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Behaviors of market participants, financial innovations, moral hazard, and subprime mortgage crisis

Abstract

Declining housing price, moral hazard committed by lenders and borrowers, mortgage brokers, underwriters, appraisers, and rating agencies, financial innovations and securitization, and extremely low interest rates, greed and fear, overconfidence and shortsightedness of bank executives, laxity of oversights from regulators, opaqueness of derivative securities trading, and excessive leverage by leading financial institutions are the major causes of the current subprime mortgage and financial crises. The regulatory reforms currently under consideration if passed adequately may help preserve the essence of free markets and triumphant capitalism. The principal purpose of this study is to examine and analyze all these factors in some coordinated ways so that the subprime mortgage crisis can be better understood.

Keywords: subprime mortgages, regulatory oversight and reforms, predatory lending and borrowing, financial innovations, financial crisis, collateralized debt obligations, credit default swaps, overconfidence, greed and fear, and moral hazard.

JEL Classification: G1, G2.

Introduction

To some extent the current financial crisis is similar to the savings and loans crisis we experienced in the mid- and late 1980s, but the current one is much more serious. This crisis is caused by the low interest rate environment, a series of deregulations since 1980, explosive growth of subprime (including Alt-A) mortgages and derivative securities backed by mortgages, lack of proper oversight from regulators, low lending and underwriting standards, high leverage of mortgage loans, executives at various financial institutions becoming too aggressive, too optimistic, too careless, and in many cases ignorant, fraudulent and deceitful (White, 1991). This is similar to his studies of the saving and loans debacle in the middle and late 1980s. The critical differences lie in the fact that in the 1980s crisis subprime mortgages were negligible, collateral credit obligations (CDOs) supported by subprime mortgages were virtually nonexistent, credit default swaps (CDSs) were not yet innovated, and information technology and globalization of financial institutions and markets were not as advanced and widespread. In addition, in recent years the savings by Americans have been so meager while they have unsatiated taste to borrow from foreigners and by refinancing their mortgages with unrealistic expectations of ever rising housing prices. The predatory lending and borrowings were not a problem and the Glass-Steagall Act was not yet repealed. These key differences contributed to the current financial and economic crises, so severe and so widespread across nations.

If the economy and employment could have continued to grow, the interest rate could have stayed unusually low, the housing price could have kept ris-

ing or stabilizing, the borrowers, the mortgage originators, the mortgage brokers, the underwriters, the lenders, the issuers of mortgages and mortgage-back securities, the rating agencies, and investors could have followed the prudent standards and practices or better risk management, and regulators could have enforced the regulations and had proper oversight, there would not be any subprime mortgage problems and the resulting financial crisis. Unfortunately, in a free capitalistic economic and financial system when market participants have greed and fear (Shefrin, 2000) and were driven by animal spirit (Akerlof and Shiller, 2009) the markets tend to swing from one extreme to the other, and the system will go wrong from time to time. What turns the subprime mortgage problem into full-fledge crisis is the fact that all the things just mentioned did go wrong at the same time, and the market participants, especially major financial institutions and policy makers, were too slow to realize and counteract the severity of the problem and potential damage to the U.S. financial system and economy as well as the global economy.

In 2007 national housing price declined the very first time since the Great Depression. According to Golding, Green and McManus (2008), economists consider financial innovations such as subprime (including Alt-A) mortgages will improve the well-beings of the general populace, but they and policy makers had overlooked market failures until the failures are too obvious and too severe to ignore. Current subprime mortgage crisis is due partly to asymmetric information and agency problems. "The asymmetric information problems flow between borrowers and brokers, aggregators and rating agencies, and investors and issuers." Increasing competition in the subprime mortgage markets has aggravated the problems. Agency problems result from

the fact that subprime borrowers are highly heterogeneous and brokers may not work for the best interest of the borrowers.

Socially speaking, increase in home ownership is desirable if the goal is achieved in proper ways such as raising the amount of income qualified for tax exemption and encouraging people to save by lowering tax rates, providing more affordable housing, making mortgages more affordable by lowering mortgage rates, and setting suitable amount of interest and dividend free from federal and state income taxes to encourage savings. All these measures will cost the government and society far less than the potential or actual cost as we are experiencing now. Government policy and financial institutions may be redesigned and restructured to make owning houses more affordable. Improvement in education and employment compensation system will also be helpful in the long run. Making people realize that they can own houses only if they can afford to is of critical importance.

The home ownership in the U.S. increased very rapidly during the immediate postwar period until 1950s from about 45% to 65%, and it stayed that way until the middle of the 1990s. During that long period of time mortgages were overwhelmingly prime. There were relatively small fluctuations in housing prices over several housing cycles, but there was no housing crisis. According to Gramlich (2007), home ownership rate increased from 64% in 1994 to 69% in 2005 with significant rise in subprime mortgages which accounted for less than 5% of new origination in 1994 to about 20% in 2005. In terms of total mortgage stock, subprime mortgages were negligible in 1994 but accounted for 7% in 2005. Gramlich (2007) attributed the rapid development of subprime mortgages to the following factors:

1. Usury laws were eliminated in the Depository Institutions Deregulation and Monetary Control Act of 1980. The usury laws barred mortgages beyond certain rates from being made and effectively closed the door to lower income borrowers. Gradually the lenders learn how to profit from making subprime loans which can easily be securitized and passed the risk to investors.
2. Newly developed technology allows the lenders or originators to apply the automated techniques to quickly process and approve credit applications by using credit scores without checking on borrower's actual income and ability to pay.
3. Securitization of subprime mortgages by large Wall Street firms without proper and careful lender supervision. Although Fannie Mae and Freddie Mac introduced mortgage securitization

in the 1970s, they were securitizing only the prime mortgages.

4. The Community Reinvestment Act (CRA) of 1977 requires banks and thrifts to plow back funds to low- and moderate-income borrowers in their business areas. The impact of CRA on the recent subprime crisis appears to be negligible since it has been there for 30 years without causing any problem in the early years.
5. The rapid increase in independent mortgage brokers was astounding. In 1987 they accounted for about 7,000 and the number increased to 53,000 in 2004. They are state-chartered and not subject to federal supervision. They have little incentives to get borrowers the best deal or to check if borrowers are able to make mortgage payments. The more subprime mortgages they originate, the more fees they earn.

The current subprime mortgage and financial crises were caused further more by the following five additional factors:

1. Predatory lending and borrowings have become common practice among the subprime mortgage markets across the country during the housing boom from 2002 to 2006. This practice is closely tied to factor number 5 above.
2. Moral hazard committed by some market participants from originators, appraisers, underwriters, lenders, servicers, investment banks and other large financial institutions which securitize subprime mortgages, rating agencies, investors, and to some extent the borrowers.
3. Regulators have neglected their duty to enforce the existing rules and regulations such as the Fed on bank holding companies and some state banks, The Office of the Comptroller of the Currency (OCC) on national banks, the Office of Thrift Supervision (OTS) on national thrift institutions and thrift holding companies, the Security and Exchange Commission (SEC) on investment banks and corporations, Federal Deposit Insurance Corporation (FDIC), and state governments on insurance companies and others.
4. Inadequate ratings on mortgage backed securities CDOs, CDSs due to conflict of interests between rating agencies and investment banks, complexity of financially engineered products, and rating agencies' lack of knowledge to properly value those derived securities.
5. Lack of disclosure and transparency of derivative securities and trading of these securities over-the-counter, some deceptive trading scheme and self-dealing by some special investment vehicles and off-balance sheet operations by large investment banks and bank holding companies.

All these factors directly and indirectly contributed to the current subprime mortgage crisis. The principal purpose of this study is to analyze and integrate the above mentioned factors so that the subprime mortgage crisis can better be understood. Section 1 discusses the recent housing price pattern. Section 2 deals with predatory lending and borrowing and moral hazard problems. Section 3 discusses monetary policy, government regulations, supervision, and enforcement related to subprime mortgages. Section 4 presents financial innovations and mortgage securitization, trading of derivative securities, rating, and the resulting financial crisis. Section 5 explores the potential regulatory and other changes in the future.

1. Boom and bust of housing prices

Robert Shiller (2005, pp. 12-20), co-builder of Case/Shiller housing price index, constructed the US housing price index for standard existing houses dated back to 1890. It reached new high around 1893/1894 and then was fluctuating downward until about 1914 before dropping sharply to the bottom in 1921. The upward movement from 1921 to 1940 was relatively small. The more significant price increase occurred from 1942 to 1946 with the index risen from below 70 to almost 110 for an increase of about 57%. From 1946 to 1977 the price was fluctuating but stagnant. The small boom from 1976 to 1979 was followed by small bust from 1979 to 1985. The price index in-

creased from about 106 in 1985 to about 114 in 1989 and then declined to 110 in 1997. Real housing prices increased about 52% from 1997 to 2004. However, the real home prices were declining from 1890 to 1940. The annual increase in housing price was 7.40% in 2002 and 7.7% in 2003. In 2004 the price index rose 11.79% followed by 13.12% increase in 2005 and 6.10% in 2006. Shiller (p. 14) indicates that building cost, population, or interest rates cannot explain the changes in home prices. He shows that there is no substantial long-run uptrend in real (inflation adjusted) home prices for the U.S. as a whole. In general, housing cycles are reflected by changes in housing prices, housing starts, and mortgage originations.

During the latest home price boom the total housing starts for both single-family and multi-family steadily rose from 1,474 thousand units in 1997 to 2,068 thousand units in 2005. The total housing starts were still very high in 2006 at 1,802 thousand units. New single-family home sales increased from 804 thousand units in 1997 to 1,283 thousand units in 2005 before falling to 1,060 thousand units in 2006. At the same time, existing single-family home sales increased from 4,382 thousand units in 1997 to 7,076 thousand units in 2005 and 6,478 thousand units in 2006.

Let's turn to examine the originations of single-family mortgages from 1990 to 2005 as shown in Table 1.

