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2007-9: An Explanation for why the
subprime mortgage defaults and the
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any previous crashes (with exception of the
Great Depression of 1929)**

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Moral hazard and the financial crisis of 2007-9: An Explanation for why the subprime mortgage defaults and the housing market collapse produced a financial crisis that was more severe than any previous crashes (with exception of the Great Depression of 1929)

ABSTRACT

This paper examines the financial crisis in 2007-9 that was more severe than previous crashes, including the dot-com crash of 2001 and the market crash of 1987 (with the exception of the Great Depression of 1929). This severity was due to excessively risky speculative bets taken by the executives of financial institutions. When the 'housing bubble' burst, these speculative bets, which were based on the U.S. housing market and the subprime mortgages, triggered the financial systemic failures of the U.S. in June 2007 (the subprime mortgage crisis) and September 2008 (the shadow-banking crisis). The systemic financial failure of September 2008 (the shadow-banking crisis) was greatly amplified by excessively risky speculations and this led to a rapid deterioration of the entire global economy. This paper examines the potential for moral hazard in the financial system leading up to this crisis, and attempts to determine if this was a motivating factor in these risky bets.

Keywords: moral hazard, financial crisis of 2007-9, burst of the housing bubble, subprime mortgages crisis, shadow-banking crisis

INTRODUCTION

This paper explains that the excessively risky bets taken by the executives of financial institutions were possibly motivated by *moral hazard*. It shows that these risky bets, in the context of the integration of global financial markets, meant that subprime mortgage defaults and the housing market collapse produced a financial crisis in 2007-9 that was much more severe than previous crashes, including the dot-com crash of 2001 and the market crash of 1987 (with the exception of the Great Depression of 1929).

Speculative bets based on the U.S. housing market and subprime mortgages triggered the U.S. financial systemic failures of June 2007 (subprime mortgage crisis) and September 2008 (shadow-banking crisis). The systemic financial failure of September 2008 (shadow-banking crisis) was greatly amplified by these excessively risky speculations, and this led to a rapid deterioration of the entire global economy.

Determining if risk-taking was induced by moral hazard

Many authors, including Wolf (2008), Elliott & Atkinson (2009), Krugman (2009) and the editors of *The Economist* (2009, July 16) have written that the systemic financial failures that occurred in the U.S. were the consequence of excessive risky bets taken by the executives of financial institution. This reckless risk-taking was possibly induced by 'moral hazard' (Acharya et al. 2009; Cooper 2008; Leopold 2009). Leopold (2009, p. 48) has identified that the term moral hazard, borrowed from the insurance industry, describes a troublesome financial innovation:

If I have full insurance on my bicycle, I might not lock it up properly since it's not such a big deal (to me) if it's stolen – the insurance company will replace it. So, at least in theory, more insurance could lead to lazier bicycle riders – a moral hazard – who enable more bicycle thefts. In finance the bicycle is risk. If I know I will be bailed out if I assume risk and fail, I'll assume more and more risk and let you bail me out if I fail.

In the context of this description, two factors can be identified that may have encouraged executives of financial institutions to take excessively risky bets:

1. *The compensation system of executives within the financial system is skewed toward moral hazard.* These executives often receive basic fixed salaries, and large cash bonuses tied to short-term profits. These bonuses are positive in times of success, and at almost zero when returns are poor. This creates a perverse incentive to take-on risks: winning on a risky bet results in large cash bonuses, while losing does not result in loss; the cost of this risky bet is not carried by the executives, it is carried by the shareholders. In most cases, one year's winning bet is enough to guarantee a safe retirement. In this context, economic performance of the financial institution throughout the next year and beyond becomes of lesser concern to the individual.

This is the classic *principal agent problem* (also known as *agency theory*) with asymmetric information in favor of the agent. The principals (shareholders) of financial institutions demand profits and provide large bonuses as incentives to motivate their agents (the executives of the financial institution) to obtain these. The asymmetry of information lies in the lack of knowledge, from the principals, of the consequences of the risks that these agents take to earn their bonuses.

2. *The explicit and implicit government guarantees across the financial system lead to a lack of effective market supervision of possible moral hazard.* These guarantees remove the need for depositors to evaluate the health of commercial banks, for debt holders to look at the soundness of government-sponsored enterprises (GSEs), and for investors to analyze the risk of 'too big to fail' financial institutions. Additionally, because of the government guaranty function these institutions have access to low cost debt. This easily obtained money is a tempting incentive

