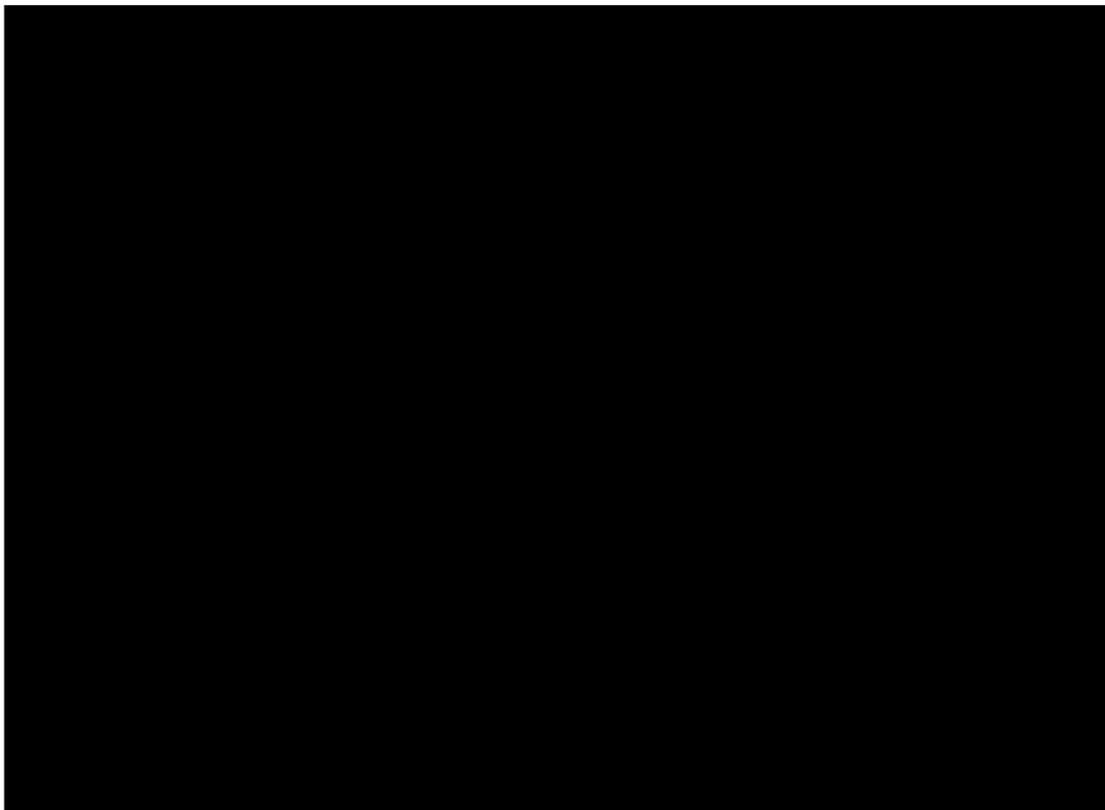
There is a fundamental flaw in the human psyche. When a person makes a decision, that person desperately wants to be correct. Likewise, when an investor purchases a stock, that investor desperately wants it to appreciate. Losing is not an option. Thus, investors and bankers were quick to forget the mistakes of the dot-com bubble in the interests of making more money. As confidence in the stock market grew, the stocks began appreciating in a dramatic way. The value began to grow, which spurred more investing, which, in turn, caused the stocks to increase in value. The merry-go-round was spinning, and as more people began to push, it began to spin faster (Growing pains: dot-com bubble 2.0, 2013).

However, there is an insidious truth to the stock market. The value of a stock is only how much someone is willing to pay for it. Stock has (for practical purposes) no real value. This began to manifest in the markets following the crash of 2000. While earnings growth remained stable, the growth rate in the markets increased dramatically. In hindsight, it is easy to see what happened and that investors were overestimating future returns, but at the time, people wanted to be right so badly that they were willing to overlook the telltale signs in the market (Immergluck, 2011). (This is similar to your favorite National Football League (NFL) team being down by two touchdowns with 10 minutes left in the fourth quarter. Statistically, it is extremely unlikely that your team

would win the game, and anyone watching the game objectively could see this. However, the avid fan would, in that situation, honestly believe that their team *could* come back and win the game.)