Table 1. Originations of single-family mortgages (\$ billions)

Year	Single-family mortgages			Conventional			Government-backed		
	Total, \$	ARMs, \$	FRMs, \$	Total, \$	ARMs, \$	FRMs, \$	Total, \$	ARMs, \$	FRMs, \$
1990	458	128	331	381	127	253	78	0.6	77
1991	562	135	427	498	132	366	64	2.8	61
1992	894	205	689	829	195	633	65	8.9	56
1993	1020	236	784	925	222	703	95	14.0	81
1994	773	308	465	631	281	349	142	26.9	115
1995	639	232	408	568	213	355	71	18.6	52
1996	785	239	547	678	217	461	107	21.1	86
1997	859	224	636	755	196	559	104	27.3	76
1998	1450	236	1214	1301	225	1077	149	11.6	137
1999	1310	318	992	1134	309	825	176	8.5	167
2000	1048	311	737	929	302	627	119	9.5	109
2001	2215	372	1843	2044	367	1677	171	4.3	167
2002	2885	626	2259	2697	613	2084	188	13.8	174
2003	3945	850	3095	3711	835	2876	234	14.7	220
2004	2920	1167	1753	2787	1141	1641	133	20.6	112
2005	3120	1145	1975	3033	1137	1896	87	7.6	80

Source: <http://www.ofheo.gov/media/pdf/assumptions103106.pdf>.

From Table 1 it is obvious that there were sharp increases in single-family mortgages in 1998 and 2001, and substantial increases in 2002 and 2003. In the late 1990s the stock market went up so much and American people suddenly felt so much well-

off. On the other hand, stock market suffered three consecutive years of large decline, particularly the NASDAQ from 2000 to 2002. Then from 2001 the Fed cut interest rate so much and so quickly in response to the steep decline in the stock prices and

September 11 terrorists' attack at the World Trade Center. These events made real estate investment a very attractive alternative. From Table 1 we can see there were sharp increases in adjustable rate mortgages (ARM) in 2004 and 2005 with 39.97% and 31.70%, respectively. In 1994 the percentage of ARMs was 39.94%, and from 2001 to 2003 the percentage was fluctuating between 17% and 22%, which was lower than most of the years in

1990s. This finding is contradictory to the popular press charging that subprime mortgage problems could be attributable to the increases in ARMs. Based on the Office of Federal Housing Enterprise Oversight (OFHEO), which was merged into the Federal Housing Finance Agency (FHFA) in 2008, the seasonally adjusted house price index for the U.S. in the recent house price appreciation is shown in Table 2.

Table 2. US house price index, 1997Q1-2007Q4

Quarter	Quarterly price change, (%)	Annualized change, (%)	Change from the same quarter of last year, (%)
1997Q1	0.66	2.64	2.69
1997Q2	0.96	3.84	2.96
1997Q3	0.76	3.04	3.06
1997Q4	1.04	4.16	3.46
1998Q1	1.28	5.12	4.10
1998Q2	1.31	5.24	4.45
1998Q3	1.34	5.36	5.05
1998Q4	1.57	6.28	5.60
1999Q1	1.44	5.76	5.77
1999Q2	1.47	5.88	5.94
1999Q3	1.52	6.08	6.13
1999Q4	1.48	5.92	6.04
2000Q1	1.75	7.00	6.37
2000Q2	1.69	6.76	6.59
2000Q3	1.60	6.40	6.88
2000Q4	1.68	6.72	6.89
2001Q1	1.83	7.32	6.97
2001Q2	1.67	6.68	6.95
2001Q3	1.57	6.28	6.92
2001Q4	1.54	6.16	6.78
2002Q1	1.66	6.64	6.60
2002Q2	1.81	7.24	6.74
2002Q3	1.97	7.88	7.16
2002Q4	1.97	7.88	7.61
2003Q1	1.69	6.76	7.64
2003Q2	1.61	6.44	7.44
2003Q3	2.02	8.08	7.49
2003Q4	2.09	8.36	7.63
2004Q1	2.10	8.40	8.05
2004Q2	2.15	8.60	8.62
2004Q3	2.40	9.60	9.03
2004Q4	2.42	9.68	9.38
2005Q1	2.16	8.64	9.45
2005Q2	2.42	9.68	9.74
2005Q3	2.44	9.76	9.78
2005Q4	2.25	9.00	9.60
2006Q1	1.59	6.36	9.00
2006Q2	0.99	3.96	7.47
2006Q3	0.55	2.20	5.49
2006Q4	0.90	3.60	4.10
2007Q1	0.83	3.32	3.32
2007Q2	0.53	2.12	2.85
2007Q3	-0.34	-1.36	1.93
2007Q4	-1.29	-5.16	-0.29
2008Q1	-1.67	-6.68	-3.13
2008Q2	-1.43	-5.72	-4.84
2008Q3	-1.99	-7.96	-6.15
2008Q4	-3.41	-13.64	-8.24

From Table 2 we can see housing price started to accelerate from 1998, particularly from 2002 to 2005. From the third quarter of 2007 the housing price actually started to decline and culminated to

the annualized quarterly decline of 13.64% in Q4 of 2008.

Housing price changes vary greatly from state to state as shown in Table 3.

Table 3. Housing price by state ended December 31, 2007

State	Rank	5-year, (%)	1-year, (%)	Since 1980, (%)
Hawaii	1	96.59	2.01	449.11
District of Columbia	2	87.62	1.87	569.75
Maryland	3	80.64	0.80	441.83
Arizona	4	80.40	-2.40	320.35
Florida	5	77.90	-4.69	363.56
Nevada	6	75.63	-5.86	287.15
California	7	69.09	-6.65	501.56
Oregon	8	67.42	3.85	372.37
Washington	9	66.85	5.44	413.94
Virginia	10	66.28	0.81	378.42
Wyoming	11	64.47	8.27	189.56
Idaho	12	63.03	4.55	258.02
Montana	13	62.34	6.90	294.61
Delaware	14	59.93	1.95	421.50
New Jersey	15	57.18	-0.27	477.49
Vermont	16	56.25	2.41	374.91
New Mexico	17	56.20	5.39	245.60
Utah	18	54.26	9.27	293.60
Rhode Island	19	51.21	-2.56	485.31
Alaska	20	51.11	5.97	185.40
New York	21	51.10	0.66	564.43
Pennsylvania	22	47.95	2.83	313.18
Maine	23	45.95	1.91	421.20
Connecticut	24	43.51	0.81	377.32
United State		41.37	0.84	290.20
North Dakota	25	41.11	7.87	161.03
Louisiana	26	39.76	4.14	153.02
Illinois	27	36.18	1.95	285.44
New Hampshire	28	34.60	-0.61	398.65
South Carolina	29	33.39	3.77	222.31
Alabama	30	33.11	4.45	196.66
South Dakota	31	33.02	4.83	197.74
West Virginia	32	32.99	3.04	135.62
North Carolina	33	32.05	4.85	247.89
Mississippi	34	31.96	4.12	165.69
Wisconsin	35	31.43	1.94	234.38
Arkansas	36	31.37	3.63	164.06
Tennessee	37	31.14	4.14	213.81
Minnesota	38	28.58	-1.15	267.58
Massachusetts	39	28.08	-2.17	607.71
Missouri	40	28.00	2.46	207.82
Oklahoma	41	26.98	5.13	110.06
Texas	42	25.17	5.21	128.94
Georgia	43	24.74	2.55	248.14
Kentucky	44	23.50	3.51	195.37
Iowa	45	21.79	2.73	155.18
Kansas	46	21.65	2.54	147.88
Nebraska	47	18.75	2.45	161.09
Colorado	48	17.46	1.37	270.22
Indiana	49	14.66	1.47	160.24
Ohio	50	11.47	-0.42	169.69
Michigan	51	5.66	-4.27	204.87

Since 1980 Massachusetts' housing prices appreciated 607.71%, the fastest growing state. DC is num-

ber 2 with 569.75% appreciation followed by New York, California, Rhode Island, New Jersey, Ha-

waii, Maryland, Delaware, Maine, and Washington with appreciation of more than 413% from 1980 to 2007. The compound annual growth rate for Massachusetts over the past 27 years was 7.51% per year. For the fastest appreciation over the past 5 years, Hawaii's annual compound growth rate was 14.48%. The housing price increases from 1999 to 2005 far exceeded the normal growth pattern. The recent boom in housing prices from 1998 to 2005/2006 is phenomenal nationwide and extraordinary in certain states. From the historical perspective, the housing bust since 2006/2007 is just as spectacular as the recent boom from 2002.

The S&P/Case-Shiller home price index for 20 metropolitan areas increased substantially between January 2000 and July 2006 at the peak. The composite index increased from 100 (January 2000) to 206.52 with annual compounding rate of increase of 11.08%. The home prices more than doubled in nine metropolitan areas. The indexes and their annual growth rates in parentheses of the top nine are as follows:

1. Miami 278.68 (17.8%)
2. Los Angeles 273.94 (16.77%)
3. Washington, D.C. 251.07 (15.21%)
4. San Diego 249.60 (15.11%)
5. Tampa 237.92 (14.26%)
6. Las Vegas 234.78 (14.03%)
7. Phoenix 227.42 (13.47%)
8. San Francisco 218.37 (12.77%)
9. New York City 215.83 (12.56%)

On the other hand, Cleveland, Dallas, Charlotte, and Detroit were the depressed areas with index increased between 23% and 27% over the six and half year period. The nine metropolitan areas which had the most price appreciation were the hardest hit when the housing prices started to fall in the second half of 2006.

In 2007 the housing price in the U.S. increased 0.84%, but 12 states experienced sharp decline led by California (-6.65%), Nevada (-5.86%), Florida (-4.69%) and Michigan (-4.27%). Based on the recent data from FHFA, the housing price in the U.S. in 2008 declined 8.27%, the very first year since 1980. Furthermore, in all but six states the housing price declined and nine states experienced more than 9.41% drop led by Nevada (-28.24%), California (-25.52%), Florida (-23.96%) and Arizona (-20.56%). The decline in home prices has significant impact on home mortgages and mortgage backed securities and is greatly influenced by the high leverage of mortgage loans and predatory lending and borrowings.

