The Great Panic of 2008: Lessons we Should Teach our Students

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The fall of 2008 witnessed the greatest financial upheaval since the Great Crash of 1929 and found the United States in its deepest economic downturn since the Great Depression.

It was a “perfect storm” in which all sectors of our economy participated and all sectors exhibited reckless behavior. It began with the creation of the housing bubble fueled by speculation, over-spending by home buyers, excessive acquisition of household debt, the government’s encouragement of home ownership and the relaxation of lending standards. The problems were then compounded by a failure to recognize risk in the housing market, the growth of systemic risk, excessive speculation by financial institutions, development of financial instruments that few if any fully understood, the emergence of “shadow banks” and the failure of governmental regulation. When the bubble burst the entire system came crashing down with disastrous effects that continue to plague the world’s economies in 2011.

This paper traces the origins of these monumental events, chronicles the events during that fateful fall and develops a number of lessons which should be taught to our students.

“The Wall Street I knew had come to an end.” (September 21, 2008), former Secretary of the Treasury, Henry Paulson (2010, p. 277)

INTRODUCTION

No matter how it is named, the Great Panic of 2008 and the accompanying recession has been the most significant economic event since
the Great Depression. The extent of the crisis is indicated by the following:

1. The Dow Jones Industrial Average dropped from a high of over 14,000 in October of 2007 to a low of 6,600 in March of 2009—a 53% decline.
2. The share price of Citigroup dropped from a high of $55 in January of 2007 to a low of $1 in March of 2009—a 98% decline.
3. Every major investment banking firm went bankrupt, was sold to a commercial bank or became a bank holding company.
4. The U.S. economy went into its longest recession since the Great Depression with the unemployment rate rising from 4.7% to 10%.
5. The economic and financial crisis spread worldwide with the U.S. being the source of the problem rather than the solution.

A great deal has been written about the Great Panic⁴ and it will surely be the source of continued debate well into the future. However, what we now know reveals obvious lessons that should be taught. The purpose of this paper is to present in summary form the events that led up to the Great Panic, what happened during those momentous weeks in 2008, and what lessons should be learned. The paper is intended to be a supplement for the typical introductory Corporate Finance course and read by students.⁵

**Events Leading to the Great Panic**

The most proximate cause of the Great Panic is the bursting of the housing bubble. Yet we have had speculative bubbles in the past and we have had crises in the financial markets. But what made this one into the “Great Panic?” Fed Chairman Bernanke, in his testimony before the Financial Crisis Inquiry Commission (2010), distinguishes between triggers and vulnerabilities. It was the vulnerabilities that made this panic so severe.
Bernanke states that the most prominent trigger was “the prospect of significant losses on residential mortgage loans to subprime borrowers that became apparent shortly after house prices began to decline.” The vulnerabilities included:

1. Dependence on unstable short-term financing
2. Deficiencies in risk management
3. Leverage
4. Derivatives
5. Regulatory deficiencies and failures

Let us see how all of these factors combined over time and came to a head in the fall of 2008. The story contains a series of events and elements that should not individually have led to such a catastrophe.

Like many significant events in history, the origins of the Great Panic began many years earlier and have their roots in the housing market. Stemming from a desire on the part of the U.S. Government to stimulate home ownership, a giant housing bubble grew, fueled by lenders and investors chasing higher yields, a mistaken view of risk in the housing market, favorable economic conditions, the development of creative new loan products, and the abandonment of traditional lending standards, driven by greed. While all these factors were sufficient to generate a bubble, it is unlikely that the bubble’s bursting would have produced the great panic had it not been for the risk-taking actions of investment and commercial banks and the phenomenal growth of securitization. However, combined, these actions produced a potent brew that exploded in the fall of 2008.

**The Growth of Home Ownership**

Home ownership has always been a significant part of the American Dream. Following the Second World War, the percentage of home ownership in the U.S. grew sharply from 45% to 65% in just 10 years. The growth rate then leveled off until the 1990’s when it began to increase once again, spurred by the rise in subprime lending that focused
heavily on the poor and minorities (Hojnacki and Shick, 2008). Charles Gasparino provides an excellent discussion of the Clinton Administration’s desire to increase home ownership in the early 1990’s. President Clinton appointed Henry Cisneros Secretary of the Department of Housing and Urban Development. Cisneros believed that home ownership was a key element in moving the poor into the middle class and set as a goal increasing the ownership rate from 60% to 70% (Gasparino, 2009, pp. 108–109).

The surge in home ownership and the growth in subprime lending went hand in hand. Originations of subprime mortgages grew from $65 billion in 1995 to $150 billion in 1998. The growth of home ownership then cooled through 2003 as the subprime originations declined. However, starting in 2004 subprime originations spiked, growing to $625 billion by 2006 (Hojnacki and Shick, 2008)!

At this point it is useful to briefly discuss what is meant by subprime lending. Basically, subprime borrowers fail to meet the traditional standards for loans (those who do meet the standards are known as prime borrowers). Subprime borrowers are high risk, but they are not necessarily bad risks. Often the individuals have a weak credit history and are heavily in debt. Hojnacki and Shick (2008) provide a more detailed discussion of subprime borrowers.

Lenders saw the greater profit potential from the subprime market in terms of higher interest rates on the mortgage loans and fees generated from the loan originations. The lure of profits was combined with a curious view of the lack of risk in the housing markets. Lenders and borrowers saw housing prices continually rising in an atmosphere of favorable economic conditions characterized by fewer downturns in the economy and relatively stable employment rates. In retrospect, the market participants did not see that their risky lending actions were causing the rise in home prices and fostering the illusion that there was no risk in that market (Hojnacki and Shick, 2008).

