

The Role of Financial Innovations in the Current Global Financial Crisis

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Several macroeconomic missteps such as global imbalance have been blamed for causing the current international financial crisis. Others have also blamed the excessive Wall Street greed for the crisis. While the above factors may have played a supporting role in the financial crisis, they were certainly not the primary causes of the crisis. The root cause of the current international financial crisis is the abuse of various innovative financial techniques and new investment instruments that have been developed. In recent decades, the pace of financial innovations has accelerated precipitously, which in turn has driven the explosive growth in both the size of global financial markets and its array of new financial products and techniques. The current crisis is primarily the direct result of the abuse of some of the latest and most innovative financial techniques, most of which are too esoteric and technical to be comprehended correctly by both government regulators and academic economists. Many crises are usually a byproduct of the cycle of financial innovations.

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I. Introduction

The sign of the current global financial crisis first emerged publicly in the summer of 2007, when two German banks, IKB and SachsenLB,

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that had invested heavily in subprime mortgage-related securities *via* their off-balance sheet vehicles, had to be bailed out by the government in August 2007. Then, the crisis spread to Great Britain the following month, when long queues formed outside Northern Rock, Britain's fifth largest mortgage lender, showcasing the first bank run in the country in 150 years. By early 2008, giant banking institutions in Wall Street and Europe also announced huge write-offs related to the crisis, resulting in the forced takeover by JPMorgan Chase in March 2008 of Bear Stearns, the fifth largest investment bank in the United States.

The crisis has affected not just giant banking and financial institutions in the West. Even small towns such as Narvik in Arctic Norway and some obscure municipalities in Australia lost their precious savings and had to come up with emergency funding to keep their towns in operations. State of Florida discovered that its state investment fund lost almost half of its \$27 billion assets within two weeks and had to temporarily suspend further withdrawals from the fund, and some feared that many Florida counties and municipalities would not have enough cash to pay teachers and trash collectors in coming months. A similar problem was faced by State of Maine, whose investments suffered big losses due to the current crisis. The Indiana Children's Wish Fund, which grants wishes to children with life-threatening illnesses, was affected when some of its fund's investments suffered a heavy loss as well.

The international financial crisis and the resulting credit squeeze has also reached Asian countries such as Korea, where in November, 2007, after almost four months from the outbreak of the crisis in the summer, the drastically tightened credit market forced the Bank of Korea to inject emergency funding into the market and many Korean banks found themselves desperate to obtain necessary funds. The common thread linking Arctic Norwegian towns to the state treasuries of Florida and Maine and stretching from regional banks in Germany and Britain to commercial banks in Korea to the mightiest names on Wall Street in a chain of misery is the current global financial crisis first triggered by the meltdown in the U.S. subprime mortgage market. The unprecedented global financial crisis has then eventually pushed the global economy into the most severe crisis since the Great Depression of the 1930s. Total global losses in the current financial crisis are estimated at \$40 trillion, equivalent to more than two-thirds of last year's world GDP, including the loss of \$35 trillion in publicly traded corporate equities and \$5 trillion in home equity and unincor-

porated or privately listed businesses.¹ According to the IMF, global credit losses are estimated at \$4 trillion, 3/4 of which are borne by banks and the rest by non-bank investors.

II. Major Differences from Previous Financial Crises

During the past several hundred years when financial markets have existed, there have been numerous financial crises, some of which are the stuff of legend, such as the tulip boom-and-bust of 1637 in Holland and the 1720 South Sea bubble. However, it was the 20th century that witnessed the most dazzling array of financial crises like the U.S. financial panic of 1907 and the stock market crash of 1929. The introduction of the Bretton Woods fixed exchange rate system and the establishment of the IMF and the World Bank in the immediate post-World War II era gave rise to a relatively calm period as far as international financial crises were concerned. Only after the breakdown of the Bretton Woods system in the early 1970s have we witnessed the reemergence of international financial crises, such as the oil money crises of 1973 and 1979, the LDC foreign debt crisis of the 1980s, the Mexican peso crisis of 1994, the Asian financial crisis of 1997, the Russian financial crisis of 1998, the Ecuadorian financial crisis of 1999, and the Argentine financial crisis of 2001.

The previous international financial crises during the past 35 years after the breakdown of the Bretton Woods system were mostly triggered in the developing countries, which then spread to the global financial markets eventually. In contrast, the current international financial crisis was triggered in an industrialized country, specifically in the subprime mortgage loan market in the United States. Unlike the earlier crises when the main adverse impact was felt first in developing countries, the current crisis has troubled first the financial institutions both mighty and small and their investors in industrialized countries.

Furthermore, the main causes of earlier crises were macroeconomic in nature, such as runaway budget deficits, chronic current account deficits and excessive government debts including foreign debts, all symptoms of economic mismanagement usually by the governments of developing countries. In contrast, the current crisis was less due to any deliberate macroeconomic mismanagement by the U.S. or other

¹ Alan Greenspan, "Equities Show Us the Way to a Recovery." *The Financial Times*, March 30, 2009.

industrialized country governments but more a result of abusive operational behaviors of numerous financial institutions or other private sector entities. In other words, the current crisis was mainly the direct result of inappropriate or abusive microeconomic behavior by many of the most sophisticated and reputable financial institutions in the Western industrialized countries and their investors. Macroeconomic missteps played only a supporting role in the current financial crisis, as will be discussed later in this paper.