What are the most important forces driving the home prices? Some traditional explanations are

income and population growth, family formation, building costs, interest rates, and increase in home ownership. However, the patterns of change from year to year in home prices in the whole U.S. have no consistent relation with any of these factors. Shiller (2005) further argued that "The period of home price increase starting in 1998 in the United States has been concentrated in some states and metropolitan areas, and where it has been concentrated, there have been many stories about the psychological correlates of the boom. Stories have abounded since 2000 of aggressive, even desperate, bidding on homes," (p. 17) and many other stories. "The changing behavior of home prices is a sign of changing public impressions of the value of property, a heightening of attention to speculative price movements." (p. 27) Indeed, the spectacular bubbles typically end up with more spectacular bust in certain states and metropolitan areas we have just witnessed. But as Table 3 has shown, the long-term housing prices have appreciated a great deal in quite a few states, particularly along both the east and the west coastal areas due to the better improvements in economic and employment conditions in those states and metropolitan areas.

The recent housing boom coincided with the historical low interest rates and people's general belief that real estate investment is good over the long run. As pointed out earlier and will be explained later, many factors contributed to the unusual housing boom and bust! Home ownership jumped from about 45% at the end of World War II to about 65% in the 1960s and held steady afterward. However, real estate as a percent of net worth had increased from 27% in 1952 to 42% in 2005 (Kahn, 2008). Glaeser and Gyourko (2005) attribute price increases to supply and zoning restrictions. Kahn (2008) developed a two-sector (one for manufactured non-housing goods and the other the housing services) growth model to explain the housing price fluctuations and attribute the housing price appreciation to the changes in productivity in the economy. He argues that the regime switching due to productivity increases or slow down can explain the housing price fluctuations at both the national and regional levels. However, if we look at the major economic slumps such as great depression from 1929-1933, the Japanese experience in the 1990s, what happened after 1997 in Southeast Asia, and what occurred in South America in the 1990s and the early 2000s, every major economic crisis was preceded by major financial crisis (Krugman, 2009). Shiller (2007) believes that "a psychological theory, that represents the boom as taking place because of a feedback mechanism or social epidemic that encourages a view of housing as an important investment opportunity, fits

the evidence better.” Demyanyk and Hemert (2008) after analyzing the loan and borrower characteristics from 2001 to 2006 found that the quality of loans deteriorated over the six-year period. They concluded that the recent “rise and fall of the subprime mortgage market follows a classic lending boom-bust scenario, in which unsustainable growth leads to the collapse of the market. All market participants, policy makers, and regulators know the housing price could not keep going up forever, but nobody would do anything to stop the irrational behaviors of the market participants until the bubble burst. Even in the middle of 2007 most big players in the mortgage markets, the Fed officials, the experts within the housing industry and academia, the Treasury officials, the Congress, and other regulators all indicated that the subprime problems would have only minor impact on the U.S. financial markets and institutions or the U.S. and other economies. This behavioral bias and overconfidence along with many other fundamental factors and speculative extremes, uncharacteristic low interest rate policy, laxity of enforcing the existing regulation, lack of regulating certain derivatives, no disclosure and transparency in trading over-the counter derivatives, and moral hazards related to the subprime sector of the housing markets are the root causes of the current mortgage and economic crises. One conspicuous new feature was the significant increase in predatory lending and borrowing in the last few years. In addition, moral hazard was committed by market participants and regulators.

2. Predatory lending and borrowing and other moral hazard

Predatory lending refers to various situations or conditions. It can occur when there is little competition among lenders and borrowers are poorly informed about risks. It can refer to any loan that is bad for borrowers although borrowing is voluntary. It can refer to any loans with excessive high interest rates such as payday loans or putting borrowers at a high risk of default in negative amortization mortgages or mortgages with teaser rates allowing borrowers to make very low monthly payments for one to three years and then steady increases in interest rates after that. It may also refer to the information asymmetry when lenders have much more knowledge about products availability and the costs and benefits to borrowers than the borrowers themselves. Sometimes the salespeople of lenders apply high pressure techniques to meet their loan quotas. Some lenders may commit straight fraud and abuse. Some predatory loans involve refinancing or home-equity loans. Greed and fear and Ponzi scheme have the long history (Shefrin, 2000) and boom and bust extremes are the typical consequences.

For examples, Amy Merrick of the Wall Street Journal (8-21-2007, A1 & A10) reported that at least 30 states have predatory-lending laws which limit or make it illegal for certain practices such as balloon mortgages and making profits by recommending loans with excessive tough terms. Early in 2004 Ruth Simon of WSJ (3-16-2004, D1 & D3) reported that some large financial institutions such as Washington Mutual, Indy Mac Bancorp, GMAC, Wells Fargo, Countrywide Financial, New Century Financial were applying some creative mortgages to target home buyers whose budgets were stretched thin. Examples are: 1. Miss-a-payment mortgages which allow borrowers to skip up to two payments a year and up to 10 payments over the loan life; 2. Payment option mortgages which let the borrowers choose to make minimum payment and allow loan balance to increase; 3. Interest only mortgages which let borrowers pay interest only; 4. Piggyback mortgages that allow the loans to combine a standard first mortgage with home equity loan or line of credit to avoid private mortgage insurance but at higher interest rates on jumbo loans; and 5. Fixer-upper mortgages that allow the loan to be based on home value after renovations.

The situations were exacerbated by inflating home appraisal values. For example, a recent report by Mitch Weiss of Fresno Bees (8-18-2008, A1 & A8) reported from Associate Press (AP) analysis over six-month period indicated that since 2005 more than two dozen states and U.S. territories had violated federal rules not to investigate and resolve complaints about appraisers and allowed those accused to stay in business. Based on the results from more than three dozen appraisers interviewed by AP, there was a clear indication that they were forced by real estate agents or mortgage brokers to fraudulently inflate appraised property values. They actually supplied the AP with documents from lenders. In fact, the Financial Institutions Reform, Recovery and Enforcement Act of 1989 had rules and regulations against faulty and fraudulent appraisals, the problem lies in the lack of enforcement by the regulators. Another example of mortgage fraud reported by Hagerty and Hudson of WSJ (9-28-2006, A1 & A10) illustrated how a typical mortgage fraud works: First, promoters buy a house and arrange to quickly sell to someone else at a higher price. Second, the promoters arrange a loan for the buyer using fictitious information. Third, the promoters find an appraiser to ratify the inflated house price and the promoters make quick profit from the sale. Fourth, the home buyer eventually ends up with default on the loan. At the time the Federal and state authorities were investigating about 100 people involved in elaborate mortgage frauds living in or near Martins-

ville, Virginia, a small factory town. They also reported that mortgage frauds involving loans acquired by providing fake information had mushroomed in recent years as lenders were competing for quick profits and speedier loan approvals. The fast profits from mortgage fraud even attracted some criminal gangs involved in drug dealing and other street crimes.

Michael Corkery of WSJ (12-21-2007, A1 & A14) described how the fraud ring works in the following steps: 1. Recruit borrowers with good credit to apply for loans; 2. Apply for very large loans using false statements of income and assets; 3. Find appraisals willing to inflate home values and brokers willing to submit false information; and 4. Split the proceeds among the members of the ring. The homes sold through the ring usually end up with foreclosure. For example, in a multimillion-dollar fraud scheme that federal prosecutors discovered in Atlanta, the criminals obtained \$6.8 million in mortgages from Bear Sterns. A New Yorker who got \$1.8 million in mortgages told the investment bank that he and his wife made more than \$50,000 a month and submitted statements with assets of \$3 million. In fact, he earned only \$105,000 a year and his wife was a homemaker. The Mortgage Asset Research Institute (MARI), which works with lenders to prevent fraud called the stated-income loans "liar loans". In a sample of 100 stated-income loans reviewed by MARI, it was found that about 60% of the stated income was inflated by more than 50%. Similarly, BankFirst made loans to the same Atlanta fraud ring totaling \$4.9 million. It gave its blessings to closing documents showing no explained payments of hundreds of thousands of dollars to obscure companies owned by the fraud ring. At BankFirst it took typically 15 minutes from the time it received closing documents by fax to the time it released the loan proceeds to the borrowers. In 2005 Bear Sterns created Bear Sterns Residential Mortgage (BSRM) to focus on "Alt-A" mortgages. Based on the Fed data BSRM rejected only about 13% of applications compared to the national average of 29%. Indeed, these examples are only the tip of an iceberg.

The problems of predatory lending, borrowing, and moral or ethical hazard went even further. According to Glenn Simpson of WSJ (12-31-2007, A1 & A10), some subprime lenders such as Ameriquest, Citigroup, Countrywide Financial, and Wells Fargo along with the Mortgage Bankers Association spent lots of money lobbying against some states to put more restrictions on mortgage lending practices. For example, Ameriquest handed out more than \$20 million in political donations to persuade legislators in New Jersey and Georgia to relax tough new laws. Simpson examined the data from the federal and

state campaign-finance records, the Internal Revenue Service (IRS) filings, and the National Institute on Money in State Politics. The data show that Ameriquest, its executives and their spouses and business associates donated more than \$20.5 million from 2002 to 2005. Countrywide gave about \$2 million in campaign gifts and \$6.7 million lobbying in Washington, D.C. Ameriquest contributed \$10.8 million to state politicians and lobbying groups. It also made contributions in Texas, Florida, New Jersey, Georgia, New York, Illinois, Pennsylvania, Oregon, Wisconsin, Washington, and Utah. This type of behavioral or ethical problems from the lenders, to borrowers, business leaders, lobbying groups, politicians, policy makers, regulators, appraisers, brokers, and underwriters was widespread during the housing boom from 2002 to 2006. These behavioral problems may change in the short run after the current mortgage and financial crises, but they are difficult to overcome in the long run unless changes in rules and regulations, supervision and oversights, and business education are made in the immediate future.

In another report by Brooks and Ford of WSJ (10-11-2007, A1 & A16) the recently bankrupted Washington Mutual's Long Beach Mortgage (LBM) made \$48 billion high-rate loans (interest rates higher than 8% or more above the Treasury securities of the same maturities). LBM used so many outside brokers to push subprime loans into the suburbs. WSJ analyzed more than 130 million home loans from 2004 to 2006 and found that risky mortgages were made in almost everywhere in the country from small towns to big cities and suburbs. High-rate mortgages jumped from 16% of total loans originated in 2004 to 29% in 2006. Even though the high-rate loans concentrated in poorer communities, they increased sharply in middle-class and wealthy communities. At the same time, lenders also extended more second-lien mortgages, such as piggy-back second loans, to cover down-payments. In addition, lenders made more loans to speculative real-estate investors to boost home prices. The non-owner-occupied home loans increased from 9% in 2004 to 13% in 2006. Such properties have higher risk of foreclosure than the owner-occupied properties. One of the major reasons why the lenders were so eager to make subprime (including Alt-A) loans was the willingness of Wall Street bankers to buy most of the subprime loans and securitize them into mortgage backed securities. In 2004 63% of those new loans were securitized and that percentage increased to 73% in 2006. If the lenders do not have to hold on to the risky mortgages, why would mortgage brokers, appraisers, and underwriters care whether borrowers can pay back loans or not? The more they originate the loans, the more profits they earn.