Subprime lending growth was aided by the development and expansion of the types of mortgage loans available to borrowers. The traditional fixed rate mortgage loan with a substantial down payment
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did not work in the subprime market, so lending focused on adjustable rate mortgages with low initial interest rates and reduced down payment requirements. This type of loan was especially attractive during the period from 2003 to 2006 when interest rates were low. Borrowers could afford the initial monthly mortgage payments, but either did not understand or ignored what would happen to their payments when interest rates rose. Mortgages were also not limited to the simple adjustable rate loans. The so-called “teaser rate” mortgages offered borrowers very low initial interest rates for the first two or three years of the loans. The pay option loan set the initial payments below the interest on the loan and, as a result, the amount the borrower owed actually grew over time. Finally, requirements for down payments were dropped to the point where purchasers had little or no money in their homes (Hojnacki and Shick, 2008).

As the housing bubble grew, lenders not only developed new types of loans to attract borrowers, they also dropped lending standards and resorted to illegal actions. Practices such as falsifying the borrower’s financial records, over-stating income and depositing money in the borrower’s bank account so that it would appear that they had more money occurred. These “liar loans” served only to fuel the housing bubble (Hojnacki and Shick, 2008).

Another part of the picture is the parties originating the loans. Traditionally, mortgage loans were made by thrift institutions such as savings banks and savings and loans, as well as commercial banks. However, during the rise of the subprime lending market, mortgage brokers grew in popularity. Mortgage brokers are not financial institutions as we traditionally understand them. They merely arrange loans with various lenders and make their income from fees obtained through the origination process. Mortgage brokers became so profitable during the subprime mortgage boom that many commercial banks and investment banks either started their own mortgage brokerage or purchased one. Unfortunately, the lure of profits led some mortgage brokers to resort to unethical lending practices that amounted to nothing more than boiler room operations (Hojnacki and Shick, 2008). One of the better known mortgage
brokers was Countrywide which was sold to Bank of America in 2008, making the bank the number one mortgage lender in the United States (Mollenkamp and Fitzpatrick, 2009). Recently, Bank of America paid Fannie Mae and Freddie Mac nearly $3 billion to settle claims of bad loans sold to the two GSEs by Countrywide. With claims from other purchasers, the bank’s liabilities for bad mortgage loans could easily exceed $8 billion (Fitzpatrick, 2011).

Supply of Mortgage Funds
The demand for housing and the resulting demand for mortgages is only one factor in the equation. The growth in the housing market could never have occurred without a corresponding growth in funds for mortgages. This growth is a very important part of the Great Panic.

In its simplest form, financial intermediation consists of an institution taking in funds in the form of deposits and then lending out part of that money by means of various types of loans, such as mortgages. The institution’s supply of loanable funds and, hence, the amount of loans it can make, is limited to its deposits. It has long been recognized that such an arrangement restricts lending activities. To facilitate more mortgage lending, President Franklin Roosevelt created the Federal National Mortgage Association (Fannie Mae) in 1938 to purchase mortgages from banks. In 1970 the Federal Home Mortgage Corporation (Freddie Mac) was created to purchase mortgages. Fannie and Freddie borrow money and use the proceeds to purchase mortgages from financial institutions. The financial institutions can then make additional loans. Although Fannie began life as a government agency, it became shareholder owned during the Johnson Administration and achieved the special status of being a government sponsored enterprise (GSE). As GSEs, Fannie and Freddie could borrow at rates close to those of the U.S. Treasury (Hagerty, 2008). During the 2000’s, Fannie and Freddie became huge purchasers of subprime mortgages and they accounted for an estimated 40% of all subprime mortgage securities (Greenspan, 2010, p. 6).
Securitization

The supply of mortgage funds did not come only from the GSEs; it also came from a process known as securitization which took loans off the books of financial institutions. Securitization became a hugely profitable process that contributed to the Great Panic.

Conceptually, securitization is a fairly straight-forward process. A separate entity is created to purchase a large group of loans. In order to finance the purchase, the entity sells securities which are known by a number of names such as Residential Mortgage Backed Securities (RMBS), Collateralized Mortgage Obligations (CMOs) or Collateralized Debt Obligations (CDOs). Collateralized Debt Obligations are more general since they can be secured by a variety of loans including credit cards, student loans, auto loans and commercial loans (Scott and Taylor, 2009). For the sake of simplicity, here we will just refer to all of them generically as CDOs. The CDOs that are issued are not all equally risky. Rather, they are divided into slices or tranches with varying degrees of risk. The safest of the tranches carried a triple A rating and offered the lowest rate of return. The riskiest of the tranches (equity tranche) had the highest promised return and held the most risk. Because the income and value for the CDOs comes from the mortgages, the CDOs are derivative securities.

The idea of mortgage backed securities was not developed in the 2000s. Solomon Brothers developed the first ones in the 1970s (Gasparino, 2009, p. 10). GMAC issued a CDO consisting of automobile loans in 1983 (Gasparino, 2009, p. 33). So, one might ask, what is so new or complicated about a CDO? Is it not just a portfolio of loans that is used to pay a return to various groups of investors? Is this any different from the typical corporation that raises money from debt and equity and invests in productive assets? What is new, they been around for a long time? In their simplest form, there is nothing new or particularly complicated about CDOs. However, Scott and Taylor (2009) provide an illustration of what happened to the CDOs as the market evolved. They describe a $1 billion CDO (technically known as a CDO Squared) that was created...
in 2005. The CDO consisted of 173 investments in tranches of other CDOs. Two of the 173 investments were in tranches from a CDO that consisted of 155 Mortgage Backed Security tranches and 40 Collateralized Debt Obligation tranches. Two of the 155 Mortgage Backed Securities were backed by 7,000 mortgage loans, 90% of which were subprime. In addition 43 of the 173 tranches were composed of hundreds of corporate loans. So far this has only described the assets of the entity, how were the assets financed? The answer is by four Triple A rated tranches that were purchased by banks and three subordinate tranches that were bought by hedge funds. With this single illustration, Secretary Paulson’s statement that “The market became opaque as structured products grew increasingly complex and difficult to understand even for sophisticated investors,” is the understatement of the year (Paulson, 2010, p. 68). Is it any wonder that investors had little or no idea of what they were purchasing or what risks were involved? In the case of default, how would anyone know what loans they ultimately owned? And could they make a claim on any of these loans?