Furthermore, the role of such premier international financial institutions as the IMF and the World Bank has been quite different in the current crisis. In previous international financial crises that were first triggered in developing countries, these international financial institutions, especially the IMF, played a prominent and active role to resolve the crises. For example, the IMF and the World Bank in conjunction with the U.S. Treasury Department were instrumental in developing the so-called Washington Consensus in order to cope with the LDC debt crisis of the 1980s and the Asian financial crisis of 1997. The Consensus was composed of three pillars of fiscal austerity, liberalization and privatization, given the fact that macro-economic mismanagement by the affected developing countries was the main culprit of such crises.

In contrast, both the IMF and the World Bank have played only a minor role in the current crisis. They have been relegated more or less to the status of bystanders, as they are keenly aware that the current crisis is not so much due to any macroeconomic mismanagement of affected countries as the result of abusive market practices of private financial institutions and investor groups in most industrialized countries, especially the United States.

III. Causes of the Current Crisis

Several macroeconomic missteps have been blamed for causing the current global financial crisis. For example, some have argued that the global imbalance has been magnified by the prolonged low savings and high consumption in the United States, resulting in the accumulation of massive foreign exchange reserves in East Asian countries and others. These surpluses were promptly recycled back to the United States, resulting in the excess liquidity and low yields there that in turn encouraged risky investment behaviors among Wall Street bankers.

The U.S. Federal Reserve under Chairman Alan Greenspan has also been blamed for contributing to a prolonged period of excessive liquidity because of its liberal monetary policy in the wake of the 2000-01 tech-stock collapse and the subsequent 9-11 disaster. Also, the root cause of the U.S. subprime mortgage crisis has been traced by some to over-enthusiastic drive by both Democrats and Republicans in the Congress to promote home ownership, even among those low-income households, by forcing American banks to make mortgage loans to poorer neighborhood enacting such laws as the Community Reinvestment Act. Others have also blamed the excessive Wall Street greed for the crisis, ignoring the fact that the free market capitalism has always been operating on the basis of profit motives. Greed in Wall Street or even in Main Street has been there all along, but it has not always triggered a financial crisis.

While the above factors may have played a supporting role in the current global financial crisis, they were certainly not the primary causes of the crisis. The root cause of the current international financial crisis is the abuse of various innovative financial techniques and new investment instruments that have been developed in recent decades. The world financial markets have experienced a sharp acceleration in the pace of financial innovations over the years. Major innovations have emerged in the fields of new financial products, funding and investment tools, and trading and risk management techniques. Both the richness and complexity of these new financial products and techniques bear a testimony to the robust spirit of financial innovation that has pervaded international financial markets since 1960s. While these innovations have improved the market efficiency in general, some of them have been misused and abused by a certain group of market participants out of ignorance and/or outright greed.

The modern history of international finance has really been driven by a series of innovations. Global financial markets have thrived on the wings of the animal spirit of innovations. Financial innovation involves more than development and diversification of new borrowing sources. It affects the entire range of financial intermediation, both domestic and international. In fact, the variety of services offered by financial intermediaries has been not only on the asset side but it has also been equally impressive on the liability side of their balance sheets. Liability management of modern financial institutions has become an important part of their integrated approach to financial intermediation.²

In recent decades, the pace of financial innovations has accelerated precipitously, which in turn has driven the explosive growth in both the size of global financial markets and its array of new financial products and techniques. As of mid 2008, the worldwide outstanding volume of debt securities (cash market instruments) alone stood at \$87 trillion. On the other hand, the total outstanding volume of derivatives such as swaps, futures, options and forwards (in terms of their notional principal amounts) are estimated at \$767 trillion and the daily volume of foreign exchange trades is estimated at close to \$4 trillion. Such a gigantic global financial market, far higher in magnitude than the real sector of the global economy with the world GDP of \$53 trillion in 2007, is run by hordes of global financial institutions, many of which operate around the clock across the entire 24-hour time zones. The old adage of “The sun never sets on the British Empire” is now replaced by a new reality of “The sun never sets on the Citibank or UBS or Goldman Sachs, *etc.*”³

However, a careful observer has to conclude that the current crisis is primarily the direct result of the abuse of some of the latest and most innovative financial techniques, most of which are too esoteric and technical to be comprehended correctly by both government regulators and academic economists. Many crises are a byproduct of the cycle of financial innovations. First, new sophisticated financial products or techniques are developed and utilized exclusively among the few early innovators to a great advantage. At the second stage, as the innovation is copied and spread to a wider circle of market participants, some of the participants start to abuse them either out of ignorance or outright greed. At this stage, regulatory authorities have not caught up with the full implications of the new innovation and there appears a regulatory vacuum as far as the new innovative product or technique is concerned, which tends to embolden the early abusers to push the envelope to an extreme limit. At the next stage, such abusive practices are further copied and imitated by a wider circle of market participants, resulting in a full-blown crisis. At the final stage, both government authorities and general market practitioners start to take corrective actions, including introduction of new regulations and new supervisory

² Esteban Buljevich and Yoon S. Park, “Project Financing and the International Financial Markets.” Kluwer Academic Publishers, Boston, 1999, pp. 1-18.