Based on a report by Mark Maremont of WSJ (7-21-2008 A1 & A10), predatory lending continued after FDIC seized Superior Bank, a national subprime lender based in Hinsdale, Illinois. The FDIC continued to make more than 6,700 subprime mortgage loans worth more than \$550 million while looking for a buyer. With FDIC people supervising day-to-day operations, the bank was making loans to unqualified borrowers, inflated appraisals, and improper verifications of borrowers' incomes. Some mortgages were sold to Texas-based Beal Bank that later sued the FDIC, which acknowledged numerous appraisal deficiencies and some loans were fraudulent. Other mortgages sold to Bank of America had troubles also. The majority of the troubled loans were made when FDIC was running Superior Bank. The problem lay in the fact that before and after the FDIC takeover of Superior, it depended heavily on using some national network of independent brokers to find potential borrowers. The fact is that market participants are prone to commit ethical or moral hazard when profitable opportunities are great even under the supervision and oversight of regulators.

According to Gramlich (2007), as late as 1994 the subprime mortgage originations were only \$35 billion or less than 5% of total mortgage originations. In 2005 they increased to \$625 billion or 20% of total originations with compound annual growth rate of 29.96%. The statistics are very close to those indicated by Ernst, Bocian, and Li (2008) when they found that annual subprime mortgage market grew from \$97 billion in 1996 to \$640 billion in 2006 accounting for 12% and 21% of total mortgage originations, respectively. Historically, the prime mortgage market has been well regulated and supervised with major lenders limited to banks and thrifts. On the other hand, in the subprime mortgage market about 30% of the loans were made by the subsidiaries of banks and thrifts and 50% were made by independent mortgage bankers or brokers. They are less or unsupervised and are prone to become predatory lenders who incline to take advantage of lower income, less literate, financially less savvy, or more vulnerable borrowers. There were about 7,000 independent mortgage brokers in 1987, and the number quickly increased to 53,000 in 2004. In 2005 about 60% of all subprime mortgages were originated by these independent brokers. These brokers earn the yield spread premiums which are unregulated, and so most brokers steer many borrowers away from prime market into high interest loan subprime market.

On the basis of 1.7 million mortgages originated from 2004 to 2006, Ernst, Bocian, and Li (2008) found that borrowers paid significantly higher interest rates on mortgages originated by brokers than those originated by retail lenders. For subprime

weaker borrowers the rate disparities were greater. For a typical mortgage loans of \$166,000 a subprime borrower originated from a broker would pay \$5,222 more for the first four years and \$35,874 more over the life of the loan. According to Gramlich (2007), subprime brokers might not be knowledgeable about the mortgage process and how to get the better deal for their clients. They are prone to place inaccurate advertisement to seek for potential borrowers and initiate the contact. The broker profits are generally high and unrelated to their knowledge and performance in processing the loans. Based on Home Mortgage Disclosure Act (enacted in 1975) data, Gramlich found that only 20% of subprime loans were made by supervised banks and thrifts, 29% by lightly supervised subsidiaries and affiliates of banks and thrifts, and 51% by unsupervised mortgage entities.

Predatory lending and borrowing, moral hazard, prolonged period of low interest rates, and slack of enforcing regulations and loan standards as illustrated by the above examples combined with market participants' overconfidence and irrational expectation of continuous excessive price appreciation resulted in the recent housing boom-bust cycle. They also contributed to the large mortgage loan defaults and foreclosures since 2007. In addition, most subprime and other mortgages were securitized by major investment banks into exotic mortgage-back securities (MBS) and collateralized debt obligations (CDO), and with the help of major rating agencies these MBSs and CDOs were quickly sold to institutional investors for fast profits. The funds were channeled back to finance more mortgage loans. The original CDOs were further securitized into what were called CDO² to boost rating. The institutional investors buying these derivative securities and mortgages were mostly financed by issuing short-term commercial papers. When mortgage defaults and foreclosure were mounting from the middle of 2007, the risk and the commercial paper rates increased tremendously, and the commercial paper markets were quickly frozen. To protect their investment in MBSs and CDOs these institutions purchased credit default swap (CDS) from insurance companies such as American International Groups (AIG). When the markets of these exotic derivative securities collapse and hedge funds and money market funds had stopped buying, some large investment banks with high leverage of 30 or 40 to 1 witnessed their losses mounting. As a result, some financial institutions such as Lehman Brothers went bankrupt, while Bear Sterns and Merrill Lynch required the government backed mergers. Many large financial institutions such as Bank of America, Citigroup, Goldman Sachs, J.P. Morgan Chase, Morgan Stanley, AIG to name a few

all need the government bailout. Due to the globalization of financial institutions over the past decades major banks around the world, especially the European banks, were all seriously affected. Finally, the entire financial system could not function normally, and we are facing the most serious financial crisis since the Great Depression.

Predatory lending practice has been considered as one of the major root causes of the current subprime mortgage crisis and, as a result, the Congress was forced to take a remedial action by legislating the Mortgage Reform and Anti-Predatory Lending Act of 2007. The major provisions of the Act include the following: 1. All mortgage originators are required to be part of a national registration system through states or the Department of Housing and Urban Development (HUD). 2. All originators must ensure any mortgage borrower to have reasonable ability to repay the loan and a borrower will receive tangible benefit from the loan in case of refinancing. 3. It prohibits undisclosed and unfair compensation schemes or steering borrowers to subprime loans. When mortgage originators practice predatory lending, they will be subject to severe penalty. 4. It subjects Wall Street firms to liability if they buy, sell, and securitize loans that the borrowers cannot repay the loans. 5. It will establish a national standard regarding assignee and securitizer liability to make sure that borrowers are able to pay and there is a net tangible benefit to the borrowers. Wall Street firms will be held accountable for their actions in the mortgage market. At the same time, states remain free to pass more stringent laws against lenders and originators. 6. It provides some protections for renters to receive proper notification so that they have enough time to relocate in case of foreclosure. 7. It expands and enhances borrower protections under the Home Owners Equity Protection Act by lowering points, fees, and interest rate for high-cost loans that increase the risk of foreclosure. The Act also establishes an Office of Housing Counseling within HUD to provide more pre-loan counseling. Since government policies have played significant roles in the housing industry and the mortgage markets, I will discuss more on government regulations, supervision, and enforcement on housing and the impact of monetary policy on housing related to the current subprime mortgages crisis.

3. Government regulations, supervision, and enforcement on housing and monetary policy

Persistent extreme low interest rate policy has been widely cited as one of the major causes for the recent bubble of housing prices. Indeed, when the high tech bubble burst in early 2000, the Fed cut the federal fund rate so much and so fast from 6.50% in

December 2000 to 2% in November 2001 and further cut to 1% in June 2003 and stayed at 1% until June 2004. From December 2001 to November 2004 the federal fund rate was below 2%. From early 2000 (Dow peaked in January, NASDAQ peaked in March and S&P 500 reached its peak in September) to October 2002, stocks suffered the sharp declines for three consecutive years. As we pointed out in Section 1, many people were led to believe that the housing prices would continue to rise and investment in real estate, particularly in some state and certain municipalities, was the best long-term investment strategy when alternative investments, such as stocks, were too risky and the yields on debt securities were too low. With the help of easy monetary policy engineered by the Fed and other major central banks around the world, housing bubble was developing like the high tech bubble in the second half of the 1990s. Then the Fed started to boost federal fund rate from 1% in June 2004 to 5.25% in June 2006. When energy and commodity prices accelerated and inflation started to raise its ugly head, the Fed began to cut the fed fund rate in September 2007 due to increasing mortgage foreclosure and defaults and credit shortage. As I pointed out earlier, the housing price accelerated too fast from 2002 to 2005 and reached its peak in late 2006 or early 2007 to the unsustainable level. However, the current housing boom-bust cycle is different from the previous cycles, since the interest rates and mortgage lending standards have never been so low during the entire postwar period, the predatory lending and subprime mortgages were never so rampant, and the private label mortgage backed securities and derivatives have never mushroomed so much and so fast. In addition, the laxity of regulations and supervision by the Fed, the SEC, the FDIC, the HUD, the OCC, the OTS, the OFHEO, and various state responsible agencies, and moral hazard committed by market participants, particularly the large investment banks and other major financial institutions with greedy, irresponsible and short-sighted executives all add up to causing the largest global financial crisis since the Great Depression. It is a wake-up call for all to realize that free market works well only if all market participants can always behave rationally and ethically. Psychologists and Nobel laureates in economics Herbert Simon (1982, 1997) and Daniel Kahneman (1982, 1998) have already pointed at that impossibility. Other experienced and knowledgeable people such as Bookstaber (2007), the architect of program trading and possible cause of 1987 stock market crash, well-known private equity fund manager George Soros (2008), and behavioral finance experts Thaler (1991, 2005), Shleifer (2000), and Shiller (2005), to name a few, all question the efficiency of the markets and the ra-

tionality of market participants. Even Greenspan, one of the most experienced and reputable central bankers, on October 23, 2008 when he testified in Congress, acknowledged that he had never anticipated the home prices could fall so much. He said that no regulator was smart enough to foresee such a serious housing crisis could happen. He also confessed that his hand-off regulatory philosophy and policy were a mistake. Most people including business leaders, policy makers, regulators, and the Congress tend to follow the recent trend and act like cheerleaders following the band wagon. Many top executives of leading investment banks and other financial institutions were taking too much risk and chasing short-term quick profits when most regulators were enjoying the party. Without their behavioral errors or moral hazard, the subprime debacle and current financial and economic crises would have been avoided.

Let us turn to discuss some specific government regulations, supervision, and enforcement issues related to the current subprime mortgage problems.