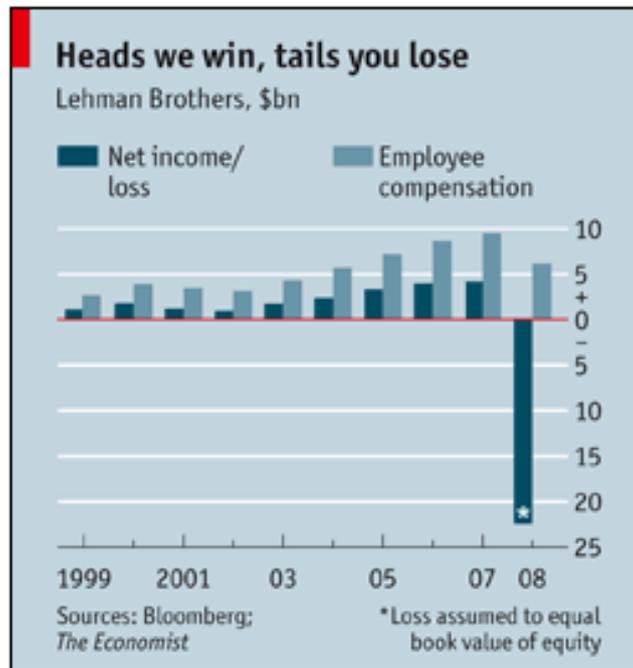
for the executives of these institutions to leverage their bets, and so take greater risks to generate increased profits and gain substantial bonuses.

The excessive risk taken by the executives of financial institutions, possibly induced by moral hazard, was reinforced by an article written in the *The New York Times* (Krugman, 2009, March 1) that commented on a speech given by Federal Reserve Chairman Ben Bernanke four years prior:

Bernanke cited "the depth and sophistication of the country's financial markets (which, among other things, have allowed households easy access to housing wealth)." Depth, yes. But sophistication? Well, you could say that American bankers, empowered by a quarter-century of deregulatory zeal, led the world in finding sophisticated ways to enrich themselves by hiding risk and fooling investors.

The magazine *The Economist* (2009, July 16), in an article with the suggestive title of *Going overboard: are investment banks run for employees or shareholders?*, used the Lehman Brothers bank as an example of the kind of moral hazard that precipitates a financial crisis. This bank made losses in the two quarters before it collapsed September 14, 2008, and yet continued to accrue a compensation pot for its employees not far off the levels of 2007 (see Figure 1). *The Economist* (2009, July 16) explained this with the saying, "heads we win, tails you lose".

Figure 1. Lemman Brothers: an example of moral hazard



Source: The Economist (2009, July 16)

<http://www.economist.com/businessfinance/displaystory.cfm?story_id=14034875

Furthermore, returns to shareholders over the entire cycle worsen when the failures of the bank are included. Lehman paid out \$55 billion to employees in the decade up to the end of 2008. Shareholders earned cumulative profits of zero, as well as the loss of all of their capital when the firm failed.

In retrospect, with the integration of global financial markets, the availability of cheap money, and the incentive for risk-taking, the stage was set for the substantial financial crisis that was triggered by the burst of the housing bubble.

The systemic financial failures in the U.S. during 2007 and 2008

Acharya et al. (2009, p. 2) have given a compact explanation of the systemic failures in the U.S. that precipitated the financial crisis:

The financial crisis was triggered in the first quarter of 2006 when the housing market turned. A number of the mortgages designed for a subset of the market, namely subprime mortgages, were designed with a balloon interest payment, implying that the

mortgage would be refinanced within a short period to avoid the jump in the mortgage rate. The mortgage refinancing presupposed that home prices would continue to appreciate. Thus, the collapse in the housing market necessarily meant a wave of future defaults in the subprime area – a systemic event was coming...

While subprime defaults were the root cause, the most identifiable event that led to systemic failure was most likely the collapse on June 20, 2007, of the highly levered Bear Stearns-managed hedge funds that invested in subprime asset-backed securities (ABSs). In particular, as the prices of the collateralized debt obligations (CDOs) began to fall with the defaults of the subprime mortgages, lenders to the funds demanded more collateral.

The event discussed in this extract illustrates the features of a typical financial crisis: a credit boom, which leads to leveraging of financial institutions (in this case, the Bear Sterns hedge funds); and an asset bubble, which increases the probability of a large price shock (in this case, the housing market). Eventually, when shocks led to a bursting of the asset bubble (that is, a fall in housing prices) and trigger a process of deleveraging, these unsustainable asset bubbles and credit booms collapse, with the following three consequences:

1. The fall in value of the asset, backed by high leverage, leads to margin calls that force borrowers to sell the asset, which in turn starts to deflate in value.
2. This fall in the asset value then reduces the value of the collateral backing the initial leveraged credit boom.
3. Margin calls, and the forced fire sale of the assets, then drive down its price even below its now lower fundamental value, creating a cascading vicious circle of falling asset prices, margin calls, deleveraging, and further asset price deflation.