Gasparino (2009) states that obtaining a triple A rating for the top tranche of a CDO was an absolute necessity (p. 202). As a result, securitization became a gold mine for the rating agencies. In 1999, Moody’s earned $172 million in fees from rating these securities and by 2007 the fees were $900 million (Gasparino, 2009, p. 202). To make the CDOs more popular to investors, the CDOs applied for and received credit ratings for their tranches. Seemingly the credit ratings gave the purchasers an indication of the risk of the securities they purchased, but that did not turn out to be true. Greenspan (2010) has called the ratings “grossly inflated” (p. 7). Indeed many of the issues have been downgraded to junk status and the rating agencies have been severely criticized for the obvious conflict of interest when they earn fees from their ratings.

Securitization became amazingly popular because of the tremendous fees the process generated for the institutions creating the entities (Gasparino, 2009, p. 26). While much of the attention has been on the actions of the investment banks, a recent article in The Wall Street Journal (Eaglesham, 2010) shows that the big issuers of CDOs in
2007 were Bank of America/Merrill Lynch ($65.5 billion), Citigroup ($49.3 billion), J.P. Morgan/Bear Stearns ($44.3 billion), Deutsche Bank ($42.5 billion) and Barclays/Lehman ($36.9 billion).

**Change in Government Regulations**

Following the stock market crash of 1929 and the subsequent bank failures, the Glass-Steagall Act of 1933 was passed which prohibited commercial banks from engaging in activities that were deemed to be non-banking activities. Of most significance for this paper, the banks were prohibited from activities related to investments, investment banking, insurance and other financial services. In 1999, the Gramm-Leach-Bliley Act repealed many of the provisions of Glass-Steagall and allowed qualified banks to enter the securities, insurance and investment banking businesses (Besley and Brigham, 2009, pp. 122–123). As a result, commercial banks were able to engage in the same type of activities as the investment banks that exacerbated the crash of 2008.

**Role of Investment Banks**

So far we have seen the role of government, commercial banks and mortgage lenders and securitization in the subprime mortgage crisis which led to the Great Panic. Now we need to explore the role of investment banks in more detail. Traditionally, investment banks were not banks at all but, rather, institutions that underwrote and distributed new issues of securities and offered advice to their clients (Weston and Brigham, 1981, p. 1072). However, in the 1980’s they began to change their business model. The major investment banks changed from private to public organizations and they found that their fees from marketing new securities were shrinking. So they looked for new sources of income and found it in two areas. The first, as we have seen, was securitization and the second was using their own funds and funds from their clients to trade in securities (Gasparino, 2009, p. 14).

The investment banks found that they could multiply their profits by borrowing additional money to finance their trading activities. There is nothing inherently wrong with leverage and, as Greenspan points out,
financial intermediaries cannot make money without using borrowed money or leverage (Greenspan, 2010, p. 16). With low short-term interest rates the investment banks made huge amounts of money by borrowing in the money markets and using it to purchase mortgage backed securities. This practice, known as the “carry trade,” became the major source of income for the investment banks (Gasparino, 2009, p. 25). The investment banks evolved into what Bernanke (2010) calls “shadow banks” and they were not subject to the same degree of regulation as the commercial banks. The lack of regulation was most evident in capital requirements where there was no legal restriction on the amount of money that the investment banks could borrow. The borrowing soared, easily reaching 30 to 1 and higher, meaning that every dollar of equity used to purchase securities was paired with $30 of debt (Sorkin, 2009, p. 169).

While the use of debt can magnify profits, it also magnifies risk, especially when debt ratios reach the dizzying heights of 30 to 1 or more. The high degree of financial risk is further magnified when short-term debt is used to finance purchases of long-term assets such as mortgage backed securities. Investment banks used the short-term money market instruments known as repurchase agreements (repos) to finance their trading activities. The mortgage backed securities they purchased or originated were the security for borrowings in the repo market. The problem with the short-term borrowing is that it must be renewed on a regular basis and when the lender becomes concerned about the value of the securities that are pledged as security the debt no longer rolls over. Then the borrower must find a way to repay the debt. The obvious way is to sell the securities but, if the value of the securities declines, either they cannot be sold or they can be sold only at a loss. Unfortunately, if the borrower has very little equity capital, there is no cushion to absorb the losses and the borrower faces bankruptcy. On the other hand, if the debt had been long-term, the lenders could not have withheld their money and the investment banks might have been able to survive the crisis. Greenspan summarizes this situation by stating that speculative bubbles appear “to be a function of the degree of debt leverage in the financial sector, particularly when the maturity of debt is less than the
maturity of the assets it funds” (Greenspan, 2010, p. 10). This is exactly what happened.

There can be no doubt that the risk taking behavior on Wall Street was driven by the compensation packages which were so astronomical as to generate what Sorkin (2009) calls the “second gilded age.” (p. 9). The literature is filled with accounts of huge earnings by executives. As illustrations, Lloyd Blankfein of Goldman Sachs took home $68 million in 2007 (Sorkin, 2009, p. 4), Stan O’Neal of Merrill Lynch took home $46 million in 2006 (Sorkin, 2009, p. 146) and Richard Fuld of Lehman Brothers became a billionaire (Sorkin, 2009, p. 506). Following the Great Panic the issue of executive compensation became a major issue for financial firms.