Making mortgage loans to low- and moderate-income borrowers will not necessarily result in high rate of defaults and foreclosures as long as those problems I discussed in the previous section did not occur. In order to combat discrimination the Fair Housing Act of 1968 and the Equal Credit Opportunity Act of 1974 were passed. The Truth in Lending Act of 1968 set the standards for disclosure and for computing the annual percentage rate. This Act is part of Regulation Z of the Federal Reserve Act and is supervised by the Fed. The Real Estate Settlement and Procedures Act of 1974 set the detailed rules and procedures for mortgage origination and disclosure requirement at the closing. This act is administered by HUD. In addition, the Home Mortgage Disclosure Act of 1975 required lenders to report mortgage loans by race, sex, and census tract. The Community Reinvestment Act of 1977 required banks and thrifts to make mortgage loans to low-income people in their business areas, but it had been around for so long and it had never caused any major problem. Gramlich (2007) pointed out that the Mortgage Bankers Association and some state association had developed some kinds of best lending practice to make sure members are in compliance with their general guidelines. For high-cost mortgage loans the Home Owner Equity Protection Act (HOEPA) of 1994 prohibits balloon payments in the first five years and prepayment penalty beyond five years. Furthermore, HOEPA is intended to force lenders to verify borrowers' ability to pay back the loan. The Act also requires the buyers of a loan be responsible for the actions of the lender, known as assignee liability which makes the sale of HOEPA

loans more difficult. There are about 40 states trying to regulate subprime mortgage markets similar to the HOEPA guidelines. All these existing laws and regulations could have prevented the current subprime (including Alt-A) mortgage crisis if all market participants had followed them and the regulators had enforced them. Unfortunately, the federal and state governments might not have enough resources and personnel to enforce the rules and regulations, the market participants have been too greedy and violated the rules and regulations, and the regulators have too much faith in free market mechanism as to neglect their oversight and supervision responsibilities. The problems are not due to a lack of rules and regulations, instead they result from a lack of enforcement of those rules and regulations and moral hazard or unethical behaviors of market participants and business leaders.

According to a recent report by Ip and Paletta of WSJ (3-22-2007, A1 and A14), "in 2005, 52% of subprime mortgages were originated by companies with no federal supervision, primarily mortgage brokers and stand-alone finance companies. Another 25% were made by finance companies that are units of bank-holding companies and thus indirectly supervised by the Fed; and 23% by regulated banks and thrifts." Many states simply don't have enough resources to supervise. For example, in California the home-state regulator had 25 examiners to oversee more than 7800 state-licensed lenders with many largest subprime lenders in the country. Some state regulators charged that federal regulators condoned major players to fund loans without paying attention to borrowers' ability to pay. OTS and OCC, in fact, argued that the nationally chartered banks and thrifts did not have to comply with tougher lending standards set by some states. For example, Georgia passed one of the toughest anti-predatory lending laws in 2002. Due to the strong objections by some lenders, OTS and OCC shortly afterwards said that Georgia laws did not apply to their regulated institutions. In 2005 the banking industry and the OCC successfully blocked Mr. Spitzer's charges against J.P. Morgan Chase, Wells Fargo and other national banks to provide him information on whether they charged unfair interest rates to minority borrowers.

From the above examples, it is rather difficult to know when, where, who, and how to regulate properly all the players involved in the subprime mortgage markets. Clearly, the regulators have not done their jobs in recent years. Opponents to tough regulations argue that free market and capitalism are the best system for a capitalistic society like ours and they have been proven to be the best system around the world. Regulations are harmful to fostering en-

trepreneurship and innovations. Financial innovators or engineers have been able to get around regulations. It takes too much human and other resources to examine, supervise, and effectively enforce rules and regulations. As we pointed out in the previous section, some people involved in subprime mortgages from borrowers to brokers, underwriters, lenders, securitizers, rating agencies, and ultimate investors are prone to commit moral hazard when they pursue their self-interest or profitable opportunities. Setting rules and regulations are easier than overseeing and enforcing them. Currently we have several regulatory agencies and some of their responsibilities are overlapping, while in other areas it is unclear who is responsible for supervising and enforcing certain rules and regulations. The OCC was established in 1863 and is responsible for chartering, regulating, examining, and supervising national banks and the federal branches of foreign banks. The Fed was established in 1913 to conduct monetary policy and regulate and oversee bank holding companies and some state banks. The FDIC was established in 1933 to insure deposits against bank (including savings and loan associations and savings banks) failure and promote sound banking. The SEC was established in 1934 to regulate the securities markets and enforce securities laws, provide guidance to accounting rules, and review corporate financial statements. The CFTC (Commodity Futures Trading Commission) was created in 1974 originally to ensure open and efficient operation of the commodity futures markets and newly developed financial futures products. Some rules and procedures for mortgage origination and disclosure are administered by HUD since 1965. Finally, the OTS was created in 1989 succeeding the Federal Home Loan Bank Board to regulate and supervise savings and loan associations. How to consolidate and unify these regulatory agencies to improve the efficiency of supervising financial institutions and enforcing rules and regulations will be the urgent but controversial subject to be discussed and resolved in the near future.

The Gramm-Leach-Bliley Act of 1999 may turn out to be the major contributor to the too-big-to fail and systemic risk problems of the current financial and economic crises. That Act repealed the Glass-Steagall Act of 1933 and has allowed financial institutions to engage in commercial banking, investment banking, insurance and other financial services. That Act allows large financial institutions to conduct highly leveraged and risky businesses through subsidiaries which are nonbank and not subject to more restrictive bank regulations, supervisions, and capital requirement. At the same time, the Act enables some financial institutions to grow

too big through mergers and acquisitions and makes it harder for regulators to tackle the too-big-to-fail and systemic risk problems. The Futures Practices Act of 1992 has contributed to the crisis of some over-the-counter trades of derivatives such as CDOs, CDO²s, and CDSs. That Act has exempted certain OTC transactions from the oversight of CFTC. The lack of disclosure and transparency of trading the above mentioned derivatives caused the major problems as will be discussed in the next section. Finally, the Commodity Futures Modernization Act of 2000 let the transactions of OTC derivative securities exempt from trading on an exchange. Again, the lack of transparency, disclosure, and oversight has allowed the trading volume of CDOs, CDO²s, and CDSs to explode and get out of hand.

Indeed, the Congress passed The Housing & Economic Recovery Act of 2008 to improve the safety and soundness of supervision by establishing the Federal Housing Finance Agency (FHFA) to oversee the Federal National Mortgage Association (Fannie Mae), the Federal Home Loan Mortgage Association (Freddie Mac) and the Federal Home Loan Banks (FHLBs). The FHFA has broad supervisory and regulatory powers over the operations, activities, corporate governance, safety and soundness, and missions of the government sponsored enterprises (GSEs) just mentioned. It is intended to provide new and more flexible authority to establish minimum and risk adjusted capital requirements for the GSEs. This Act boosts Treasury's authority to provide more credit to the three GSEs and FHLBs for the next 18 months and the Treasury some standby authority to buy stocks or bonds of those companies. In order to protect taxpayers' money, the Treasury should consider the priorities or preferences and set some limits on dividends, approve, disapprove or modify executive compensation, and other uses of resources. GSEs have the duty to serve the underserved markets of manufactured housing, housing preservation and rural housing. The Act created a Permanent Housing Trust Fund to increase and preserve the supply of rental housing and home ownership opportunities for extremely low and very low income families. This Act also transfers the supervisory and regulatory authorities from FHLBs and OFHEO, used to supervise and regulate Fannie Mae and Freddie Mac, and the Federal Housing Finance Board to FHFA to consolidate the supervisory and regulatory responsibilities. This Act also established the Hope for Homeowners Program to enable the Federal Housing Administration (FHA) to refinance the mortgages of at-risk borrowers living in their only home if (1) mortgage holders write down the mortgage loan principle; (2) borrowers agree to share future equity due to housing price

appreciation with the government; and (3) borrowers can repay the new loan.

In March 2009, the U.S. House of Representatives Brad Miller, Mel Watt, and Barney Frank introduced the Mortgage Reform and Anti-Predatory Lending Act of 2009 intended to prevent the predatory lending practices in recent years. The Act will enhance restrictions paid to mortgage loan originators and brokers based on interest rates and terms of the loan commonly known as yield-spread premiums. The Act will also make mortgage securitizers who convert home mortgages into securities more liable for fraudulent loans. The Act prohibits lenders from underwriting loans which borrowers are unable to repay. Finally, the Act urges lenders to make fully documented 30-year fix-rate mortgages. Given the recent subprime mortgage problems and financial and economic crises, the Act is expected to be passed. One of the key differences between the current housing crisis and previous ones is partly due to the significant increase in subprime mortgage securitization, new derivative securities, and excessive risk taking by financial institutions.

4. Mortgage loan securitization, opaque trading, improper rating, and excessive risk taken

Events like declining housing prices, predatory lending, laxity of supervision and oversight from regulators, securitizing too many subprime loans, improper rating by rating agencies, opaque trading of derivative securities and securitization process, and excessive risk taken by investors and financial institutions have combined to result in the current subprime crisis and the collapsing of financial system.

Before the mid-1990s many mortgages were backed by the Federal Housing Administration (FHA), Fannie Mae, Freddie Mac, and Ginnie Mae. Ginnie Mae guarantees investors the timely payment of principal and interest on mortgage-backed securities (MBS) backed by federally insured or guaranteed loans such as FHA and Veterans Administration (VA), the Department of Agriculture's Rural Housing Service (RHS) and HUD's Office of Public and Indian Housing (PIH). In 1968 Ginnie Mae initiated the mortgage securitization by issuing mortgage pass-through (PT). Fannie and Freddie have issued collateralized mortgage obligations (CMOs) and real estate mortgage investment conduits (REMICs), Fannie and Freddie issued interest only and principal only mortgage backed securities (MBSs), and Fannie and Ginnie have also issued mortgage pass-through. Since all these MBSs had been backed by conventional and FHA and VA guaranteed mortgages, there was little problem. These government and government sponsored enterprises have operated under strict federal underwriting standards that

make sure borrowers could afford to pay back loans and required 20% down-payments. In other words, if underwriters, lenders, and issuers of mortgage derivatives follow the prudent and ethical standards and practice, securitization itself would not cause problems. In late 1990s Freddie and Fannie were pressured to make subprime loans to expand mortgage loans to low and moderate income borrowers. The increased purchases of subprime loans and the current mortgage crisis coupled with executive mismanagement brought down Fannie and Freddie to conservatorship of the FHFA in September 2008.