This is the problem that the investors on Wall Street encountered following the dot-com bubble. They were desperate to be right. The markets had suffered from a massive crash in 2000, and from a smaller hiccup following the tragedy of 9/11. However, in the early 2000's, the economy was growing, and confidence began rising. The big banks were searching for a winner, and when they found one, they ran with it. After the downturn from 2000-2002, the markets began to win again (chart 2). From its low in 2002 of just over 7,500, the market nearly doubled in size. Investors were feeling bullish, and they were ready to make some money. After all, the market had just crashed

Chart 2 (Morningstar, n.d.)



in 2000, and that must mean that securities were undervalued. Investors began to buy again, causing massive gains in the stock market. As the markets trended up, more and more people began to invest, fueling even more gains. Markets swung up once again, gaining back more than they had lost in 2000. Only five years after the dot-com crash, the Dow Jones Industrial Average peaked at 14,164.53, an annualized gain of 13.5% since 2000.

### **Behavioral Economics**

The field of Behavioral Economics explains the subprime mortgage crisis in a more complete way than any other single explanation for the crash. It encompasses why the crash occurred, at a very human level. It explains why people bought into the idea of high rates of subprime mortgages, and rising home prices unsustainable by the economy, and CDO's and swaps. The field of Behavioral Economics is the intersection of psychology and economics, and seeks to explain how individuals behave in real-world environments instead of how they might behave in a theoretical situation, acting perfectly rational (Thorgeirsson & Kawachi, 2013). Thus, it seeks to investigate how markets actually operate instead of how they should operate. This field explains the disproportionately high risk that was being taken on during the expansion of the housing market in the mid-2000's by noting the perceived risk of MBS at the time were relatively low. According to a study by Ludger Schuknecht, the Directorate General Economics at the European Central Bank, and Luca Agnello of the University of Palermo in Italy, the period from 1980 to the crash of 2007 "took place in an environment of strong financial innovation, and as it turned out, insufficient risk management, lack of transparency, poor incentives and increasing leverage" (Agnello & Schuknecht, 2011, p. 171). These factors

all contributed to the banks and lenders increased risk taking. Because the lenders themselves did not hold the mortgages, but instead, sold them to banks, who packaged them into MBS, which were then sold to consumers, other banks, and collateralized into CDO's which were hedged by swaps, the amount of risk involved with the mortgages was actually lost during the numerous repackaging of the loans. The lenders themselves had no incentive to accurately represent the risk of the individual loans, nor did the banks, nor did the companies selling the swaps on the loans. Thus, investment banks took on a disproportionate amount of liquidity and market risk without knowing it. Furthermore, while banks would hedge against price fluctuations on MBS, they would also issue swaps for other banks to do so (many of which were naked) which, based on the risk models of the time, was within their boundaries (naked swaps refer to a contract in which neither party owns the underlying security). However, the risk models were wrong and based on faulty information. Therefore, even though the banks thought they were hedging their bets, they were actually doing the opposite (Agnello & Schuknecht, 2011).

### **Signs of the Times**

#### **Consumer Debt**

There are always signals of impending doom. One of the key signs preceding the recession of 2008 was a drastic rise in consumer debt. By the end of 2007, the debt of American households as a percentage of annual disposable personal income was 127%, up from only 77% in 1990 (UNC, 2012). During the early-mid 2000s, houses were rising in value while consumers were spending more money and saving less. The difference between disposable income and spending was made up by debt, accounting for the

ballooning household debt by the end of 2007. By decreasing spending in excess of income in the early 2000's, households could have decreased debt, including the toxic subprime loans, and, partially, softened the blow of the subprime mortgage crisis. In many ways, this mirrors the crisis in 1929. Both crashes were preceded by excess spending financed by debt, both crashes were preceded by excessive speculation and unwarranted market growth, and both crashes were entirely avoidable. Clearly, they were not brought about by the same stimuli; the two crashes were far from the same. However, some of the same elements were present in the market preceding both market failures, and this on its own is worth noting (Peicuti, 2014).