**Credit Default Swaps**

Another element of the Great Panic was the use of credit default swaps (CDS). CDSs are a form of insurance designed to protect a lender in case a borrower defaults on a loan. The premium on the insurance is called the spread. The contracts are typically in the $10 million to $20 million range with maturities ranging from one to ten years. CDSs can be purchased on a firm or a CDO. They were not invented for the CDO market, having first been issued in the mid-1990s. But the use of CDSs really grew in the 2000s. To illustrate, if a lender wanted to insure $10 million for five years and the spread was 40 basis points, the lender would pay a premium of $40,000 every quarter (Federal Reserve Bank of Atlanta, 2008).

Insurance giant, American International Group (AIG), started selling CDSs under the legendary Hank Greenberg in the mid 1990s. The company found that there were tremendous profits to be made by selling CDSs and that they were not subject to capital reserve requirements like a typical insurance policy (Gasparino, 2009, p. 96). At the time, there were very few defaults and AIG thought their risk exposure was minimal short of another Great Depression (Sorkin, 2009, p. 157). When Greenberg left AIG in March of 2005 the company had $40 billion CDSs, nine months later the exposure had doubled to $80 billion making AIG the largest issuer of CDSs in the world (Sorkin, 2009, pp. 204–205).
The world of Credit Default Swaps and securitization has two critical intersections. Lenders to investment banks like Lehman Brothers took out credit insurance and the issuers of CDOs took out insurance which allowed them to underwrite larger pools and keep the securities on their books (Gasparino, 2009, p. 203). AIG was about to find itself ravaged by the Great Panic from a number of sides.

While the CDSs did not require AIG to maintain capital reserves, they did require the posting of collateral to insure that they would be able to pay off in the event of a credit event such as a default. The collateral was held by the purchasers of the CDSs. If the market value of the securities that were insured declined or the credit rating of the company insured was downgraded, AIG would have to post additional collateral (Gasparino, 2009, p. 203). In addition, if AIG’s credit rating declined, it would be required to post additional collateral. AIG’s credit rating did fall below triple A and AIG was forced to post an additional $1 billion in capital (Gasparino, 2009, p. 205). As we shall shortly see this was just the beginning of AIG’s problems.

The Great Crash

By the mid 2000’s the subprime lending house of cards began to fall. The Fed began raising interest rates and borrowers found that the payments on their mortgages rose dramatically. Especially hard hit were those with the special mortgage deals that had artificially low payments. Borrowers found that they could no longer afford their homes and they either had to try to sell them or default on their loans. If the borrowers found that they owed more on the property than they could get for it, many opted to abandon their property. Thus, the housing bubble burst and prices plummeted (Hojnacki and Shick, 2008, pp. 31–32).

Chairman Bernanke believes that the triggering event of the Great Crash occurred on July 30, 2007 when an off-balance-sheet subsidiary of a medium-sized German bank, IKB, could no longer roll over the short-term borrowing it was using to fund investments in CDOs (Bernanke, 2010).
However, the crash did not reach crisis proportions until almost a year later.

**Bear Stearns**

In March of 2008, it became evident that the smallest of the big 5 investment banks, Bear Stearns, was having liquidity problems (Paulson, 2010, pp. 93–94). Bear had a huge exposure to the repurchase agreement market and, as Paulson observes, these types of borrowings are safe until the lenders lose faith in the value of the securities being pledged or in the credit worthiness of the borrower (Paulson, 2010 p. 98). Paulson describes how, when he was with Goldman Sachs, they had obsessed about liquidity and kept $60 billion in cash reserves (Paulson, 2010, p. 99). Unfortunately, Bear’s cash reserves were dwindling fast, down from $18 billion at the beginning of the week of March 9 to $2 billion on Thursday of that week (Paulson, 2010, p. 100). When financial firms fail, they fail quickly and by Sunday, March 16, 2008, a deal had been worked out for JP Morgan Chase to purchase Bear Stearns for $2 per share. A firm that had been worth $20 billion in 2007 was sold for $236 million (Paulson, 2010, p. 115). This was not the full extent of the deal because JP Morgan also received a guarantee from the Fed to cover up to $30 billion in losses on Bear’s investment portfolio (Sorkin, 2009, p. 78). The $2 per share purchase price was so low that it was subsequently revised to $10 to achieve shareholder approval (Paulson, 2010, p. 120). Thus, in a matter of days a firm that had not reported an earnings loss for 84 years ceased to exist (Sidel and Kelly, 2009). Clearly portending future events, Paulson observed in late March of 2008 “Bear Stearns’ failure had called into question not only the business models but also the very viability of the other investment banks” (Paulson, 2010, p. 122).

**Fannie Mae and Freddie Mac**

By fall of 2008, the problems of the subprime mortgage crisis and their effects on Fannie Mae and Freddie Mac became painfully apparent. In early September, Secretary Paulson briefed President Bush on the coming disaster and the need for the government to take action (Paulson, 2010, p. 1).
The impact of Fannie and Freddie was enormous. Together they either owned or guaranteed more than $5 trillion in residential mortgages and mortgage backed securities accounting for half of the U.S. market. To finance their operations, the two entities had issued about $1.7 trillion in debt and they had incurred losses so far in 2008 of $5.5 billion (Paulson, 2010, p. 3). The position that Fannie and Freddie found themselves in was a sharp departure from their historical approach of shunning the riskiest mortgages (Hagerty, et al. 2008). However, starting in 2005 the GSEs became major players in the subprime mortgage market responding to goals set for them by the U.S. Department of Housing and Urban Development (The Wall Street Journal, 2010).

With losses mounting, steep declines in share prices, downgrades of credit ratings and loss of investor confidence, the U.S. Government placed Fannie and Freddie in conservatorship on September 8, 2008 (Paulson, 2010, p. 3). Under the conservatorship, the government took over day-to-day operations of both firms through the Federal Housing Finance Agency. The CEOs stepped down, the boards were replaced, and dividends on the preferred and common stocks were eliminated (Hagerty et al., 2008). The investments of the common shareholders were virtually wiped out and the shares were delisted from the New York Stock Exchange in June of 2010 when their prices dropped below $1 (Timiraos, 2010).