Let us start with the securitization process, the advantages of securitization and the motivations for securitization (Fabozzi and Kothari, 2007). The mortgage lenders transfer the pool of loan receivables to a special purpose entity (SPE) or special purpose vehicle (SPV) at the par value of the loans being pooled. Then SPV issues securities to pay for the asset pool held, and the cash flows of the pooled assets will be used on the exclusive basis to repay investors. The securities issued by SPV are structured into different classes with senior class having lower risk and lower return since the investors in the senior class have higher priority of claims. These asset-backed securities have two advantages, i.e., legal and structural preferences. Legal preference is the preference that the asset-backed investors have over the traditional investors as claimants on the assets of the operator or securitizer (SPV) as SPV's assets are made legal property of the investors, while traditional investors' claims are subject to bankruptcy administration in case the SPV runs into financial difficulties. Structural preference refers to the stacking order of mutual rights among various classes of investors such as A, B, and C. Securitization by law ensures that at least some specific assets are free from other claims and can pay off only the asset-backed investors. The basic idea of creating classes or tranches is based on the probability distribution of default. If the prime loans are pooled together, the pool is still a prime, while when subprime loans are pooled together, the pool is still a subprime. When prime loans and subprime loans are pooled together, even the most senior tranche may no longer have low risk. Since investment banks pay fees to the rating agencies and if a bank cannot get the rating it wants, the bank can always go to another rating agency. Sometimes, the rating agency may demand for more information in order for the bank to get its desirable rating. Due to competition among rating agencies for profit opportunities and the potential conflict of interests between rating agency and the investment bank (securitizer), the rating agency tends to go along the desire of the bank. As a result, the rating agencies have given new mortgage securities highly desirable AAA rat-

ings. Since most derivative securities associated with mortgage loans are too complex to determine their intrinsic values, investors may not get accurate rating from the rating agency. This is particularly true when the rating agencies are rating collateralized credit obligations (CDOs) and CDOs securitized from other CDOs, commonly referred to as CDO². Indeed, most investors and executives of most financial institutions do not understand how these newly financially engineered products have been produced and how to value them. Consequently, investors rely on rating agencies' ratings. It is interesting to notice that Jaffee (2008) argues that because issuers do not have the past experience of securitizing subprime mortgages, the risk is inherited from the new innovations of securitizing them. He also pointed out that since the issuers and investors of subprime mortgage related derivatives involved the largest and smartest institutions and people, he believes "the basic economic rationale for securitizing subprime mortgages has not been challenged by subprime mortgage crisis" (Jaffee, p. 30). He blames the crisis to rating agencies, high leverage of counterparty institutions and investors, and structured investment vehicles' maturity mismatching by investing in long-term and riskier securities such as subprime MBS, CDO, and CDO² financed by short-term commercial papers. He believes that "securitization process per se was not a fundamental source of the subprime mortgage crisis". "If there has been a 'moral hazard' in the subprime mortgage lending and securitization, it lies with the failure of lenders, investors, the credit rating agencies, and the monetary authority to recognize that mortgage lending booms almost inevitably end in crashes" (Jaffee, p. 4). Indeed, some banks such as Bear Sterns, Citigroup, Bank of America, J.P. Morgan Chase set up separate structured investment vehicle (SIV) to issue mortgage backed short-term commercial papers and purchase longer-term assets or securities MBS, CDO, and CDO² to earn higher yields. As the subprime mortgage problems became widely publicized, the commercial paper yield went up significantly and the commercial paper market dried up. As a result, SIVs and conduits faced liquidity problem and suffered large losses, which, in turn, hurt the banks that set up SIVs. Most SIVs were registered in offshore havens such as the Cayman Islands but managed out of London. No wonder outside of the U.S., the U.K. suffered the most from the current financial crisis. Greenlaw, Hatzius, Kashyap, and Shin (2008) consider that conduits and SIVs have played a key role in the current financial crisis. They suggest that the current crisis will abate when financial institutions' capital ratios are restored high enough to support their balance sheets. Jaffee's view is different from the former President's Working

Group on Financial Market in March 2008. It is clear that without subprime mortgage securitization and the moral hazard committed by issuers, rating agencies, and investors of the complex derivative securities such as CDOs, CDO²s, CDSs originated from the subprime and Alt-A mortgages, the subprime mortgage crisis would not be so serious and the tax payers would not have to bail out financial institutions, and economic recession would not be so disastrous. The SEC designated Moody's, Standard & Poor, and Fitch as official rating agencies. As a result, most financial institutions around the world entrust ratings of almost all securities from the three agencies. SEC designated the three as the nationally recognized statistical rating organizations. However, SEC officially obtained the authority to regulate and supervise them only after the passing of the Credit Rating Agency Reform Act of 2006 (Ashcraft and Schuermann, 2008, p. 38). The rating process begins with the estimates of loss distribution associated with a pool of collaterals and the construction of a baseline foreclosure frequency and loss severity for each loan. Loss and foreclosure depend on local economic and financial conditions. Most rating agencies use historical data of loan loss and frequency of foreclosure, underwriting characteristics of loans, the experience of originators and servicers, and local and national economic and financial conditions. The critical underwriting characteristics are cumulative loan-to-value ratio, credit score, interest rate, loan maturity, fixed versus adjustable rate, property type, home value, documentation of income and assets, loan purpose, owner occupancy, mortgage insurance, and asset class (jumbo, Alt-A, subprime). The originators and servicers are evaluated by their past performance, underwriting guidelines, loan marketing practice, credit checks on borrowers, appraisal standards, experience, collection practices, and loan modifications and liquidation practices (Ashcraft and Schuermann, pp. 41-42). The historical data and information may not properly reflect the recent conditions and characteristics. Most importantly, the securities backed by the subprime mortgages and other asset backed securities are far more complex to assign accurate ratings than the traditional corporate debt securities. Finally, the rating agencies have less experience on rating the newly developed derivative securities related to subprime mortgages.

Based on a securitization of 3949 subprime loans having aggregate principal balance of \$881 million originated by New Century Financial in the second quarter of 2006, Ashcraft and Schuermann (2008) identified five frictions that caused the current subprime mortgage crisis. The first cause was excessive borrowing (predatory borrowing) and excessive

lending (predatory lending). Second, there is the principal-agent problem between investors and asset managers. The more sophisticated asset manager (agent) may not put in enough time and effort on behalf of the investor (principal). Asset managers intend to obtain higher yield by buying structured debts than regular corporate debts. Third, with lack of due diligence of the asset managers, there is no incentive for the arrangers to conduct their own due diligence. Fourth, most mortgage products offered to subprime borrowers are complex enough to subject to misunderstanding and misrepresentation. Finally, credit ratings on securities backed by subprime mortgages and other related assets are subject to significant errors due to model misspecifications and lack of prior experience.

Based on a report by Scannel and Solomon of WSJ (9-4-2007), because of the subprime meltdown the former President Bush's Working Group, which consists of the Treasury, the Fed, the SEC and the CFTC, looked into how securitization and repackaging and selling of assets had changed the mortgage industry and related business practice. The Congress held a hearing about the concerns that rating firms have given overly favorable ratings to mortgage-backed securities and they were too slow to downgrade them. The rating firms might often collaborate with underwriters in designing such securities and collecting hefty fees. The Congress gave SEC the authority to oversee rating agencies in fall of 2008, and the SEC had begun examining their policies and procedures, conflicts of interests, and disclosure of their rating practices. On December 3, 2008 the SEC approved tighter regulations on the rating agencies by requiring greater disclosure and banning agencies from rating securities they have helped issuers create. The rating agencies also have to disclose statistics on their upgrades and downgrades for each type of asset they rate. In addition, they must describe the steps they take to verify information used in ratings.

Most financial assets including the asset pools are subject to credit risk, default risk, liquidity risk, and interest rate risk, and the risk of prepayment in case of mortgage pool. To enhance credit an SPV can design a desirable level of excess spread between the weighted rate of return from the pooled loans and the weighted average cost associated with issuing the securities, creating stacking order of liabilities, over-collateralization, and external credit enhancements guaranteed or backed by the third party. One easy way to provide liquidity support is to hold higher cash reserve. One common device to protect prepayment risk is the prepayment-protected classes with planned amortization class structures similar to the mortgage loan securitization. There are four

primary reasons for raising funds by securitization: First, by pooling prime and subprime loans together speculative-grade rating may get higher rating through credit enhancements, and thus lowering the funding cost. Second, once an issuer establishes itself in the asset-backed securities market, it can use both the ABS and corporate bond markets to find the best combination. Third, when the assets are securitized, the issuer no longer bears the interest rate risk or credit risks of the original assets. Finally, securitization can remove assets from the balance sheet and lower the capital requirement and increase the leverage to achieve higher rate of return. Higher leverage of many larger financial institutions is one of the key reasons why some of them went bankrupt, while others need the government bailout.

Let us reconnect to the low interest rate environment from 2002 to 2005. During those years of extreme low interest rates, investors were eager to find higher yield investment opportunities. That encouraged financial engineers to innovate and develop CDOs, CDO²s, CDSs and other complex derivatives backed by bonds and other asset-backed securities including subprime mortgages. According to Coval, Jurek, and Stafford (2009), if things like default, default correlation, or misspecification of default dependencies occur, structured CDOs will magnify the risk due to imprecise estimates of default possibilities. The underestimates of default risk will become more serious when CDOs tranches are further structured into CDO². Some risky CDOs will be turned into safer CDO² and get higher ratings even though they are more sensitive to small changes in baseline parameters. Some lower rated CDOs will be turned into higher rated CDO². Since they all originated from pools of mortgages, these sequential structured products are subject to the default risk of the underlying mortgages. There were substantial increases in subprime mortgages from 2003 to 2006, and so the risks of the original mortgages and the CDOs and CDO²s derived from the subprime mortgages increased tremendously. The lack of historical data makes it more difficult for rating agencies to accurately rate these structured products. Under the pressure of financial institutions that manufactured the structured products and rating agencies' profit motives, the risky structured products were highly rated and sold to many institutional investors.