### **GDP Growth Rate**

In 2000, the United States total gross domestic product (GDP) was 10.28 trillion. From 2000 to 2007, the United States GDP averaged a 5% growth rate. By 2007, the GDP had grown to 14.48 trillion (FRED, 2017). While this rate represents a steady growth in the economy, it is completely outpaced by the growth in the stock market over the same period of time. In fact, the annual rate difference between GDP growth and DJIA growth is 8.5%. The stock market substantially outpaced real growth in the economy, and, at the time of the stock market crash of 2007-2009, was severely overvalued (Peicuti, 2014). This overvaluing of the market was largely due to the rapid growth following the crash of 2001 without any real market contractions (Peicuti, 2014). The market continued to gain ground in the mid 2000s without any signs of slowing down. Instead of noticing this abnormal market behavior and becoming apprehensive of additional investment, investors actually became more confident in the future (Peicuti, 2014).

## **Speculation**

Speculation was happening not only in the form of CDOs and credit default swaps, but also by ordinary individuals purchasing a home. Many of the home purchases made in the mid-2000's were made with the purchaser knowing full well they could not afford the payments on the houses. The purchaser was instead hoping to refinance at a lower rate, after the housing market had risen and caused their investment to appreciate. This strategy led to increasingly speculative home purchasing, as nearly 40% of homes were purchased *not* as a primary residence (UNC, 2012). Frequently, individuals would purchase condominiums which were still under construction, then flipped (sold) them for a profit without living in the condo themselves. This type of behavior is, according to Yale economist Robert Schiller, a social and psychological phenomenon. Speculation drives up prices, which in turn fuels speculation. Warren Buffet put it this way in his testimony to the Financial Crisis Inquiry Commission (FCIC): "It was the greatest bubble I've ever seen in my life... The entire American public eventually was caught up in a belief that housing prices could not fall dramatically" (On the Docket, 2013).

## **The Causes**

### **Mortgage Backed Securities: Not Very Secure**

A large part of the problem leading into the subprime mortgage crisis was the mortgage backed security. These financial instruments were believed to be safe against default and loss: the fact of the matter is that they were not. Simply put, following the crash of the housing market, Standard & Poor and Moody's, the two biggest credit rating agencies, downgraded the credit rating of trillions of dollars' worth of mortgage backed securities, demonstrating a complete failure to properly rate them in the first place

(Birger, 2008). Because of these downgrades, banks were hit with liquidity complications, and needed to improve their capital ratios to recover. The downgrade of these mortgage backed securities, combined with the significant issues brought about by credit default swaps, caused massive liquidity issues for all of the big investment banks. Bear Stearns and Lehman Brothers both went bankrupt as a result of the financial crash (Van Doren, 2008).

### **Stock Correction**

Clearly, there was a major issue with the way the stock market was valued. An 8% difference between GDP growth and market growth is simply unsustainable. While the two are not directly related, they are somewhat correlated. Because of this, when the banks started panicking and investors began to realize that the CDO and MBS markets were not stable, faith in the system quickly faded. As banks struggled to sell off their mortgage instruments and increase their liquidity, the market began to take notice. Investors began selling off stock, dumping large portions of their portfolios. As this began to happen, the markets plummeted. By 2009, the Dow Jones Industrial Average had lost nearly 50% of its value (Morningstar, n.d.).

### **Debt Decreases**

Soon after the collapse of the housing market and the subsequent selloff in the stock market, the amount of consumer debt decreased drastically. After the highs in debt of the mid-2000s, consumers began to quickly liquidate their debt. In his 2010 written testimony to the Financial Crisis Inquiry Commission, Mark Zandi, the chief economist of Moody's Economist.com wrote:

The credit crunch is clear in the lending statistics. The number of bank credit cards in circulation has plunged by nearly 100 million, or more than 20%, since peaking in the summer of 2008. Total household debt outstanding has dropped by nearly \$600 billion, a stunning 5%, over the same period. Credit card, auto, consumer finance and mortgage debt are all falling. Commercial and industrial loans outstanding are also falling quickly. According to the Federal Reserve, C&I loans have declined by some \$165 billion, or 20%, since peaking in late 2008. (3)