As part of the conservatorship, the government has provided $60 billion in capital to Fannie and $51 billion in capital to Freddie. Originally the government had pledged to provide up to $200 billion in capital for each entity, but it may have to go above that limit over the next three years (Hagerty and Holzer, 2010).

**Lehman Brothers**

Perhaps the most spectacular event of the Great Panic was the bankruptcy of Lehman Brothers on September 15, 2008 which sent the credit markets into disarray (Mollenkamp et al., 2008). Founded in the 1850s, Lehman had survived a number of market crises, but it was not going to survive this one (Gasparino, 2009, p. 89). Lehman was pursuing
aggressively the “new” business model (carry trade) for investment banks. Sorkin (2009) describes the firm as “an all-in, unhedged play on the U.S. real estate market, a giant REIT (real estate investment trust) with a little investment bank attached—a strategy that worked extraordinarily well right up until the moment that it didn’t” (p. 122). Lehman was very thinly capitalized with a debt to equity ratio in excess of 35 to 1. In fact, six weeks before the bankruptcy Lehman had run out of securities to use as security for its borrowings (Craig and Spector, 2010). And it was far larger than Bear Sterns with $600 billion in assets (Paulson, 2010, p. 181).

Starting on Tuesday, September 9, Secretary Paulson found himself dealing with the Lehman crisis. He states that from the start he felt that the government had no legal authority to put capital into an investment bank (Paulson, 2010, p. 173). Moreover, the Fed felt it could not lend funds against the securities Lehman held because of the rapid deterioration in the collateral value of its mortgage backed securities (Reddy, 2010). Thus, the only alternative was to look for a buyer and the candidates which emerged were Bank of America and Barclays (Paulson, 2010, p. 180). However, the two big stumbling blocks were the huge amount of bad assets Lehman held ($65 to $70 billion) and the very short time horizon (Paulson, 2010, p. 195). When the two possible buyers pulled out over the weekend, there was no option left but the biggest bankruptcy in U.S. history (Paulson, 2010, pp. 213–214, 223).

Recently, another problem with Lehman has arisen in connection with a practice known as Repo 105. The State of New York has charged Ernst & Young with fraud in connection with the practices of Repo 105 (Rappaport and Rapoport, 2010). Under normal circumstances, when a firm engages in a repurchase transaction in which it “sells” assets with the agreement to repurchase these assets within a short period of time, the assets are kept on the selling firm’s balance sheet and the repurchase agreement is shown as a liability (Craig and Spector, 2010). In a Repo 105 transaction neither the assets nor the repurchase obligation is shown. At the end of each accounting period, Lehman was using Repo 105 to raise cash which it then used to temporarily reduce its debt and,
thus, reduce the amount of debt it appeared to be using (Rappaport and Rapoport, 2010). Lehman apparently could not get a U.S. law firm to endorse its use of Repo 105 so it went to the U.K. for the endorsement and consequently used its European subsidiary to make the transactions (Craig and Spector, 2010). Ernst & Young argues that it was following generally accepted accounting practices and that it did nothing wrong (Rappaport and Rapoport, 2010). This will undoubtedly be contested for some time in the future, but it is reminiscent of the Enron-Arthur Anderson debacle.

The decision to let Lehman fail will be actively debated for years and it is not the purpose of this paper to enter that debate. Rather, the paper will continue with the story of what happened after Lehman’s bankruptcy when in Secretary Paulson’s words “all hell broke loose” (Paulson, 2010, p. 228).

**Short-Term Credit Markets—“Breaking the Buck”**

A major concern during the crisis was the condition of the short-term credit markets since this market is used by many organizations for financing. Former Fed Chairman Greenspan points out that the depth of a financial crisis is more properly measured by a failure in the short-term credit or money markets (2010, p. 18). It did not take long for the Lehman collapse to be felt in the short-term markets. Within 24 hours investors tried to withdraw $24.6 billion from the Primary Reserve Fund, the oldest of the money market funds in a classic “bank run.” Money market mutual funds are part of the shadow banking system and Americans had come to regard them as being as safe as a bank. The money market funds traditionally set their share value at $1.00. Primary Reserve had 1.2% of its assets in short-term debt issued by Lehman (Wessel, 2009, p. 206). The run on Primary Reserve caused their share price to fall below $1.00 or “break the buck” and it started a run on the entire industry. This caused considerable concern on the part of Treasury and Fed officials because the effects spread to industrial giants like GE, Caterpillar and Dow Chemical who depend on the short-term market for borrowing through commercial paper (Wessel, 2009, p. 207). By Friday,
September 19th, programs were announced to lend money to commercial banks to facilitate the purchase of high quality commercial paper, and deposits with money market mutual funds were temporally insured by the FDIC (Wessel, 2009, p. 208 and Paulson, 2009, p. 262).

**The Crash Accelerates and More Dominoes Fall**

Following the Lehman bankruptcy, the financial crisis was in full flight and a series of momentous events occurred in rapid succession. During the week of September 14, 2008:

1. Merrill Lynch was acquired by Bank of America
2. AIG was virtually nationalized with an influx of $85 billion in money from the Fed
3. The two remaining investment banks, Goldman Sachs and Morgan Stanley, converted to bank holding companies
4. The $700 billion program to purchase securities from banks that became known as TARP was announced.