³ In fact, the advertising slogan of Citibank, “Citi never sleeps!” is quite an accurate description of today’s global financial institutions.

tools. By this time, however, the damage has already been done to a significant sector of the economy.

IV. Role of Securitization in the Current Crisis

Financial innovations enhanced not only the size and complexity of global financial markets but they also have contributed to new ways to enhance income for market participants. The seed of the current crisis was planted several decades ago when Government National Mortgage Association (GNMA, known as Ginnie Mae) in the United States pioneered in 1970 securitization of mortgage loans, by bundling hundreds and thousands of long-term mortgage loans into marketable bonds known as mortgage-backed securities, or MBS. MBSs are so-called pass-through securities, which are new types of bonds whose investors retain ownership interest in the collateralized assets, which in this case are home mortgage loans. The emergence of the MBS market injected new liquidity in the entire mortgage loan industry, as many mortgage lenders were able to sell their long-term mortgage loans to Ginnie Mae and other Wall Street firms that specialize in pooling and securitizing these mortgage loans. In the process, the original mortgage loan lenders could then make more new mortgage loans with the fresh cash that they obtained by selling the earlier mortgage loans to Ginnie Mae and Wall Street bundlers.

Mortgage loan securitization was given an added impetus when, in 1983, Federal National Mortgage Association (FMNA, known as Fannie Mae) came up with the first collateralized mortgage obligations (CMOs). Unlike MBS, CMOs are so-called pay-through securities where the investors of these securities do not have any ownership interest in the mortgage loan collaterals but their new securities (CMOs) are serviced by the cash flows generated by the collateral assets. In other words, while pass-through securities such as MBS are certificates of ownership in the collateralized assets such as mortgage loans, pay-through securities like CMOs are simply collateralized debt obligations whose debt service is provided by the cash flows generated by the collateral pool. The added advantage of new securities such as MBS and CMOs lies in the fact that they can be issued in different tranches categorized by the degrees of risk exposure, with the safest tranche usually accorded the highest credit rating of triple-A and the lowest tranche, known as the “toxic materials,” normally un-rated due to its high

credit risk but carrying high yields.

Securitization soon spread from home mortgage loans to other financial assets such as commercial mortgage loans, auto loans, credit card receivables, equipment leases, home equity loans, manufacturing loans, student loans and others. By early 2007, 53% of all non-financial debt in the United States was securitized, compared to only 28% in 1980. By the end of 2006, the outstanding volume of securitized instruments in the U.S. alone reached over \$9 trillion, composed of \$7 trillion in MBS and CMOs and \$2.1 trillion in other asset-backed securities (ABS). The widespread practice of securitization has enriched the financial markets all over the world, allowing a number of homeowners and other market participants a greater access to lower-cost credits that would otherwise have been unavailable. Securitization provides a “secondary” market for traditional illiquid bank loans and other financial assets, thereby pushing down borrowing costs for consumers and companies alike. That is why securitization was called “democratization of capital” by Michael Milken, of the junk-bond fame at the ill-fated Wall Street firm Drexel Burnham that went bankrupt in 1990. There have been other systemic gains as well. Subjecting bank loans and other debt to valuation by capital markets encourages the efficient use of capital, and the broad distribution of credit risk through securitization reduces the risk of only few creditors shouldering all the credit risk.

While securitization all over the world has in general made a positive contribution to the global financial markets, it has also implanted a seed of abuse and misuse. The concept of MBS and CMOs has provided major market players such as Wall Street firms and credit rating agencies a great opportunity to increase fee income by bundling all kinds of debt instruments into various tranches of securities, some of whose upper tranches can carry prime credit ratings to satisfy the investment requirements of many institutional investors such as pension funds and insurance companies, while the lower-rated tranches carrying higher yields prove attractive to such risk takers as hedge funds and other specialized investors.