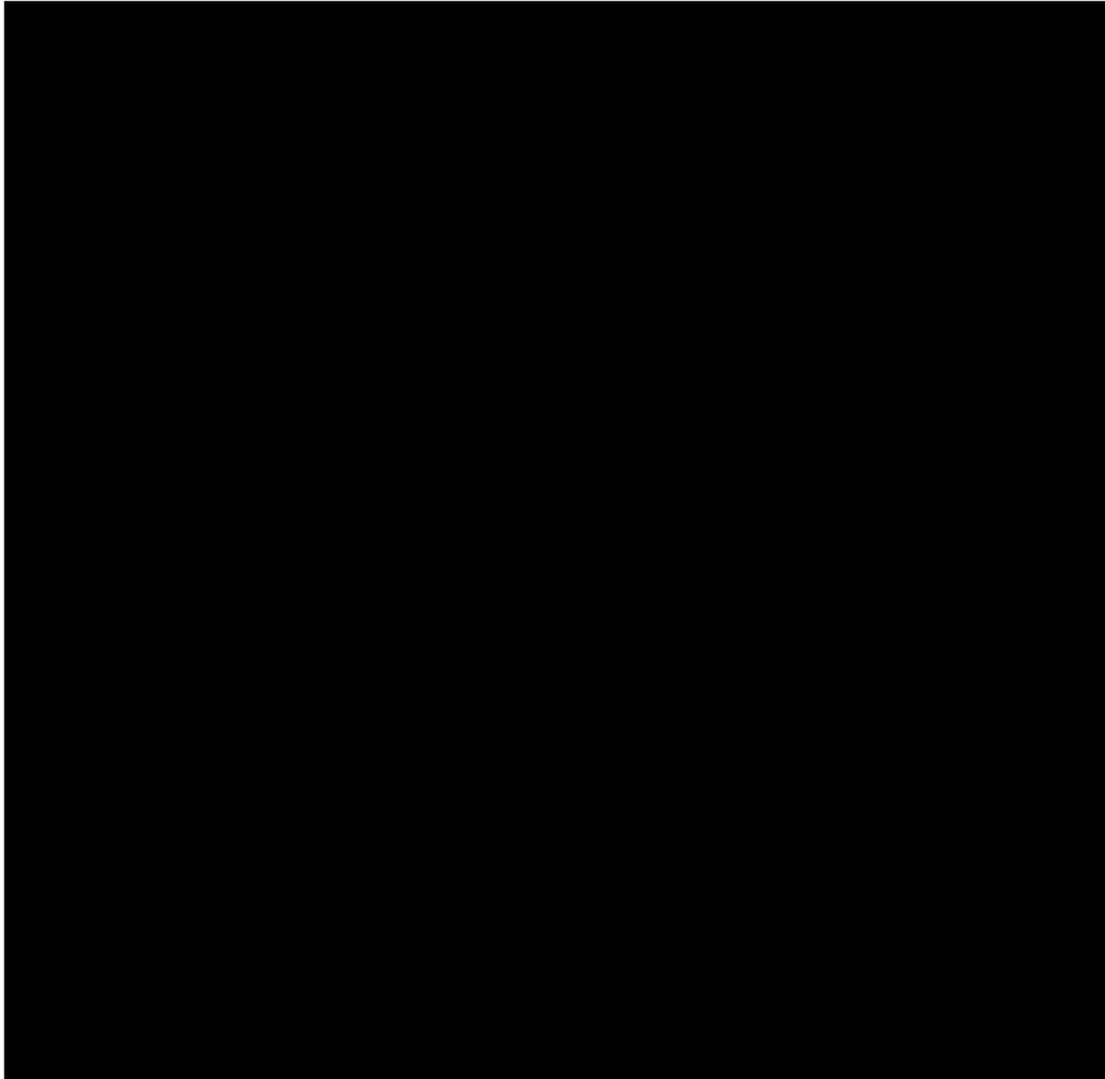
This massive drop in consumer debt was indicative of both a desire of American consumer's post-crash to reduce their debt and, perhaps more importantly, an unwillingness of lenders to give out loans.