While the subprime defaults were identified as the root cause, the event that most conspicuously led to the first systemic failure was the collapse (on June 20, 2007) of two highly leveraged Bear Stearns-managed hedge funds, which had invested in subprime asset-backed securities (ABSs).

This problem with the Bear Stearns-managed hedge funds motivated a complete revaluation of all credit instruments. Acharya et al. (2009, p. 3) have identified a consequence of this as being the widening of credit spreads on investment grade bonds, high-yield bonds, leverage loans via the LCDX index (based on 100 equally weighted loan credit default swaps referencing syndicated first-line loans), collateralized debt obligations (CDOs) backed by commercial mortgages via the CMBX index (based on 25 commercial mortgage-backed securities), and CDOs backed by subprime mortgages via the ABX index (based on tranches of 20 subprime mortgage pools).

As subprime mortgages defaulted, the pricing of structured credit instruments was called into question, particularly as the new, exotic and illiquid financial instruments were difficult to value (the same was true for complex derivative instruments). Another complication was that many of these instruments traded over-the-counter rather than on an exchange, and investors discovered that there was little information and disclosure about such instruments and who was holding them. Many of the new financial institutions (such as hedge funds, private equity, structured investment vehicles (SIVs)) were opaque, having little or no regulation.

Private financial markets cannot function properly without transparency for market participants and regulators, as when investors cannot price complex new securities, they cannot properly assess the overall losses faced by financial institutions; and when they cannot know who is holding the risk for the so-called toxic waste, this results in generalized uncertainty. In this instance, this scenario led to lack of trust and confidence between the financial institutions, which in turn resulted in the freezing of the market.

The consequence of market freeze was, over several months, a series of subprime lender bankruptcies, massive write-downs by financial institutions (culminating in the rescue of Bear Stearns, the fifth-largest investment bank), the Federal Housing Finance Agency (FHFA) decision to place two government-sponsored enterprises (the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage

Corporation (Freddie Mac)) into conservatorship, and the bankruptcy of Lehman Brothers (the fourth-largest investment bank) in 2008. The run on Bear Stearns started in the week of March 10, 2008. During the following weekend the government engineered a rescue package for its purchase by JPMorgan Chase. The FHFA assumed conservatorship of Fannie Mae and Freddie Mac on September 7, 2008 and Lehman Brothers filed for bankruptcy over the weekend following Friday, September 12, 2008.

The Lehman Brothers bankruptcy (during the weekend of September 14, 2008), revealed to the market that there were no financial institutions that were 'too big to fail', and precipitated the second systemic failure. The consequence was a run on other institutions, leading to the announcement by the Bank of America during the same weekend (September 14, 2008), that it was negotiating to acquire Merrill Lynch (the third-largest investment bank). Collateral calls on American International Group (AIG) led to its government bailout on Monday, September 15, 2008. Without this bailout, its exposure to the financial sector (from insuring of some \$500 billion worth of currency default swaps CDS on AAA-rated CDOs) would have caused immediate (and potentially catastrophic) losses to a number of firms. The two remaining large investment banks, Morgan Stanley (the second-largest investment bank) and Goldman Sachs (the largest investment bank) received the official approval for transition from investment banks to bank holding companies (BHCs) on September 21, 2008, which allowed them to receive extensive low-cost loans from the Federal Reserve Bank.

The shadow-banking crisis

Krugman (2009, p. 170) has described the financial crisis of 2007-2009 as a 'non-bank banking crisis'. To clarify this, he quoted a speech given in June of 2008 by the President of the Federal Reserve Bank of New York, Timothy Geithner (Krugman, 2009, p. 161):

The structure of the financial system changed fundamentally during the boom, with dramatic growth in the shares of assets outside the

traditional banking structure. This non-bank financial system grew to be very large, particularly in money and funding markets. In early 2007, asset-backed commercial paper conduits, in structured investment vehicles, in auction rate preferred securities, tender option bonds and variable rate demand notes, had a combined asset size of roughly \$2.2 trillion. Assets financed overnight in tripartite repo grew to \$2.5 trillion. Assets held in hedge funds grew to roughly \$1.8 trillion. The combined balance sheets of the then five major investment banks totaled \$4 trillion.

In comparison, the total assets of the top five bank holding companies in the United States at that point were just over \$6 trillion, and total assets of the entire banking system were about \$10 trillion...

The scale of long-term risky and relatively illiquid assets financed by very short-term liabilities made many of the vehicles and institutions in this parallel financial system vulnerable to a classic type of run, but without the protections such as deposit insurances that banking system has in place to reduce risk.

Krugman (2009, p. 163-164) has further identified the presence of what he has described as *malign neglect*, which may have been the cause of the shadow-banking crisis:

As the shadow-banking system expanded to rival or even surpass conventional banking in importance, politicians and government officials should have realized that we were re-creating the kind of financial vulnerability that made the Great Depression possible – and they should have responded by extending regulations and financial safety net to cover these new institutions...