After he became CEO of Merrill Lynch, Stan O’Neal set out to make it like Goldman Sachs. At first the results were spectacular, with profits of $7.5 billion from trading its clients’ and its own money (Sorkin, 2009, p. 144). But, as with many of the Wall Street firms, these profits came at tremendous risk. Merrill leveraged itself with mortgaged backed securities (Gasparino, 2009, p. 221) and, despite being unable to obtain credit insurance on the CDOs they were creating continued to churn them out at a record rate in 2006 (Sorkin, 2009, p. 145). By 2007, the majority of the CDOs could no longer be sold and so the firm kept them in its portfolio (Gasparino, 2009, p. 260). During the week leading up to Lehman’s collapse, John Thain (O’Neal’s successor) realized that his firm was almost as weak as Lehman and anticipated similar problems (Paulson, 2010, p. 176). Unlike Lehman, however, a buyer was found for Merrill—Bank of America. By that point, Merrill was experiencing a quarterly loss of $5.15 billion, reflecting a heavy exposure to Fannie Mae, Freddie Mac and Lehman (Lucchetti and Ng, 2010).
Leading up to the Lehman collapse, AIG had been experiencing liquidity problems and they were worried about a downgrade in their credit rating. In addition, the firm had initiated a practice of lending out high grade securities, such as treasuries it held, and investing the cash received in subprime mortgage securities. This practice posed a significant threat to liquidity if the parties on the other side of the trade wanted their cash back (Sorkin, 2008, p. 207–08). On the Tuesday following Lehman’s bankruptcy that credit downgrade came and AIG needed an $85 billion loan to keep from following Lehman (Paulson, 2010, p. 229). It was clear that the markets could not weather another bankruptcy and something had to be done to save AIG. On September 16, 2008 the Fed agreed to lend AIG $85 billion. This was followed by another $38 billion in October and by November the loan was up to $150 billion (Pleven et al., 2009).

At this point there were only two major independent investment banks left standing—Morgan Stanley and Goldman Sachs—and the pressures were mounting on them. Secretary Paulson writes that he knew the markets could not tolerate another failure like Lehman so efforts turned toward rescue for these two firms. Morgan was under the most pressure (Paulson, 2010, p. 268). After exploring various merger and acquisition options for both banks, it was decided to allow them to convert to bank holding companies and to be regulated by the Fed. Approval for the change in status was given by the Fed on September 21st (Paulson, 2010, p. 277).

The problems in the financial markets were not limited to the investment banks and AIG. There was also tremendous concern that commercial banks held significant portfolios of subprime mortgages and mortgage backed securities.

**Troubled Asset Relief Program (TARP)**

As the fateful week of September 14th wore on, it became apparent that this crisis could no longer be fought on a firm-by-firm basis and that the Federal Reserve and the Treasury lacked the resources to fight the problem. A bailout was necessary. On Thursday, September 18th, Secretary
Paulson and Chairman Bernanke went to Congress to ask for legislation to purchase illiquid assets from U.S. financial institutions (Solomon and Paletta, 2008). This legislation became known as the Troubled Asset Relief Program or TARP. The path for this legislation was not an easy one. On September 29th, the House of Representatives defeated the bill and the Dow Jones Industrial Average dropped 778 points, its largest one day point drop in history (Lueck et al., 2008). The Senate, however, passed the bill on Wednesday, then the House reconsidered, passing the bill on Friday October 3rd and President Bush signed it into law (Hitt and Solomon, 2008).

TARP provided $700 billion for purchasing bad assets (CDOs) from financial institutions. $250 billion was available immediately with another $100 billion if the Secretary of the Treasury requested it and the final $350 billion was subject to joint congressional approval (Hitt and Lueck, 2008). It was not long before the concept of purchasing illiquid assets ran into operating difficulties in establishing prices for these assets. The Treasury then revised the plan by purchasing preferred equity stakes in nine major banks (Bank of America, Bank of New York Mellon, Citigroup, Goldman Sachs, J.P. Morgan Chase, Merrill Lynch, Morgan Stanley, State Street and Wells Fargo) on October 13, 2008 (Solomon and Paletta, 2008, Solomon and Enrich, 2008). By mid-November the Treasury had committed almost $300 billion in TARP funds and they hadn’t begun to deal with General Motors (Solomon, 2008).

The equity values of the commercial banks plummeted during the fall of 2008. As an example, Citigroup’s market capitalization dropped from $241.6 billion in August of 2007 (Wessel, 2009, p. 94) to $99.9 billion in October of 2008 (Wessel, 2009, p. 230). The solvency of many of the commercial banks was called into question and people began to wonder if the money they had on deposit was safe. When a bank is in danger of failing it is typically sold to another bank with a guarantee to cover losses provided by the Federal Deposit Insurance Corporation. During the week of September 28th, Wachovia, the fourth largest bank in the U.S., agreed to be acquired by Citigroup (Sorkin, 2009, p. 502). Later the Citigroup offer was rejected in favor of a higher offer from
Wells Fargo (Fitzpatrick and Enrich, 2008). One can only wonder at the viability of a merger between Citi and Wachovia given the subsequent problems of Citi (Enrich, 2009). Washington Mutual was sold to JP Morgan Chase making it the fourth largest bank failure in U.S. history. (Sidel, et al., 2008).

The Crash Becomes International
So far we have talked only about the crisis in the US financial markets, but the contagion quickly spread to all aspects of the economy and the rest of the world. Our purpose here is not to chronicle the international effects of the Lehman collapse in detail but rather to just give a flavor for the world wide effects. Lehman’s bankruptcy triggered a cash crunch around the world and the LIBOR rate spiked. Norwegian pension holders suffered losses (Solomon et al., 2008).

Banks failed in Iceland (Paulson, 2010, p. 336). In the U.K the government took control of mortgage lender HBOS and the Royal Bank of Scotland, (Solomon et al., 2008, Guevarra and Kjetland, 2008). The governments of Germany and France had to put money into their nation’s banks (Browning et al., 2008). Governments in Australia, the United Arab Emirates, and Italy had to guarantee interbank lending (Cimilluca et al., 2008). And surely these events were a trigger for the on-going sovereign debt crisis currently being experienced by a number of European nations.