When housing prices reached the unsustainable levels in 2006 and at the same time interest rates were going up, subprime mortgage defaults and foreclosures began to explode. Many newly developed mortgage-backed securities are highly customized and traded over-the-counter being unregulated. When credit markets were frozen abruptly, the prices of all those securities were

falling quickly and CDSs and their prices exploded. CDO was first developed by Blythe Masters of J.P. Morgan in 1995 and CDS was invented by J.P. Morgan team in 1997. When the Congress passed the Commodity Futures Modernization Act of 2000, it became illegal to regulate CDS. According to Wikipedia (http://en.wikipedia.org/wiki/credit_default_swap), the Act was rushed through Congress without hearings or opportunities for recorded committee votes on the last day before Christmas holiday. By March 2006 the OCC reported that the notional amount of outstanding CDSs from 882 reporting banks was \$5.472 trillion. The Bank of International Settlements also reported that the notional amount of outstanding CDSs was \$13.9 trillion in December 2005, \$28.9 trillion in December 2006, and on February 17, 2008 the New York Times reported that there was \$45 trillion worth of CDS contracts at the end of 2007 of which at least \$20 trillion were speculative bets by speculators in which neither buyers nor the counterparties owned the referenced assets. CDSs are the most widely traded credit derivative product.

According to Shah Gilani (<http://www.moneymorning.com/2008/09/18/credit-default-swaps/>), CDSs are traded over-the-counter, opaque, unregulated, and subject to serious counterparty risk. Based on the guesstimate by the International Swap and Derivative Association (ISDA) the notional amount of CDSs could reach \$62 trillion including those written on subprime mortgage securities. As of June 30, 2008 AIG had written \$441 billion of CDSs on corporate bonds and mortgage-backed securities that forced the Fed and the Treasury to spend \$185 billion to bail it out.

CDSs are financial instruments or credit derivatives based on some reference entity such as bonds, loans, CDOs, and others agreed between two parties: a seller and a buyer. When a credit event in the reference entity is triggered, the seller either takes the defaulted underlying assets or pays the buyer the difference between the par value and the recovery value of the assets. Subprime mortgage lenders can buy more CDSs to protect themselves against potential losses when they make more loans. A buyer of CDS can be a hedger or speculator depending on whether the buyer holds the underlying assets or not. Most buyers and sellers are insurance companies, banks, pension funds, and hedge funds. Since there is no central trading processing agency of CDSs, it is very difficult to trace the risks associated with parties and counter-parties. Realizing the complexity and risk of the CDS market, Warren Buffet directed his General Re to pull back from that market. AIG would go bankrupt without the government bailout because its London unit is the

largest seller of CDSs. Other smaller players such as MBIA, Ambac Financial Group, and ACA Financial Guaranty all got into deep trouble for selling CDSs. The CDOs, CDSs, and troubled derivatives are private labeled or negotiated and all traded over-the-counter. Based on a report by Ng and Pulliam of WSJ (1-30-2008) the bond insurers' ability to write or sell CDSs was through the 1998 legal loophole by insurers' shell companies called "transformers". After New York insurance regulators had approved bond insurers to sell CDSs, other state insurance regulators followed suit. Many transformers are private companies incorporated in Delaware set up by insurers which guarantee the transformers' obligations and are required to pay principal and interests on the securities if they defaulted. The business increased very rapidly from 2005 to 2007. The ISDA started to report credit derivatives in 2001 with trading volume of \$919 billion. By 2007 CDS stood at \$62 trillion. As it turned out, selling CDSs has far greater risk than buying them. That brought down AIG, Bear Sterns, and Lehman Brothers, and the tax payers have to spend about \$185 billion to bear AIG out. By June of 2008 ISDA estimated potential counterparty exposures of \$2.9 trillion out of the \$532 trillion notional amount of all financial instruments including credit derivatives, interest-rate swaps and equity derivatives. The large banks' credit derivative dealers serve as the intermediaries between buyers and sellers, and these dealers usually have substantial offsetting positions. Therefore, the net positions of bank dealers are smaller than the amount of outstanding derivatives in the global market. Based on a report by Ng and Mollenkamp (10-25-2007) the major players of CDOs are (Table 4):

Table 4. CDO losses at major banks

Firm	Losses (\$billion)
Merrill Lynch	8.4
Citigroup	3.5
UBS	3.4
Deutsche Bank	3.1
Morgan Stanley	2.4
Goldman Sachs	1.7
Bank of America	1.6
J.P. Morgan Chase	1.6
Lehman Brothers	0.7
Bear Sterns	0.7

Sources: WSJ Market Data Group.

After Chris Ricciardi joined Merrill Lynch in 2003 Merrill Lynch became the largest underwriter of CDOs from 2004 to 2006 and was second in 2007 (Table 5).

Table 5. CDOs underwritten by Merrill Lynch

Year	Amount (\$ billion)	Number of deals	Ranking
2007	5.89	50	2

Table 5 (cont.). CDOs underwritten by Merrill Lynch

Year	Amount (\$ billion)	Number of deals	Ranking
2006	53.70	72	1
2005	35.24	46	1
2004	18.93	38	1
2003	8.69	14	3
2002	2.22	9	15
2001	3.22	7	9
2000	2.64	7	10

Note: Figures as of October 23, 2007.

Source: Dealogic.

In 2006 Merrill sharply increased the subprime CDO issuance to \$44 billion from \$14 billion in 2005. Ralph Cioffi managed two Bear Sterns' hedge funds invested heavily in Merrill's CDOs. When the CDO market collapsed in late 2007 and early 2008 and without being bailed out by the Fed or the Treasury, Lehman went bankrupt. Bear Sterns was sold to J.P. Morgan Chase and Merrill was purchased by Bank of America, both with guaranteed loans and being bailed out by the Fed and the Treasury. The \$15 billion loss of Merrill Lynch in the fourth quarter of 2008 has been dragging down Bank of America.

According to Dealogic, the global issuance of CDO was 181 deals in 2001, 208 in 2002, 263 in 2003, 312 in 2004, 402 in 2005, 471 in 2006, and 805 in 2007. The deal value was about \$60 billion in 2001, increased to about \$150 billion in 2005, \$225 billion in 2006, and jumped to \$387 billion in 2007. Asset-backed CDOs had been the largest buyers of subprime mortgages from 2002 to 2007. Among the CDOs issued in 2007 about 40% were backed by residential mortgage-backed securities (RMBS) and out of those RMBSs about 75% was made up of subprime mortgages and home equity loans. Unfortunately, from late 2006 the housing prices started to fall and the falling was accelerated in 2007 and 2008 while the issuance of CDOs was still increasing to June 2007. Then in late 2007 rating agencies began massive down grading of many CDOs, at the same time the asset-backed commercial paper market began to get frozen up, and the CDO market became very illiquid and hard to value.

According to Simkovic (2009), the erosion of the doctrine of secret liens and the complex and opaque financial products such as CDO and CDS receive the highest priority in bankruptcy. In addition, these opaque products allow investment banks, insurance companies and other related financial institutions to hide the extent of their leverage. Hidden leverage creates the appearance of high credit worthiness for debtors to enjoy low interest rates and encourages creditors to improperly assess the risk of default by

the debtors. The doctrine of secret liens forces the creditors to disclose information and discourage the development of highly complex and opaque products of asset securitization and derivatives. These products with hidden leverage, according to Simkovic (2009, p. 10), have the following characteristics:

- ◆ priority in bankruptcy for select creditors guaranteeing that debtor will repay these creditors first;
- ◆ no requirement for creditors to disclose the transaction to other potential creditors;
- ◆ no requirement for debtor to disclose the transaction on its balance sheet or other financial statements;
- ◆ complexity that limits the usefulness of any required disclosures to third parties; and
- ◆ immunity from secret lien doctrine and related provision of the Bankruptcy code.

The rapid growth of asset securitization and derivatives in recent years has been contributed by the preferential treatment in bankruptcy compared to secured loans from the creditors' perspectives. The opaqueness will create value for debtors when asset securitization and derivatives lead some creditors to underestimate the risk and overestimate the benefits in the leveraged securitization transactions. Based on the Uniform Commercial Code, secured debt must be disclosed by creditors through filings and by debtors through presentation on their consolidated balance sheets, while asset securitizations require neither filing by the creditors nor disclosure on debtor's balance sheet. "In sum, asset securitization constitutes a secret lien because it grants some creditors a very strong claim on specific assets of the debtor while hiding from other creditors the extent to which the debtor is leveraged and retains risk. Extensive use of these secret liens enabled sophisticated debtors such as investment banks to borrow cheaply, while creditors under-priced risk." (Simkovic, 2009, p. 19). Over-the-counter derivatives such as CDO and CDS are "an ideal vehicle for hidden leverage and secret liens because of their inherent complexity, limited disclosure, and superior treatment in bankruptcy" (Simkovic 2009, p. 22). In addition to the fact that the basic information about OTC derivatives transactions is hard to come by, the ISDA has resisted voluntary disclosure. He suggested that the Bankruptcy Code established a universal recordation system for any instrument such as a security, a derivative, an asset securitization, or any other financially engineered products. Long time ago some common law judges warned the dangers of products such as CDOs and CDSs could be vehicles for secret liens and threatened to result in serious credit crisis. Simkovic believes that manda-

tory disclosure and some new regulation may force bank efforts to shift from hiding leverage and concealing balance sheets to value-creating innovations (p. 46). However, it is unclear how much is impact of the change in Bankruptcy Code, as explained by Simkovic, on the recent growth of CDOs, CDO²s, and CDSs. The more likely reasons for the rapid increases in these derivatives are the booming housing prices, the popularity of subprime mortgages, the low interest rates, the predatory lending practices, the low underwriting and lending standards, the lack of regulatory oversights, the inability of rating agencies, the greed and short-sightedness of executives of financial institutions.

5. Potential future regulatory and other changes

How could a country with so many smart and experienced people armed with the most advanced technology, abundant resources, well established institutions and rules, and powerful government allow the multi-trillion dollar crisis to develop and explode? Where were all these people when the crisis was developing? Where were the regulators when the market participants ran wild? Where were all those highly paid executives? What were policy makers, regulators, the congress and the government doing? All boil down to greed and fear (Shefrin, 2000), animal spirit (Akerlof and Shiller, 2009), laxity of oversight and enforcement by regulators, moral hazard, shortsightedness and unethical behavior of market participants.