V. Abuse and Misuse of Innovations: Subprime Mortgages, CDOs, Conduits, SIVs, ABCP

Securitization has become a major source of fee income for those

institutions related to its business, such as loan originators (mortgage lenders and mortgage brokers), Wall Street firms acting as underwriters and placement agents for newly created securities, large commercial banks and insurance companies acting as credit enhancers for the securitized instruments, credit rating agencies with more ratings business, and investors eager to pick up additional yields by obtaining exotic new securities. In order to satisfy the growing demand for new mortgage loans that have become the most crucial raw materials (*i.e.*, collaterals) for the securitization process, originators of mortgage loans became bolder and more risk-taking by expanding subprime mortgage loans. The subprime market in the United States barely existed ten years ago, but it exploded during the three years of 2004-06, growing from 6.9% of all residential mortgage loans in 2002 and 7.9% in 2003 to 18.2% in 2004, 20% in 2005 and 20.6% in 2006. Originally subprime loans were either for refinances or debt consolidation, with fewer than 5% used for actually buying homes. The role of subprime loans in securitization also increased sharply from 9% of newly originated securitized mortgages in 2001 to 40% in 2006.⁴

Six years ago, home purchase loans accounted for only one-third of all subprime originations. During the past several years, however, subprime lenders relaxed underwriting standards and offered home mortgages with almost no down payment, little or no documented evidence of the borrower's ability to pay, adjustable-rate mortgages with built-in large increases in the monthly payment after initial few years, *etc.* Some of them are called *ninja* (no income, no job and no assets) loans. Then, these subprime mortgage loans were sold quickly by the loan originators to Wall Street firms eager for any raw materials as collaterals for securitization. When several state governments in the United States tried to enact laws limiting abusive practices in mortgage lending during the housing boom, the subprime industry engaged in aggressive lobbying to sabotage any such efforts. For example, Ameriquest Mortgage Company, one of the nation's largest subprime lenders until 2007, handed out more than \$20 million in political donations and played a major role in persuading the states of New Jersey and Georgia to relax tough new laws.⁵

⁴ Danielle DiMartino and John Duca, "The Rise and Fall of Subprime Mortgages." Economic Letter, Federal Reserve Bank of Dallas, November 2007.

⁵ The Wall Street Journal, "Lender Lobbying Blitz Abetted Mortgage Mess." December 31, 2007a.

While mortgage loans have been the traditional raw materials (*i.e.*, collaterals) for MBS and CMOs, the securitization industry, ever hungry for more business, launched in late 1990s collateralized debt obligations (CDOs) whose collaterals are not just new mortgage loans but also already existing MBS, CMOs, ABS backed by mobile home loans, car loans, airplane leases and credit card receivables, as well as other CDOs and even derivatives linked to these mortgage securities known as credit default swaps or CDS. The main advantage of such CDOs over conventional MBS or CMOs is that they do not need a supply of new mortgage loans, since their raw materials (collaterals) need not be confined to new mortgage loans as in the case of MBS and CMOs. Thus, the banking industry was able to create a brand new category of securities in the form of CDOs utilizing as collaterals existing securitized instruments or even derivatives linked to them, while in the process making huge sums of additional fee income. Investment banks underwriting CDOs earned typical fees of 2.5% to 3.5%, implying as much as \$35 million income for a typical \$1 billion CDO issue. For example, Merrill Lynch launched almost \$150 billion worth of CDOs during the four-year period of 2004-07, earning over \$5 billion in fee income.

Rating agencies such as Moody's and Standard & Poor's were unseemly accommodating in rating of these CDOs. For example, a \$1.5 billion CDO issue called Norma was marketed by Merrill Lynch in March 2007, whose collateral was composed of other securities and derivatives with average BBB ratings. But 75% of Norma CDOs was rated the highest triple-A by all three rating agencies of Moody's, Standard & Poor's and Fitch Ratings and all but the bottom 11% out of \$1.5 billion was rated A or above. Norma's generous rating, typical of other CDOs issued in their heyday, resulted from a risk management model looking backward only to a time period when rising house prices and easy credit had kept defaults on subprime mortgage loans unusually low, and even though Fitch cited growing concern about the subprime mortgage business and the high number of borrowers who obtained loans without proof of income. Barely eight months after Norma's launch, however, all the Norma CDOs were downgraded in November 2007 to well below the junk bond level at single-B or below. In late 2007 and early 2008 when the credit market crisis has deepened, rating agencies have downgraded hundreds of CDOs and other securitized instruments in their belated recognition of the inherent risks of such securities.

TABLE 1
 ACTUAL BOND MARKET YIELDS AT THE TIME OF NORMA CDO ISSUE

Bond Category	Market Yield	Difference from 6.5%	Difference in Dollars
AAA bonds (75%)	5.30%	1.20%	\$13.50 million
AA bonds (9%)	5.66	0.84	1.14
A bonds (5%)	5.84	0.66	0.49
BBB bonds (7.7%)	6.27	0.23	0.26
Unrated bonds (3.3%)			
Total additional interest income			\$15.39 million

CDOs were also highly lucrative to investors, since CDOs offered comparatively high returns. For example, when Norma CDOs were issued in March 2007, their yields were much higher than comparably rated corporate bonds. Such a yield enhancement was made possible through the magic combination of “tranching” and ratings inflation. We can illustrate this magic with the example of Norma CDOs, which were created with the collaterals carrying average triple-B credit ratings and average yields of 6.5%, which was already higher than the comparable triple-B corporate bond yield of 6.27% at that time due to tranching of the collateral securities. Out of \$1.5 billion Norma CDOs, the lowest tranche of 3.3% (\$50 million) was un-rated and the next lowest tranche of 7.7% (\$115 million) was rated triple-B, the same credit rating as carried by the entire \$1.5 billion collaterals. The remaining tranches were all assigned credit ratings higher than triple-B. The highest tranche of triple-A accounted for 75% (\$1,125 million) and the remaining 14% tranche (\$210 million) was rated either double-A or single-A. This meant that 89% of the Norma CDOs were assigned credit ratings higher than the triple-B, even though their raw materials (collaterals) carried only the triple-B ratings.