### **Aftermath**

#### **The Great Recession**

Following the stock market crash of 2007-2009, the U.S., and indeed the world economy was plunged into a recession which lasted nearly two years. From December of 2007 to August of 2009, the U.S. economy experienced negative GDP growth (Table 1). Industrial production sank, while unemployment grew. The American economy stagnated and faltered as businesses went under, banks closed their doors, and savings accounts crumbled. The economy was finally pulled out of its recession (in part) by The American Recovery and Reinvestment Act in 2009. This act invested trillions of dollars into the American economy, stopping the bleeding and filling the cracks in the banking industry. This, along with the fiscal policies of the Obama administration, caused one of the slowest and most steady recoveries in recent history. From 2009 to 2015, GDP has averaged a growth rate of just over 2% (Long, 2016).

TABLE 1 (National Bureau of Economic Research, n.d.)

**Other Economic Indicators**

Consumer credit outstanding (not including real estate loans) has grown each year since 2011 (Board of Governors of the Federal Reserve System, 2016). In 2011, the growth rate for consumer credit was 4.2%, with a total outstanding debt of 2.76 trillion dollars. Four years later, in 2015, the growth rate was 7%. As of November of 2016, outstanding consumer debt was 3.75 trillion dollars. In November, the credit growth rate was 8%. When mortgage and real estate secured debt is included, the figures become even more alarming. In fact, total American debt, including mortgages, auto loans,

student loans, and all other debt, increased by 2.1% in the last three months of 2013 alone, a total of \$241 billion (Frizell, 2014). This is the largest margin of increase since Q3 of 2007 (Frizell, 2014). Global debt has also ballooned. “Seven years after the bursting of a global credit bubble resulted in the worst financial crisis since the Great Depression, debt continues to grow. Global debt in these years has grown by \$57 trillion, raising the ratio of debt to GDP by 17 percentage points” (Dobbs, Lund, Woetzel, & Mutafchieva, 2015, p. 1). Debt is rising at alarming rates, and it is becoming easier and easier to obtain debt.

## **Conclusion**

### **It All Went Wrong**

Looking back, it is easy to point out decisions that were made which led to the subprime mortgage crisis. The overextension of investment banks, coupled with the growth of the shadow banking system which was entirely dependent on subprime mortgages which could only be sustained in a growing housing market created the perfect storm which grew into a massive market correction. However, at the time, very few people saw the crash coming. In fact, those who predicted a housing bubble were mocked and ridiculed. Furthermore, it was only in hindsight that companies could see that they had taken on too much risk. Although the businesses took on more risk than they should have, the risk models of the time were inaccurate, and led to the overextension of many banks and investment firms. Unfortunately, this is the nature of recessions. If people could see them coming, they would not happen. If the banks and investors in 2007 had known the real risk associated with each CDO they bought and each credit default swap

they sold, they would not have sold them. It was only because they were unaware of the real risk that they engaged in such risky behavior.

### **Evaluating Today's Economy**

Perhaps it is futile to attempt to predict economic declines. After all, market performance is based almost exclusively on human psychology, a field that is impossible to accurately predict (Of course, technical factors play a role. Nevertheless, even these technical evaluations are made by people, influenced by psychology). However, markets are cyclical and historically, there have always been declines following growth periods. There is precedent for indicators of economic decline. The interest spread, unemployment, and building permits for new private housing units are all leading indicators of the future of the economy. The economy will never be perfectly efficient, and there will always be abnormalities and understatement of risk. However, it is irresponsible to ignore the possibility that the economy is not functioning properly. While analysts and stock brokers say that the economy is on solid footing, it is important to remember that they said the same thing in 2007. There is wisdom in looking closer, at taking a second look at the state of the economy. The massive downturn of 2007-2009 could have been avoided. There were leading indicators, as well as clear factors which contributed to the collapse of the economy. The recession could have been avoided by decreasing borrowing, increasing capital requirements for banks with REPO agreements, or simply eliminating subprime mortgage loans (or forcing those issuing the loans to carry the loan burden). These mistakes are clear and they are repeatable. Only by looking to the past and understanding the shortcomings of the current system can the economy avoid future failures.

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