More specifically, the behaviors of executives of financial institutions, mortgage lenders and borrowers, originators, brokers, appraisers, underwriters, securitizers, investors, regulators, monetary policy makers, and other market participants may change in the near future as a result of the current financial and economic crises. But when housing prices rise and the economy recovers and grows and substantial profit opportunities show up again, will market participants turn from optimistic to overconfidence and exuberance once more? Have they learned from this bitter lesson? Can they remember the lesson for a long time? Will the continuous improvement in information technology, financial innovations, and globalization of financial institutions and markets benefit the majority of the people around the world or will they make some people rich and powerful while bringing major disaster to the general public in the future? History may not repeat exactly, but will it repeat itself over and over again?

Back in 2006 when economists including some Nobel laureates and the Federal Reserve chair and some other members of monetary policy makers pronounced the death of business cycles, who would expect to experience so soon the arrival of the most serious financial and economic crises since the

Great Depression? Where is the magic of free market mechanism? How could rational market participants and government policy makers promoting people to own houses not consider the affordability to home buyers? This is a critical moment for all of us to take all these questions seriously. The following report is particularly timely and valuable.

In late March 2009, the Wall Street Journal (the Journal Report, March 30, 2009) assembled about 100 smart and experienced people from business, investors, government officials, policy makers, and academia to find solutions to the current crisis and develop some measures to prevent it from occurring again. Here I will focus on what we can do to avoid repeating the past mistakes and hopefully prevent the crisis as serious as the current one from happening again. The group developed an action plan with 20 principles for rebuilding the broken financial system. Those principles from expert participants are very comprehensive but they need to be translated into concrete actions regarding the forms of rules and regulations and the required changes in behaviors of market participants.

First, the Mortgage Reform and Anti-Predatory Lending Act of 2009 introduced by Miller, Watt and Frank must be passed. This Act set standards for lenders, borrowers, mortgage brokers, appraisers, underwriters, mortgage loan securitizers, and investors, and also stipulates penalties for violators of the rules. This Act targets at the central problem and the origin of the current subprime mortgage crisis. It is too early to tell exactly what and how the Congress will pass the Act.

Second, regulatory reforms including overhauling the existing regulatory system, similar rules and regulations applying to banks and non-bank financial institutions, creating systemic regulator, increasing capital ratios and restricting leverage to prevent systemic risk, creating new clearinghouse to enhance transparency and standardization of derivative securities such as credit default swaps and collateralized debt obligations, price and volume disclosure, setting collateral requirements, and providing the FDIC with more fund to close failing institutions as quick as desirable must be put to effect.

Third, regulatory oversights and regular examinations and reporting must be enforced. In particular, the Federal Reserve, the FTC, the FHFA, the SEC, the OCC, the CFTC, the FDIC, the Congress, and state regulators must do their jobs and minimize the influence by powerful lobbyists by taking into account the multi-trillion dollars and 7 million job losses to people in the U.S. and around the world. Indeed, the laxity of regulatory oversights, which the current regulatory reform has focused upon, is one of the major contributors to the current crisis.

Finally, rating system reforms such as the avoidance of conflict of interests between rating agencies and securitizers, transparency of rating methods and results, more competition allowing more rating agencies, compensation for rating services based on long-term rating accuracy, and making investors pay for rating services are urgent.

The U.S. Department of Treasury after lengthy studies of the financial and economic crises for months by various parties such as the Fed, the Treasury Department, and many experienced and knowledgeable experts finally disclosed the financial regulatory reform in mid-June of 2009 (<http://www.financialstability.gov/docs/regs/FinalReport>). This proposal is disclosed for further discussions and recommendations from various government agencies, businesses, scholars and the general public and the recommendations are to be made by October 1, 2009. The final conclusions are targeted by December 31, 2009. It is a document of 88 pages reflecting the very thoughtful expertise of those involved in the process. Here I will briefly summarize the key reforms.

First, in order to “promote robust supervision and regulation of financial firms” a new Financial Oversight Council will be established to identify systemic risks and coordinate various regulatory agencies. The Federal Reserve will have new power to supervise all firms, not just banks and bank holding-companies that may cause systemic risks. Higher capital requirements and more prudential business standards are required for all large financial and interconnected firms. Elimination of the OTS and establishing a new National Bank Supervision to supervise all federally chartered commercial banks and thrift institutions are needed. Advisers of large hedge funds and private equity funds are required to register with SEC.

Second, to withstand systemic risks and failure of some large institutions, a more comprehensive supervision of financial markets will be established. Securitization markets are required to provide market transparency, credit rating agencies must be more closely regulated, and issuers and originators of securitized loans must retain a certain percentage of financial interest. All over-the-counter derivatives are subject to comprehensive regulation. The Federal Reserve will oversee payment, clearing, and settlement systems.

Third, a new Consumer Financial Protection Agency (CFPC) will be established “to promote transparency, simplicity, fairness, accountability, and access” in the consumer financial product and service markets. Currently, federal and state banking regulations have potential conflicts and result in

fraud and abuse, particularly in financial products such as mortgages and credit cards. The FTC will have new authorities and resources to protect consumers in a wider range of products and services. The SEC will have new authorities to protect investors by improving disclosure, raising standards, and stronger enforcement.

Fourth, in case of potential failure of a bank holding company, non-bank financial firm or large interconnected firm, which posts systemic risks, the Government must have tools to manage financial crisis. The Federal Reserve board must receive prior written approval from the Secretary of the Treasury to provide emergency lending under “unusual and exigent circumstances”. The Federal Reserve is an independent agency since its establishment in 1913 and is intended for making independent monetary policy for the economy as a whole, while the Treasury is part of the Government and must be accountable for using tax payers’ money.

Fifth and final, since financial institutions and markets have been globalized, to have a more effective financial regulation, the international regulatory standards must be strengthened and international cooperation must be improved. In particular, capital requirements and supervision for all global financial institutions, oversights of global financial markets, and crisis management must be strengthened. The Financial Stability Board, the Basel Committee, the ISDA will play important roles. The U.S. will continue to coordinate international financial policy through the G-20. However, when crisis hits, almost all nations will pursue policies which meet the most urgent domestic needs.

Shiller (2008) advocates that institutions need to develop better risk management to avoid bubbles and to insulate the general public from the consequences of the bubbles. He proposes: (1) to improve financial information infrastructure to enable the general public to make sounder financial decisions regarding financial practices, products, and services; (2) to make available to the public wider scope of financial markets such as new real estate market futures and other products to hedge against other economic risks; (3) to create retail financial instruments such as continuous-workout mortgages and home equity insurance to enhance financial security for consumers. However, he does not propose any regulatory reforms even though he emphasizes speculative booms and busts, irrational exuberance, and other behavioral problems. I believe, regulatory reforms should be the center piece of all efforts to minimize the recurrence of financial meltdown and the consequential economic crisis. Those who truly believe whole-heartedly in free markets and market

efficiency may consult with Bookstaber (2007), Haugen (1999), Soros (2008) Shefrin (2000) and Thaler (1991, 2005). It will be helpful if major business schools that produce many business leaders can stress the importance of business ethics and risk management, while the general education can help with more emphasis on personal and social responsibilities, moral and ethical behaviors. However, free market is essential for capitalism to thrive. Profit motivation and financial innovations will continue to prosper and capitalism will triumph. We remain hopeful that future financial innovations will be more value creating types like most technological innovations. Lobbying groups and politicians may not do businesses as usual or as the past. Human greed and fear and other animal spirits will never go away, but they may well be more contained. If the current regulatory reforms prove to be successful, we may expect a more stable financial system and the economy.

Summary and conclusions

There are many factors contributed to the subprime mortgage crisis and the resulting financial institutions turbulence and global economic recession. Driven by excessive greed many investment bankers with the help of financial engineers developed and traded exotic derivative securities such as CDO, CDO², CDS without being able to properly assess the true values of those securities. Many of these exotic securities were tied to subprime mortgages directly or indirectly. The notional amount of outstanding CDSs alone was about \$100 trillion. Most of these securities were traded over-the-counter without being disclosed or regulated. They brought down some largest investment banking firms such as Merrill Lynch, Lehman Brothers, and Bear Sterns and the largest insurance company, American International Group. The subprime mortgage crisis triggered the collapses of many financial institutions and many of the large ones had to be rescued by the U.S. Treasury and the Federal Reserve due to the concern of systemic risk which may lead to the demise of the entire financial system. How to bring all transactions of these exotic securities to some exchanges is still under serious debates. The tug war between the will of the Congress and regulators on

the one hand and the lobbying groups on the other may drag on for a while.

The causes of subprime mortgage crisis are very complicated. The most serious one was the predatory lending and borrowing. Many mortgage brokers, appraisers, underwriters, lenders, investment bankers who securitized mortgages and sold derivative securities to investors, and borrowers who falsely stated their income all were committed to moral hazard. In other words, people involved in the whole chain, from borrowers to investors of CDOs, CDO²s, CDSs and other related securities, were either committed to moral hazard or were unable to value the securities they were buying and were driven by band wagon effects. In the process the larger institutional investors played the critical role in the boom-bust cycle. Another important contributor to the crisis was the low interest rate policy by the Federal Reserve and other central banks around the world. Under the excessive low interest environment housing boom was a natural consequence. The unsustainable housing boom eventually led to bust. The laxity of enforcement by various regulators and lack of supervision by the Congress also played a key role to let market participants disregard or get around existing rules and regulations. Finally, some financial institutions, such as investment banking firms and insurance companies, were not subject to required capital ratios and were allowed to have excessive high leverage to sustain large losses.

The Congress, the Federal Reserve, the Security and Exchange Commission, the Commodity and Futures Trading Commission, the Federal Housing Agency, the Federal Deposit Insurance Corporation, the Federal Trade Commission, and others have been trying to establish the best possible regulation and supervision to prevent the most serious crisis since the Great Depression from happening again. It takes the wisdom and courage of all the parties involved and at the same time they must fend off the powerful lobbyists and special interest groups. The multi-trillion dollar losses of income and wealth and the multi-million job losses due to this crisis must be seriously considered and remembered. Otherwise, the history may repeat itself in the future.

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