In fact, the Long Term Capital Management crisis should have served as an object lesson of the dangers posed by the shadow-banking system. Certainly many people were aware of just how close the system had come to collapse.

Although the majority of the non-banking institutions in the shadow-banking sector resembled banks, they did not have access to the safety nets that were enjoyed by banks until 2008. These safety nets (deposit insurance, the lender of last resort (LOLR) and the central bank) had been

created to especially prevent runs on banks and protect depositors. The subprime crisis initiated a run on these non-bank institutions that resulted in the demise of a significant number of them. This began in early 2007 with the collapse of several hundred of the non-bank mortgage lenders, which was followed by the collapse of the entire system of structured investment vehicles (SIVs) that had invested in CDOs and were based on mortgages and other credit derivatives, as well as the demise of the major independent broker-dealers in the U.S.

Bern Stearns was the first to experience a run on their liabilities. This forced them to unravel the repo financing that was the basis of their leveraged operations. Following this was the bankruptcy of Lehman Brothers, the sale of Merrill Lynch to the Bank of America, and the transformation of Morgan Stanley and Goldman Sachs into bank holding companies. The demise of the shadow-banking system continued with the run on money market funds, hedge funds and private equity funds.

Reasons for the rapid decline in the global economy in 2008

In 2008, as a consequence of the U.S. systemic financial failures, the global economy entered into a severe financial crisis. The International Monetary Fund (IMF)'s *World Economic Outlook* (WEO) (2009, p. 2-5) explained that a dramatic escalation of the financial crisis in September 2008 provoked an unprecedented contraction of activity and trade, despite policy efforts:

In the year following the outbreak of the U.S. subprime crisis in August 2007, the global economy bent but did not buckle. Activity slowed in the face of tightening credit conditions, with advanced economies falling into mild recessions by the middle quarters of 2008, but with emerging and developing economies continuing to grow at fairly robust rates by past standards. However, financial wounds continued to fester, despite policymakers' efforts to sustain market liquidity and capitalization, as concerns about losses from bad assets increasingly raised questions about the solvency and funding of core financial institutions. The situation deteriorated rapidly after the dramatic blowout of the financial crisis in

September 2008, following the default by a large U.S. investment bank (Lehman Brothers), the rescue of the largest U.S. insurance company (American International Group, AIG), and intervention in a range of other systemic institutions in the United States and Europe.

These events prompted a huge increase in perceived counterparty risk, as banks faced large write-downs, the solvency of many of the most established financial institutions came into question, the demand for liquidity escalated to new heights, and market volatility surged once more. The result was a flight to quality that depressed yields on the most liquid government securities and an evaporation of wholesale funding that prompted a disorderly deleveraging (which then spread across the rest of the global financial system). Liquid assets were sold at dramatically reduced prices, and credit lines to hedge funds and other leveraged financial intermediaries in the shadow-banking system were slashed. High-grade as well as high-yield corporate bond spreads widened sharply, the flow of trade finance and working capital was heavily disrupted, banks tightened lending standards further, and equity prices fell steeply.

Emerging markets, which had previously been sheltered from financial strain by their limited exposure to the U.S. subprime market, were strongly impacted by these events. The issuing of new securities came to a virtual stop, bank related flows were curtailed, bond spreads soared, equity prices dropped, and exchange markets came under heavy pressure. Beyond a general rise in risk aversion, capital flows were curtailed by a range of adverse factors. These included the damage to banks (especially in Western Europe) and hedge funds (which had previously been major conduits), the growing desire to move funds under the 'umbrella' offered by the increasing provision of guarantees in mature markets, and rising concerns about national economic prospects (particularly in economies that previously had relied extensively on external financing). Adding to these strains, the turbulence exposed internal vulnerabilities within many emerging economies, bringing attention to currency mismatches on borrower balance sheets, weak risk management (for example, substantial corporate losses

on currency derivatives markets in some countries), and excessively rapid bank credit growth.

Although a complete global economic meltdown was averted, this sharp escalation of financial stress through a range of channels had strong impacts on the global economy. The credit crunch, generated by deleveraging pressures and a breakdown of securitization technology, hurt even the most highly-rated private borrowers. Sharp falls in equity markets, as well as the continuing deflation of housing bubbles have led to a massive loss of household wealth. In part, these developments can be considered to be inevitable adjustments, necessary to correct past excesses and technological failures akin to those that triggered the bursting of the dot-com bubble. However, because the excesses and failures were at the core of the banking system, the ramifications have been quickly transmitted to all sectors and countries of the global economy. Moreover, the scale of the blows has been greatly magnified by the collapse of business and consumer confidence in the face of rising doubts about economic prospects and continuing uncertainty about policy responses. The rapidly deteriorating economic outlook has further accentuated financial strains, producing a global feedback loop that has undermined policymakers' efforts to remedy the situation.