Since those upper-tranche CDOs (accounting for 89% of the entire Norma CDOs), which were assigned ratings higher than triple-B, would be carrying a yield much lower than 6.5% generated by the entire \$1.5 billion collaterals due to their credit ratings higher than triple-B, as a result those investors in all categories of Norma CDO tranches could then be offered a yield much higher than comparably-rated corporate bonds by distributing the excess returns made possible by the ratings inflation, as the above Table 1 illustrates.

This surplus interest income of \$15.39 million per year could be distributed among all tranches of Norma CDOs. Let us assume that the unrated Norma CDOs (3.3% of the total Norma CDOs or \$50 million) would be paid generous 15% (\$7.5 million). The remaining \$7.9 million could then be distributed among all other Norma CDOs, which would result in an extra yield of 0.54% over the comparably rated corporate bonds.

This is the magic of tranching in the creation of CDOs, and this magic has been made possible by the ratings inflation that somehow converted the average triple-B collaterals into mostly (89%) triple-A and other higher-rated CDOs. Such magic is equivalent to converting instantly a class of 100 students with average B grades into a new class of 89 students with A+ or A grades, with only 8 students with B grades and 3 students with C grades. In a sense, CDOs have turned into a modern version of Middle Age alchemy that tried to turn lead into gold. However, just like the Middle Age alchemists who in the end failed to convert lead into gold, the modern Wall Street alchemists also saw their supposed new gold (triple-A rated CDOs created out of triple-B rated collaterals) being down-graded to junk bond quality or worse in a couple of years, if not in months.

The rationale for such ratings inflation by the ratings agencies is the following: since the historical average default rate of long-term bonds carrying triple-B is below 1.25%, setting aside 3.3% of the entire tranche as un-rated would more than adequately satisfy any probable default risks inherent in the triple-B rated collaterals. Furthermore, the next-lowest tranche of 7.7% of Norma CDOs with triple-B rating could fully and adequately safeguard complete debt servicing of the remaining tranches of 89%, so the upper tranches beyond the triple-B tranche of 7.7% would deserve triple-A and other higher credit ratings. Financial innovations can indeed be sweet for those practitioners. As a result, the volume of CDOs expanded explosively over the ten-year period of 1997-2006 from \$300 billion to almost \$2 trillion.⁶

In their heydays, CDOs were the investment of choice for numerous asset managers and investors, since they carried both sterling credit ratings and excellent yields much higher than comparably rated corporate bonds. During the period after the 9/11 of the relatively low

⁶ Anthony Sanders, "CDO Market Implosion and the Pricing of Subprime Mortgage-Backed Securities." a draft paper presented at a George Washington University Finance Seminar, February 2009.

interest rate and excess liquidity, there appeared intense competition globally for extra yield. Higher investment returns led to more success for the investment managers around the world. In 2006, for example, a Credit Suisse money market fund achieved an investment yield just 31 basis points (0.31%) higher than the industry average. As a result, the fund size increased 26 folds from \$1 billion to \$26 billion in just six months! Therefore, it is not surprising that asset managers were eager to search out those securities of high credit ratings and high yields, which were rare combinations indeed but were available “luckily” in the form of CDOs. They were the perfect investments of choice among asset managers hungry for higher yields to stay competitive. CDOs were eagerly bought by the investors around the world, such as pension funds, mutual funds, hedge funds, commercial and investment banks, including some of the largest and most sophisticated financial institutions. Citibank, UBS, Hongkong Shanghai Bank, Royal Bank of Scotland and BOA were some of the major investors of CDOs. Many of CDO underwriters such as Merrill Lynch, Morgan Stanley, Bear Stearns, and Lehman Brothers also bought into higher-tranche CDOs for their own portfolios, since CDOs carried excellent credit ratings and at the same time provided the yields higher than comparably rated corporate bonds.

Credit ratings are a public good, and many institutional investors such as pension funds and insurance companies are limited to investing in only those securities rated double-A or above. Thus, the seal of approval by rating agencies is an important signal to the financial market participants. Nevertheless, the credit rating environment for securitized instruments such as MBS, CMOs, and CDOs (known as “structured finance products”) has been fecund with conflicts of interest for rating agencies. The securitization mania is based on obtaining satisfactory ratings, and credit rating agencies were usually consulted by Wall Street underwriting firms, before the issuance of the securities, on how to structure the deal in order to obtain satisfactory ratings in the first place. Rating agencies are also paid after the securities are successfully issued. Thus, almost an incestual relationship emerged between major Wall Street investment banks and credit rating agencies. Such partnership has also been very lucrative to rating agencies. For example, Moody’s net income more than doubled from \$289 million in 2003 to \$754 million in 2006 as securitization expanded rapidly.