WHAT IS TO BE LEARNED FROM THE GREAT CRASH?
There are many lessons in the Great Crash of 2008. Here we will concentrate on seven lessons that can be related to material covered in a typical introductory corporate finance course. These are:

1. There will always be speculative bubbles, they are not a once in a lifetime event.
2. Risk is always there even if some believe that that it is not.
3. Insuring against catastrophic risk is an illusion.
4. One must understand the nature of the investments that are being made, be willing to admit when they do not understand how the investments work, and take appropriate action.

5. Leverage carries significant risk that only becomes apparent when things turn bad and borrowing short to finance long-term assets is the riskiest kind of leverage.

6. Regulation cannot prevent risky behavior.

7. Are some firms too big to fail?

Speculative Bubbles
Typically, we do not spend much time talking about the history of finance in an introductory course and, when it comes to bubbles that gives the impression that they are infrequent. However, that is not the case. Since 1995, just in the United States, we have had the Dot-com bubble, the auto lending bubble, and now the housing bubble. Clearly some bubbles are larger than others with more catastrophic results, but the point to be made is that one must consider bubbles not as a rare occurrences, but, rather, as events that come along on a regular basis and, therefore, must be included in planning for the future. Moreover, recent experience demonstrates that financial modeling does not adequately factor in catastrophic risk. Greenspan (p. 10) tells us that bubbles burst when risk aversion reaches its minimum and credit spreads approach zero.

Persistence of Risk
One of the most surprising factors of the subprime mortgage crisis is that both borrowers and lenders acted as though risk did not exist in the residential housing market. Because housing prices were rising, the reasoning went that if the borrower did default, the property would be worth more than the loan against it and hence there was no risk. The fallacy of that argument is clear in retrospect. Risk in mortgage lending depends on both the ability of the borrower to service the debt and the value of the property securing the loan. The subprime lending frenzy contributed to the rise in housing prices and thus obscured the risk of falling property values. Once borrowers could not afford their mortgage payments they
looked to the value of their property. However, when enough borrowers do this the price of the property plunges, there is no equity and default becomes a way out.

A similar chain of events happened in the CDO market. Once investors started questioning the validity of the underlying cash flows from the mortgages, the value of the CDOs evaporated. Because this was a relatively opaque instrument the valuation problems seemed insurmountable. Holders such as the investment banks and commercial banks found that they could no longer assign values to the assets they held and there was no way to liquidate them. This was a classic illustration of the “emperor’s clothes.” The pricing problem was largely a short-term phenomenon as it turned out, but with thinly capitalized institutions, there was no way to cushion many institutions until the market recovered. The institutions that were more strongly capitalized or who had sources of money to tide them over survived; those that did not failed.

You Cannot Insure Against Catastrophic Risk
One of the ironies of the Great Crash is how institutions thought they could insure themselves against risk. The lenders made increasingly risky subprime mortgage loans and then sold them to Fannie Mae, Freddie Mac or special purpose entities that collateralized them. Then many of these lenders bought the CDOs back with the comfort that they carried triple A credit ratings and payment was insured by credit default swaps. Yet this protection turned out to be an illusion because the credit ratings were seriously flawed and there was so much credit insurance sold that the insurers couldn’t possibly cover the losses. One of the recurring themes of this crisis is the failure on the part of multiple parties to see the “big picture.”

Understanding the Nature of the Investments Being Made
The phenomenal growth of increasingly complex derivative securities has created a great problem of understanding the true nature of the investment. A traditional derivative security such as a put or a call is relatively simple to understand since the value is related to the price of
the underlying security. But this type of derivative is far different from a CDO Squared in which the cash flow is a function of the cash flow of other CDOs whose cash flow is a function of an underlying pool of mortgages and loans of differing credit quality. Financial engineering involving highly trained mathematicians and computer programmers has introduced a significant degree of opaqueness into the securities.

What is clear from the crash is that few, if any, individuals understood the true nature of the risk of the securities that were being purchased, nor did they understand the extent of their exposure to these investments. The CEOs of the large investment and commercial banks were shocked to learn the extent of their investments in the subprime mortgage market. As an illustration Gasparino (2009, p. 92) observes that Richard Fuld, the CEO of Lehman, did not understand the nature of mortgage backed securities from the early 1990’s. Some may believe that these executives paid a heavy price for their ignorance by losing their jobs, their companies and significant portions of their fortunes. Unfortunately, their actions impacted virtually everyone else. The moral of this story is to be wary of investments that you do not understand.

**Leverage**

Financial institutions must operate with leverage to be profitable. Typically, the level of capital in well-run commercial banks has been relatively low, with debt to equity ratios of 12 to 1. However, it does not follow that if a little bit of leverage is good a lot of leverage is better. Leading up to the Great Crash we have seen that many of the investment banks regularly had 30 to 1 debt to equity ratios and with questions raised about the end of period financial window dressing, the actual debt to equity ratios may have been much higher. The financial risk created by such high levels of debt is enormous because there is virtually no equity cushion to absorb losses. Had the investment banks been better capitalized, they might have been able to survive the drop in CDO prices and not plunged the world into a financial crisis.10

The high degree of leverage creates a risk that is only magnified when the maturity of the asset is not matched with the maturity of the debt as
illustrated by the carry trade. The investment banks were holding CDOs which are essentially long-term debt obligations and they were financing these purchases with short-term borrowing. This type of arrangement produces tremendous profits when the yield curve is upward sloping. However, it also produces tremendous risk because short-term debt must be rolled over constantly. If the borrower cannot renew the debt and has no other source of funds, the only recourse is to sell the assets. But if you can’t sell the assets or if you must sell the assets at fire-sale prices, you incur substantial losses that you cannot absorb. This is exactly what happened to the investment banks that failed. They could not renew their short-term borrowings, they could not sell their assets and they did not have any other sources of money or equity capital to tap.