Thus, the impact on financial activity was experienced quickly and throughout a wide area. Industrial production and merchandise trade plummeted in the fourth quarter of 2008, and continued to fall rapidly in early 2009 across both advanced and emerging economies. As purchases of investment goods and consumer durables (such as autos and electronics) were impacted by credit disruptions and rising anxiety, inventories began to rapidly build-up. Recent data provide some tentative indications that the rate of contraction may now be starting to moderate. Business confidence has picked up modestly, and there are signs that consumer purchases are stabilizing, helped by the cushion provided by falling commodity prices and anticipation of macroeconomic policy support (Summers, 2009, July 17). However, employment continues to drop rapidly, particularly in the U.S.

Overall, the global GDP is estimated to have contracted by an alarming 6¼ percent (annualized) in the fourth quarter of 2008 (a swing from 4 percent growth one year earlier), and to have fallen almost as fast in the first quarter of 2009. All economies around the world have been seriously affected, although the direction of the impact has varied. The advanced economies had experienced an unprecedented 7½ percent decline in the fourth quarter of 2008, and most are now suffering deep recessions. While the U.S. economy in particular may have suffered from intensified financial strain and the continued fall in the housing sector, Western Europe and advanced Asia have also been strongly affected by the collapse in trade as well as rising financial problems of their own and housing corrections in some national markets.

Emerging economies contracted 4 percent in the fourth quarter in the aggregate, due to damage inflicted through both financial and trade channels. Activity in East Asian economies, which have a heavy reliance on manufacturing exports, has fallen sharply, although the downturns in China and India have been somewhat muted, given the lower shares of their export sectors in domestic production and their more resilient domestic demand. Emerging Europe and the Commonwealth of Independent States (CIS: Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Uzbekistan and Ukraine) have also been greatly impacted due to their heavy dependence on external financing as well as on manufacturing exports and (for the CIS) commodity exports. Countries in Africa, Latin America, and the Middle East have suffered from plummeting commodity prices, financial strains and a weak export demand.

Inflation pressures have subsided concurrently with the rapid reduction in global activity. Commodity prices fell sharply from mid-year highs, undercut by the weakening prospects for the emerging economies, which have provided the bulk of demand growth in recent years. At the same time, economic slack has contained wage increases and eroded profit margins. As a result, the twelve month headline inflation fell below 1 percent in the advanced economies during February 2009, although core inflation remained in the 1½–2 percent range, with the notable exception of

Japan. Inflation has also moderated significantly across the emerging economies, although in some cases falling exchange rates have moderated the downward momentum.

Side effects of the financial crisis have included an increased conservatism and rising home bias. Gross global capital flows contracted sharply in the fourth quarter of 2008. In net terms, flows have favored countries with the markets that are most liquid and that have the safest government securities; thus net private flows to emerging and developing economies have almost entirely collapsed. These shifts have affected the world's major currencies. Since September 2008, the euro, U.S. dollar, and yen have appreciated notably. The Chinese renminbi and other currencies reliant on the dollar (including those in the Middle East) have also appreciated in real effective terms. Most other emerging economy currencies have weakened sharply, despite support for them from the use of international reserves.

According to the IMF (2009, p. 2), the dramatic escalation of the financial crisis in September 2008 was caused by the subprime crisis of August 2007. However, this only became catastrophic when the extent of the aggressive borrowing (leveraging) by financial institutions to speculate with these risky ABSs became known, as this threw the solvency and funding of these institutions into question. From this moment on, the situation deteriorated rapidly, and this culminated in September 2008 with the run on large non-banking financial institutions, which were more exposed to this risk. This indicates that two distinctive forces that could have been motivated by moral hazard: the subprime mortgages and the non-banking (or shadow-banking) speculation.

There is also a third force that has contributed to the financial crisis: namely, the complete blindness of the economists to foresee the burst of the housing bubble and the consequences of wild speculation going on in the financial market. However, this is beyond the scope of this paper. Krugman in his articles "School of scoundrels" (2009, August 2) and "How did economists get it so wrong?" (2009, September 5), and *The Economist* in the articles "The other-worldly philosophers" (2009, July 16) and "What

went wrong with economics" (2009, July 16) have identified some of the important reasons for this blindness. The Economist (2009, July 16) has published one of the most dramatic statements on economists of this time:

Robert Lucas, one of the greatest macroeconomists of his generation, and his followers are "making ancient and basic analytical errors all over the place". Harvard's Robert Barro, another towering figure in the discipline, is "making truly boneheaded arguments". The past 30 years of macroeconomics training at American and British universities were a "costly waste of time".