Such high returns on CDOs triggered further risky ventures in the

form of conduits and structured investment vehicles (SIVs). Large commercial banks set up conduits as separate legal entities, which then issued short-term commercial paper backed by such collaterals as auto loans and leases, equipment leases, corporate loans, and eventually mortgage loans or MBS or CMOs. The cost of issuing short-term assets-backed commercial paper (ABCP) is very low due to its short-term maturity, and conduits in turn invested the low-cost funds thus raised in the higher-yielding long-term MBS or CMOs and later even more lucrative CDOs. Conduits were “off balance-sheet vehicles” that allowed the sponsoring banks to be exposed to complex and lucrative bonds without requiring them to hold capital reserves against these assets as these assets belonged technically and legally to conduits which are separate legal entities. At their peak, the combined assets of conduits stood at \$1.4 trillion in the middle of 2007.

Then, large banks went a step further by setting up SIVs. Unlike conduits that have full credit back-up facilities from the sponsoring banks, SIVs do not always have to carry a full credit backup from the sponsoring banks. Some SIVs have some partial backup facilities from sponsoring banks known as “liquidity puts” and some do not. But just like conduits, SIV assets would stay off the sponsoring bank’s balance sheet and the sponsor bank would profit by collecting fees managing the SIV. From the late 1980s when the first SIV was launched by Citigroup, a number of SIVs have been created by banking giants such as Citigroup and HSBC as well as by some less well-known banks such as Germany’s IKB and SachsenLB that were mentioned earlier, and their combined total assets stood at \$400 billion as of summer 2007, when they peaked. Of this amount, almost one quarter of SIV assets belonged to those affiliated with Citigroup. There were even some SIV-lites that specialized in a high degree of leverage by borrowing up to 40 to 70 times their equity and then investing the funds in highly lucrative but risky subprime CDOs.

Until the summer of 2007, both conduits and SIVs relied heavily on the ABCP market, whose outstanding volume peaked at \$1.2 trillion. However, as the U.S. subprime sector started to crumble, investors shied away from ABCP, thus triggering funding scares among conduits and SIVs. If they could not renew their maturing ABCP, they would be forced to dump their assets composed mostly of CDOs and other high-risk securities whose secondary market was disappearing fast. With the blessing of the U.S. Treasury, therefore, large banks led by Citigroup, Bank of America and JP Morgan Chase tried to sep up a Super SIV in

late 2007 in order to purchase assets from distressed SIVs and conduits for the purpose of preventing massive dumping of assets by SIVs in the secondary market. But other banks were reluctant to join in the desperate rescue efforts and the Super SIV idea was finally abandoned. Instead, many sponsoring banks have started to bail out their affiliate SIVs by directly taking over their assets onto their own balance sheets or by extending full credit backing to them, thus effectively forcing the sponsor banks to move these assets on the book instead of hiding them off the book. Such market-based solution was the right though painful way to go, since the sponsor banks had to own up to their moral and reputational obligation to their affiliate conduits and SIVs.

VI. Two Phases of the Current Financial Crisis

The current financial crisis first emerged in mid 2007 as the subprime mortgage crisis, as the U.S. housing bubble burst in early 2007, resulting in sharp decline in the market value of various securities such as MBS, CMOs, and CDOs. This first phase also witnessed the bailout of some of the financial institutions heavily exposed to these investments, such as IKB, SachsenLB, Northern Rock, and Bear Stearns. This first phase of the crisis climaxed with the government bailout of the two premier U.S. mortgage finance institutions, Fannie Mae and Freddie Mac, on September 7, 2008. These two government-sponsored enterprises (GSEs) were actually private companies but they were originally established with the sponsorship of the U.S. Congress to promote housing finance in America. As GSEs, their debt securities enjoyed the highest credit ratings as the market always assumed that the government would not let them fail. Apart from their unique status as GSEs, they were considered just too big to fail with total assets of almost \$1 trillion each. Therefore, when the government finally bailed them out in mid September 2008, the global financial market was not surprised.

However, there were loud public and political outrages at the government bailing out these powerful and historically profitable private companies with taxpayers' money. Along with the March 2008 bailout of Bear Stearns through the government-arranged merger with JPMorgan Chase at the potential government liability of about \$30 billion, the public criticism of the government bailing out "rich greedy Wall Street

firms” stung the Bush administration. Thus, a week later on September 15, 2008, when Lehman Brothers needed a bailout, the Bush administration decided not to bail it out and instead let it go bankrupt. Lehman Brothers, with \$700 billion total assets and \$740 billion in outstanding derivative contracts with over 5,000 counterparties around the world, was the fourth largest investment bank in America. Until that time, it had been widely assumed in the financial market that any U.S. financial institution belonging in the top ten would be considered so-called TBTF (too-big-to-fail) banks. For example, in 1984 Continental Illinois Bank was the 7th largest bank in the United States with \$45 billion total assets and the government decided to bail it out at that time.