**Regulation**

A natural reaction to the Great Crash was to say that governmental regulation had failed and it should be strengthened. There is no question that regulation has failed. Retiring Fed vice chair, Donald Kohn, states clearly that regulation did not keep up with the financial institutions. There was a shift from bank oriented intermediation to market oriented intermediation (Hilsenrath, June 2010). The shadow banks clearly fell between the regulatory cracks and escaped regulation (2010). Moreover, Kohn points out that when regulators did spot problems they did not come down on them hard enough (Hilsenrath, June 2010).

In fact, financial institution regulation has regularly failed and there is no reason to believe that the situation will change. Why does regulation fail? There are a number of possible reasons. First, financial institution regulation in the United States is fragmented and regulators do not have a record of working together. Second, financial institutions cannot be regulated by a single country. As the Lehman actions in connection with Repo 105 illustrate, financial assets are easily transportable; if an institution wants to avoid regulation, they merely have to transfer to another country with less stringent rules.

Predictably, Congress dove into financial regulation, but was soon bogged down by infighting among the regulators and heavy lobbying
by financial institutions (Enrich and Paletta, 2009). Finally, in July of 2010, a 2,300 page bill was passed that is short on specifics and delegates the drafting of the new rules to the 10 regulatory agencies (Paletta and Lucchetti, 2010). The drafting work is running behind schedule and implementation is now predicted for 2011–12 (Eaglesham and McGrane, 2011). Some experts are skeptical that the legislation will prevent another crisis (Paletta and Lucchetti, 2010).

**Too Big to Fail**
The Great Crash has revived the debate on the issue of too big to fail—“financial institutions so large, so interconnected, so complex that the government dare not let them fail for fear of endangering the whole economy” (Wessel, October 2009). Using Wessel’s definition, it is easy to see that the concept of too big to fail is directly connected to the concept of systemic risk. During the Great Crash, Bear Stearns, Merrill Lynch, AIG, Morgan Stanley and Goldman Sachs were saved in some form or another and Lehman Brothers was allowed to fail. Critics of the government’s actions have argued that there is an implicit policy that some firms are too big to fail (Crittenden and Rieker, 2010) and The Wall Street Journal (2009) has called for the government to make its’ definition of systemic risk explicit. In answer to these criticisms Herbert Allison, who oversees TARP for the Treasury Department, states that “there is no too-big-to-fail guarantee on the part of the U.S. government” (Crittenden and Rieker, 2010). Does the government really have such a policy or was Lehman just a victim of unfortunate circumstances? We may never know the answers to these questions and as bank regulation evolves it will be interesting to see how the regulators deal with the mega financial firms.

**Some Final Observations**
At the time of this writing, the crisis seems to have passed. The National Bureau of Economic Research (2011) says that the recession ended in the second quarter of 2009 even though unemployment remains high.
The Dow Jones Industrial Average has crossed the 12,000 level for the first time since June of 2008, reflecting the return to profitability of many firms (Browning, 2011). Many of the banks that took TARP funds have repaid them and others are in the process of repaying (Eckblad and Holm, 2010). And large compensation has returned to Wall Street, hitting a record $135 billion for 2010 (Lucchetti and Grocer, 2011).

Have the problems that created the Great Crash been resolved? Will there be speculative bubbles in the future? Will there be more stock market crashes? Only time will tell, but a safe bet is that the answers to these questions are no, yes, and yes. While these answers may not be correct, history is certainly on their side.
REFERENCES


The Great Panic of 2008

ENDNOTES

1. Research for this paper was made possible by a sabbatical leave. I wish to thank Ms. Nancy Muenzner and Ms. Mary Ellen Carver for their patient efforts to put the manuscript into publishable form and Professor Michael Piemonte for his suggestions that have greatly improved this manuscript. I, of course, remain responsible for all errors.

2. Students interested in conducting further research on this subject are encouraged to read Hojnacki and Shick (2008), Mishkin (2011), Reinhart (2011), Sorkin (2009) and Wessel (2009) for background material.

3. The term Great Panic is taken from Wessel (2009).

4. In addition to the references cited in this paper, I have collected more than 300 articles from The Wall Street Journal.

5. This paper presents many of these issues in summary form so that it does not become too voluminous to use as a teaching supplement. In the process some issues do not receive full treatment or may be omitted.

6. To expand on this point a $50,000, 30 year mortgage loan with a 5% interest rate has a monthly payment of $268 (rounded). The first payment the borrower makes consists of $208 in interest on the loan and $68 of payment on the loan principal. In an interest only loan the borrower only pays $208 for an initial period of time and then the payments rise as they start to pay the principal. In a pay-option loan the borrower doesn’t even pay all of the interest of $208 and what is not paid is added to the borrower’s principal. One can see that these low payments are attractive to an unsophisticated borrower who doesn’t understand how their payments will increase in the future.

7. As we shall shortly see, Lehman’s debt was probably far in excess of this high level.

8. Bank of America’s purchase of Merrill Lynch, its desire to get out of the deal, the subsequent losses and the controversy over Thain’s compensation is a story in itself. See for example Rapport (2009), Crittenden and Fitzpatrick (2009), and Craig (2009).

9. This paper does not take up the issue of mark-to-market accounting and its role in the Great Crash.

10. Greenspan (2010) argues that the solution to the problem is higher capital ratios.
11. The key provisions of the new legislation include (Paletta and Lucchetti, 2010):
   a. Congress is given power to audit the Fed, restrict emergency loans and eliminate bank’s input into the appointment of regional Fed presidents.
   b. Regulators can seize and break up institutions whose collapse threatens the economy.
   c. Regulation of the derivatives market, hedge funds and private equity firms must register with the SEC.
   d. Sellers of mortgage backed securities must retain part of the securities they issue.
   e. Fed gets clearer responsibility for big financial firms.
   f. Banks are restricted in trading with their own capital (Volker Rule).
   g. A new agency is established to write rules for consumer finance and banks must ensure that borrowers can repay their loans.

12. Not to be confused with systematic risk.