To the uninitiated, economics has always been a dismal science. But all these attacks come from within the guild: from Brad DeLong of the University of California, Berkeley; Paul Krugman of Princeton and the *New York Times*; and Willem Buiter of the London School of Economics (LSE), respectively. The macroeconomic crisis of the past two years is also provoking a crisis of confidence in macroeconomics. In the last of his Lionel Robbins lectures at the LSE on June 10th, Mr Krugman feared that most macroeconomics of the past 30 years was "spectacularly useless at best, and positively harmful at worst".

Moral hazard and subprime mortgages

Most economists agree that the fundamental cause of the financial crisis of 2007-9 was global imbalance (primarily, the huge current-account deficit of the U.S., and China's huge surplus), which promoted the combination of a credit boom and a housing bubble in the U.S. After the dot-com bust of 2001, investors had become cautious and investment spending was weak. Faced with strong external demand for AAA-rated assets, the non-bank financial system used a creative solution. Marginal home loans (the subprime mortgages) were packaged into ostensibly safe securities (*The Economist*, 2009, January 24). These mortgage backed securities (MBS) derived their value from mortgage payments and housing prices, and thereby encouraged investors from all over the world to invest in the safe U.S. housing market. This in turn generated a vast supply of credit that inflated house prices and spurred a boom in residential construction.

The low interest rates, long-term trend of rising housing prices, and easy initial terms of the adjustable-rate mortgages (ARMs) had encouraged borrowers to assume difficult mortgages in the belief they would be able to quickly refinance at more favorable terms. However, the underlying subprime mortgages were 80 percent adjustable-rate mortgages (Dodd, 2007, February 7), and once interest rates began to rise and housing prices started to drop moderately in 2006 and 2007 in many parts of the U.S., refinancing became more difficult. Default and foreclosure activity increased dramatically as easy initial terms expired, home prices failed to increase as anticipated, and interest rates for ARMs were raised. Falling prices also resulted in homes that were worth less than the mortgage loan, and this provided a financial incentive to enter foreclosure. This situation was the main cause of the subprime mortgage crisis that started the first systemic financial failure in 2007.

Krugman (2009, p. 148-151) has outlined reasons for this situation that indicate moral hazard (or in his terms, *Ponzi schemes*) as the cause for the subprime mortgage crisis:

From long experience, we knew that home buyers shouldn't take on mortgages whose payments they couldn't afford, and that they should put enough money down so that they can sustain a moderate drop in home prices and still have positive equity. Low interest rates should have changed the mortgage payments associated with a given amount of borrowing, but not much else. What actually happened, was however a complete abandonment of traditional principles. To some extent this was driven by the irrational exuberance of individual families who saw house prices rising ever higher and decided that they should jump into the market, and not worry about how to make payments. But it was driven to a greater extent by a change in lending practices. Buyers were given loans requiring little or no down payment, and with monthly bills that were well beyond their ability to afford – or at least would be unaffordable once the initial low, teaser interest rate reset...

Why did lenders relax their standards? First, they came to believe in ever-rising home prices. As long as home prices only go up, it doesn't matter much from the lender's point of view whether a

borrower can make his or her payment: if the payment are too high, well, the buyer can either take out a home equity loan to get more cash or, if worst comes to worst, just sell the home and pay the mortgage. Second, the lender didn't concern themselves with the quality of their loans because they didn't hold on to them. Instead, they sold them to investors, who didn't understand what they were buying.

"Securitization" of home mortgages – assembling large pools of mortgages, then selling investors shares in the payment received from borrowers – isn't a new practice. In fact, it was pioneered by Fannie Mae, the government-sponsored lending agency, which dates back to the 1930s. Until the great housing bubble, however, securitization was more or less completely limited to "prime" mortgages: loans to borrowers who could make a substantial down payment and had enough income to meet the mortgage payments... The financial innovation that made securitization of subprime mortgages possible was the collateralized debt obligations, or CDO. A CDO offered shares in the payments from a mortgage pool – but not all shares were created equal. Instead, some shares were "senior", receiving first claim on the payments from mortgagees. Only once these claims were satisfied was money sent to less senior shares. In principle, this was supposed to make the senior shares a very safe investment: even if some mortgages defaulted, how likely was it that enough would default to pose problems for the cash flow to these senior shares? (quite likely, it turned out – but that wasn't understood at the time.) And so the rating agencies were willing to classify senior shares in CDOs as AAA, even if the underlying mortgages were highly dubious. This opened up large-scale financing of subprime lending, because there are many institutional investors, such as pension funds, that won't buy anything except AAA securities but were quite willing to buy AAA-rated assets that yielded significant higher returns than ordinary bonds.