At the time of its bankruptcy, Lehman Brothers was the fourth largest investment bank with total assets more than 15 times that of Continental Illinois, not to speak of its even bigger volume of outstanding derivatives contracts. When the Bush administration blinked and let Lehman fail on September 15, 2008, all bets were off in the global financial markets, which immediately fell into a total chaos triggering the second and far more serious phase of the current global financial crisis. While the first phase of the crisis mainly involved mortgage-related securities such as CDOs and associated institutions like SIVs and conduits and their sponsor banks, the second phase engulfed the entire range of global financial markets. With the hallowed TBTF principle abandoned with the bankruptcy of Lehman, all financial institutions both big and small became a fair game for bear attacks. Thus, on the same day of Lehman bankruptcy, Merrill Lynch was so weakened to seek an emergency merger with Bank of America. The following day, on September 16, the triple-A rated premier U.S. insurance firm AIG also had to be bailed out. Barely a week later, two remaining Wall Street giants, Goldman Sachs and Morgan Stanley, could not stand the concerted bear attacks and had to become bank holding companies, thus ending the 75-year history of U.S. mono-line investment banks in Wall Street.

The Lehman bankruptcy also resulted in the wholesale freeze of the entire global financial markets. The heart of these markets, the Eurocurrency interbank market, immediately got frozen, with the 3-month Eurodollar LIBOR (London inter-bank offered rate) shooting up from 2.2% to almost 5% in a matter of days, practically stopping any inter-bank borrowing. Both the \$3.5 trillion money market fund (MMF) market and the \$1.3 trillion commercial paper market in the United

States got totally frozen, preventing companies from accessing these crucial short-term funding sources. The government had to rush to their rescue by both blanket guarantees of money market funds in order to stem wholesale fund withdrawals from MMFs, and the Federal Reserve decided on directly purchasing commercial paper.

The most important damage was done to the \$58 trillion CDS (credit default swaps) market. CDS contracts were originally developed to provide credit institutions and investors the hedging tool against their credit risks. For example, if BOA provides \$100 million 5-year loan to Lehman Brothers, it can hedge against the Lehman's potential loan default by purchasing 5-year \$100 million CDS on the Lehman credit risk from, say, AIG at the price of 150 basis points. BOA then pays AIG each year \$1.5 million (150 basis points on \$100 million), but if Lehman Brothers either defaults on its \$100 million loan or goes bankrupt, BOA can collect \$100 million from AIG, who is the seller of CDS in this case. Later, however, this useful financial innovation for credit risk hedging has turned into speculative tools, as many speculators such as hedge funds bought Lehman CDS even without any credit exposure to Lehman Brothers in the first place. Bear attacks on Lehman can take place if enough speculators started to buy Lehman CDS, driving its price from 150 basis points initially to 300 to 500 or 700 points, making it extremely difficult or even impossible for Lehman to get credits from the market, forcing it into bankruptcy. Even if Lehman does not go into bankruptcy, early purchaser of Lehman CDS at 150 basis points can generate huge profits as Lehman CDS price goes up from 150 basis points to 500 or 700 points. As a massive seller of CDS to the tune of \$500 billion, AIG was especially hurt by its excessive exposure to CDS, which provides an asymmetrical risk-reward outcome. Sellers of CDS contracts such as AIG are exposed to unlimited risk on the downside while guaranteed only limited reward on the upside. On the other hand, the risk-reward profile for the buyers of CDS such as hedge funds and investors in CDOs is the opposite. AIG mispriced its potential risk exposure in a financial crisis, and both speculators and counterparties pushed it on the verge of bankruptcy on September 16, 2008.

The adverse impact of the global financial crisis has now spread to the main street, pushing the global economy into a severe recession. Immediately after the Lehman bankruptcy, the U.S. had to adopt a financial bailout package of \$700 billion, known as TARP (Troubled Assets Relief Program), and the governments around the world had to

come up with ambitious economic stimulus packages, including the new Obama administration adopting extra \$787 billion fiscal stimulus package.

VII. Government Responses

The current financial market crisis was triggered by the abuse and misuse of financial innovations in the environment of greed and ignorance. Regulatory authorities were kept in the dark for a long time as the market abuse utilized newest financial techniques and instruments whose implications were not clear to outside observers including regulatory authorities, thus creating a regulatory vacuum. When the first signs of crisis emerged with long queues of depositors forming in front of Northern Rock offices and with abrupt cutoff of credit lines to affected banks such as IKB and SachsenLB, the immediate response by governments was to make emergency credit lines available to the affected banks.

As the crisis has spread to the all-important interbank market where the short-term interbank rates stayed unusually high indicating a near-panic credit crunch, central banks around the world have aggressively injected funds into the banking system. The European Central Bank (ECB) has been especially active, injecting hundreds of billion of dollars into the interbank market in mid December, 2007, alone. The U.S. Federal Reserve also adopted innovative new techniques to supply massive amounts of funds to the banking system and the credit markets *via* direct purchase of commercial paper and mortgage-backed securities as well as Treasury bonds. Central banks around the world also drastically lowered the base rates to help out in the credit crisis.