As long as housing prices kept rising, everything looked fine and the Ponzi scheme kept rolling.

This explanation has identified moral hazard, in that the executives of financial institutions responsible for originating loans (mortgages) to borrowers (homeowners) may have been motivated to relax their standards

in conceding these loans. Traditionally, the mortgage model required a financial institution as the originating source for a loan to the borrower (homeowner), and this institution retained the credit (default) risk. With the advent of securitization, the traditional model gave way to the *originate to distribute* model, in which financial institutions essentially sell the mortgages and distribute credit risk to investors through mortgage-backed securities. Securitization meant that those issuing mortgages were no longer required to hold them to maturity. By selling the mortgages to investors, the originating financial institutions (that is, the institutions that issued the mortgages) recuperated their funds, enabling them to issue more mortgages and in doing so generate further transaction fees.

This may have produced moral hazard, as the executives of financial institutions that issue mortgages and the mortgage brokers were increasingly motivated to focus on processing mortgage transactions for fees rather than on ensuring credit quality. If the homeowner (borrower) could not pay the mortgage, and was this was foreclosed, there was little impact for the issuer.

McDonald & Robinson (2009, p. 185) have provided an illustrative account of moral hazard in their conversation with two mortgage salesmen from New Century. New Century was the second-largest subprime mortgage lender, and these salesmen had annual earnings between \$300,000 and \$600,000. Asked if they had considered the possibility of widespread default as a result of the onset of ARM resets, the answer of one of the salesmen was, "Not our concern, pal. Our job is to sell mortgage policy. Period. Right after that it's someone else's problem". When asked whether proof or assets were needed before the mortgage in granted to a borrower, one answered, "Hell, no. They just need to state their income. No docs. That's why we work here".

New Century filed voluntary petitions for relief under Chapter 11 of the United States Bankruptcy Code on August 2, 2007. On March 26, 2009, an unsealed report by the bankruptcy court examiner outlined a number of "significant improper and imprudent practices related to its loan originations, operations, accounting and financial reporting processes", and

accused its auditor KPMG with helping the company to conceal the problems during 2005 and 2006 (New Century, Wikipedia, retrieved September 7, 2009).

Moral hazard and speculation

Speculation is characterized by a rapid increase in the quantity of debt, and an equally rapid decrease in its quality (Bellamy & Magdoff, 2009, p. 96-97). Heavy borrowing is used to purchase financial assets, and is not based on the income streams that they will generate, but on the assumption of increasing prices for these assets. This is what economist Minsky (1982, p. 28-29) has called *Ponzi finance* or hyper-speculation. CDOs with exposure to subprime mortgages were the perfect object for this type of speculation.

The speculation frenzy that caused the housing bubble was generalized; starting from subprime borrowers, mortgage lenders and brokers, it spread to housing developers and real estate speculators. Even homeowners saw the increase in value of their homes as natural and permanent, and took advantage of low interest rates to refinance and withdraw cash value from their homes to increase consumption. The puzzling question is why so many financial institutions took such a large gamble on real estate, thereby placing themselves and the whole financial system at risk. By holding such large amounts of the AAA-rated subprime backed CDOs, these firms added very risky options to the housing market.

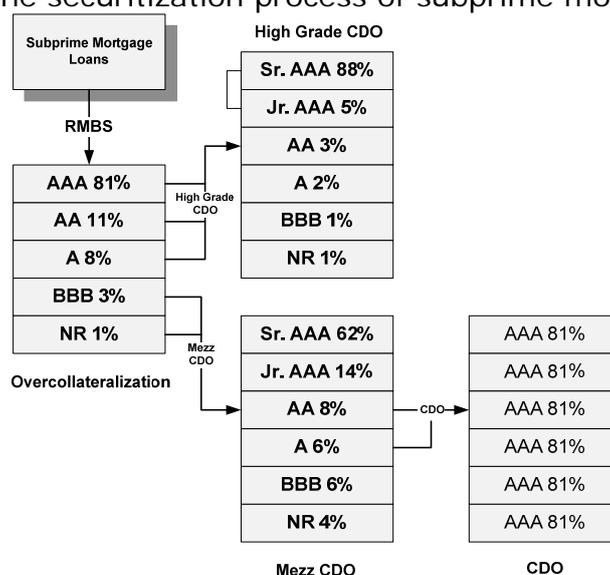
Jaffee et al. (2009, p. 73-74) have presented their conclusions as to why financial institutions engaged in such risky ventures:

We present three possible explanations for why financial firms took the gamble. The first possibility is that there was poor governance within financial firms. The creation of structured product groups, and their meteoric success through the combination of fees and continued premiums from retaining these products, gave these groups a free hand to take big asymmetric bets. The second possibility is that, because many of the firms had an explicit guarantee on their short-term debt (i.e., deposit insurance) and an implicit guarantee from being

to big to fail, their funding cost for these types of risky investments were lower than they would have otherwise been. Thus, the AAA-rated security was the most attractive investment opportunity given (1) their capital and risk constraints and (2) artificially cheap funding sources. The third possibility is that the financial firms did not fully understand the nature of the loans they were securitizing because (1) they didn't fully appreciate how securitization had eroded loan quality, and (2) a lack of transparency about the quality of the loans meant they did not realize their mistake. Consequently, when housing prices started dropping, these institutions did not realize that the value of their MBS positions was declining dramatically and so did not unwind their positions in a timely fashion before the losses got to big.