For the longer-term horizon, regulatory authorities have embarked upon much-needed corrective actions. For example, the Federal Reserve has made proposals for new regulations on abusive and deceptive mortgage lending that has precipitated the subprime mortgage crisis. The proposed reforms fall into three groups. First group is targeted at controlling abusive practices in subprime mortgage loans. Second group of reforms aims to make the fees and commissions attached to subprime mortgages fairer and more transparent. The third group deals with the advertising of subprime mortgages.

There is also an increasing demand to tighten regulations and

supervision of credit rating agencies. The State of Connecticut issued subpoenas to the three major credit rating agencies as part of its antitrust investigation. Some experts are advocating separation of rating and advising functions of rating agencies, echoing a similar movement to separate auditing and consulting services of major CPA firms in the aftermath of the Enron bankruptcy. There seems to be an emerging consensus on the need to devise a way to control the obvious conflicts of interest that have manifested themselves in the behavior of major rating agencies during the recent securitization frenzy.

Some of the abusive practices by major financial institutions are also under scrutiny. The U.S. Securities and Exchange Commission (SEC) has launched enquiry into how financial firms including hedge funds and Wall Street investment banks have been pricing their mortgage-related and other securitized instruments. Specifically, SEC would like to examine whether financial firms should have told investors earlier about the declining value of mortgage securities they held and managed and how they priced them on their books. Certainly, a more transparent investment behavior and pricing practices are called for in order to protect market participants in such securities.

VIII. Implications for Global Financial Markets

It has been noted that the current global financial crisis is different from other previous crises that have affected the international financial system during past several decades. The recent abusive behavior of many financial institutions is not only the result of greed and ignorance but also due to the excess liquidity in the world financial markets and the intense competition to enhance the investment returns. In a world of low yield due to the excess liquidity in global search of higher returns, investment managers have been subject to intense pressure to obtain higher yields just to stay competitive. In such an environment, a difference of dozen basis points (one hundredth of one percent) in investment returns can make a world of difference for the investment managers.

As mentioned earlier, a Credit Suisse money market fund was able to achieve in 2006 an investment return on its fund of just 31 basis points higher than the industry average. As a result, the size of the fund ballooned from \$1 billion at the start of 2007 to \$26 billion by July 2007. As the fund investment yield dipped a little during the

following six months, however, the size of the fund was then reduced to \$10 billion. In such a roller-coaster environment of international investment management, many financial institutions are willing to take advantage of latest innovative techniques to improve their investment performance.

It is no wonder then that both bank conduits and SIVs were able to market their ABCP to the tune of \$1.2 trillion at its peak, because there were so many money market fund managers eager to purchase such paper as long as they pay ten or fifteen basis points higher than comparable securities. The global financial markets have also created a “shadow banking system” apart from the traditional banking system which binds banks and clients on an ongoing basis, with the banks retaining the client credit risk on their books. In recent decades, however, banks have been turned into loan originators, shoveling the loans out immediately to other loan packagers and securities underwriters. Traditional relationship banking between banks and clients is replaced by transactional banking where banks are eager to generate as many transactions as possible so that they can off-load them to securitization packagers and underwriters.

Some have characterized this transactional banking as “vehicular finance” under which banks pass on their loans to new vehicles such as conduits and SIVs which then bundle them and dissect them into diverse tranches to be sold to investors all over the world, ranging from the towns in the Arctic Norway to the municipalities in the backcountry of Australia. It is a challenge now facing both regulators and market participants how a proper balance can be restored between modern finance of globalized innovations and prudent financial risk management.

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The current financial crisis started in the US housing market in 2007. The crisis spread across the world and severely damaged the economies of many countries, including the US, and reached a new level in September 2008 as a number of prominent US-based financial institutions, including AIG and Lehman Brothers, collapsed. This Research Paper first examines the underlying causes of the crisis in the US. In particular, it examines the emergence and collapse of the housing bubble and the significance of the complex financial instruments that transformed an asset price correction into a significant The financial crisis of 2007–2008, also known as the global financial crisis (GFC), was a severe worldwide financial crisis. Excessive risk-taking by banks combined with a downturn in the subprime lending market in the United States culminated with the bankruptcy of Lehman Brothers on September 15, 2008 and an international banking crisis. The crisis sparked the Great Recession, a global recession, which, until the coronavirus recession, was the most severe recession since the Great Depression. It was In the current financial crisis, the contagion spread and was exacerbated via market channels. The globalization of the financial markets can lead to greater diversification, but it also increases the likelihood of domino-effect contagion between entities and contagion due to information difficulties. The result was the collapse of the asset-backed commercial-paper market (via securitizations) and of the interbank market. Innovations that enhance markets, providing financial instruments that offer new possibilities of diversification and risk coverage (such as options and futures), and help them overcome problems of asymmetric information (the typical debt contract, for example) are beneficial.