They have explained further that the type of securitization used for the subprime mortgages made the crisis much worse than it would have been, even with the failures of the financial institutions in September of 2008. The complex performance of the securitization provided such little transparency with the securitized products that the effect of the crisis was substantially amplified. To trace the workings of this complexity, they have outlined how subprime mortgage loans work their way through the structuring process (see Figure 2):

Figure 2. The securitization process of subprime mortgage loans



Source: Adapted from Acharya & Richardson (2009, p. 74)

A portfolio of subprime mortgages is pooled into a residential mortgage-backed security (RMBS). The RMBS has five tranches; the priority of the tranches is based on seniority in terms of allocating default losses, ranging from the most protected tranches (AAA) down to the least protected on (BBB). At each point in the structure, the rating agency would determine the rating based on its assessment of each loan's default probability and, in theory, the correlation across defaults. Note that the top 96 percent of the cash flows go to a high grade CDO, which again is broken into six classes, the top 60 percent of which is the senior AAA tranche. The game was to try to generate as many AAA-rated securities as possible. In this example, the original fraction of AAA-rated securities in the RMBS was 81 percent, while at the end of the securitization process, it was 91.93 percent. Knowing that there is now a significant probability of widespread defaults, the question is whether the market can price or understand the senior and junior tranches of the AAA CDO.

In the heat of this financial crisis, it is difficult for financial markets to operate if there is a lack of transparency. This is due to (1) agents not being able to price these complex CDOs and (2) uncertainty about who is holding them. Without being able to assess the solvency of the financial firms within the system, there is a complete lack of trust and confidence in counterparties, a spike in the overall level of risk aversion, and market wide freezes without any source of liquidity.

The securitization process described and illustrated here seems to have been conceived to fool investors into believing that they were investing in AAA-rated mortgage-backed securities. Because of the lack of transparency in these securities, investors seem to have trusted the rating agencies and the salesmen of the financial institutions. Considering that the executives of the financial institutions that created these CDOs (such as the examples in Figure 2) received millions of dollars in bonuses for their creation, without any consequence to them if these failed, this strongly indicates a moral hazard that was motivated by these bonuses. The rating agencies that qualified the AAA-rated mortgage-backed securities probably did so to

oblige their clients (the financial institutions that that conceived these securities), motivated by the fees they charged these clients, and they will probably have to answer for this in the future (Gilani, 2009, September 12).

CONCLUSION

As shown above, many of the authors and editors of the reputable magazine *The Economist*, mentioned in this paper attribute the systemic financial failures that occurred in the U.S. in August 2007 (the subprime mortgage crisis) and in September 2008 (the shadow-banking crisis) to moral hazard. Certainly all the circumstantial evidence and the extraordinary bonuses paid to the executives responsible for the financial institutions seems to indicate that this is correct. Unfortunately however, there is no academic research providing proof that this is indeed the case. Nevertheless, there is little doubt that these executives were at least were irresponsible in terms of their risky speculations, that they failed in their responsibility toward shareholders, and that they provided unsound guidance to the investors who trusted them. There is also no doubt that the boards of these institutions failed in their fiduciary duty toward the shareholders. For this reason, this paper can conclude that the executives of the financial institutions made excessively risky bets that were possibly, but not certainly, motivated by moral hazard.

A proper epilogue regarding the responsibility for the financial crisis of 2007-9 has been written by Clementi et al. (2009, p. 73-74):

So far, senior management and boards of shipwrecked U.S. financial firms have not publicly accepted responsibility for the disasters on their watch, almost uniformly holding “unpredictable market turmoil” responsible. Perhaps it’s the American tendency to blame the other guy when something bad happens. Perhaps it’s the fear of accountability in a highly litigious society. Who knows? Contrition is not part of the vocabulary. In contrast, Swiss former senior managers of UBS recently acknowledged that they were in fact on the bridge of the ship and have repaid or forgone some \$35 million in compensation accrued during the time the bank struck the iceberg. Perhaps in contrast to small countries like Switzerland, with

powerful social mores and long memories, disgraced U.S. senior managers and board members can count on the camouflage of an impersonal society and short memories.

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