The Everyman's Guide To The Financial Crisis

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Prologue

St. George and the Dragon

In the National Gallery in Washington, D.C., hangs a small oil painting of St. George and the Dragon by Raphael.[1] In it, we see a fine-featured, almost delicate, St. George in black armor thrusting his lance into the plague-breathing chimera recoiled menacingly below his white horse; in the background, the maiden he has come to rescue wrings her hands, in a mixed expression of hope and trepidation. The dragon had been threatening to poison the river unless its ever increasing demands were met. Fearing the worst, the villagers decided they should try to pacify him by delivering their fairest virgin. In confronting the dragon, St. George seems to exude a curious calm that is matched only by the peacefulness of the Renaissance background. It is as though St. George's unambiguous decision and the sense of purpose that animates him have already put the world to right and provide assurance enough that the ultimate outcome cannot be in doubt – though he may falter, the forces of darkness and confusion will eventually be forced back.

The appeal of scenes such as this no doubt comes from the fact that they stand in stark contrast with our messy everyday reality. Crises where the challenge is clearly delineated are rare. Determined, unambiguous responses are even rarer. We are more often accustomed to ill-defined, recondite conundrums and muddled, controversial responses, some of which seem hopelessly incidental to the problem at hand.

Crises and Responses

Crises often evoke subterranean forces that coalesce and suddenly explode forth. Deciphering their origins, tracing back to their root causes, however, always seem a controversial endeavor. This may be because such inquiries often lead to questions whether they could have been avoided – whether cause and effect were inextricably linked or just accidentally so. Often the sense is that similar circumstances have existed before which did not lead to a crisis. Thus, while in some instances crises can strike us as long in the making, in others an overpowering feeling arises that they could have been forestalled, that someone was asleep at the switch and failed to take a stand when there was still time.

The acrimony can become so pronounced as to risk aggravating and prolonging the crisis. As a result, compromise – that is, agreeing to leave the inquiry to another day (even if it means substituting a post-mortem for a diagnosis) and stressing common action instead – sometimes seems preferable even if it means taking action without a coherent or articulated strategy. This is how many battles of yore were fought, staking everything on solidarity and common purpose in delivering a massive thrust against the adversary rather than attempting modern age-style surgical

[1] A different version, also by Raphael, of St. George and the Dragon exists at the Louvre in Paris. In it, St. George brandishes his sword, ready to strike; on the ground his broken lance attests to the fact that his first weapon failed him.

operations. At other times, a clear-minded leader will emerge who will see through the complexity, cut through the undergrowth of dissent and mobilize everyone around clear objectives.

It is perhaps not surprising then that crises seem to be characterized not only in retrospect and from the outside, but mostly in terms of the response they were met with. Beyond that, they often remain mysteries, remembered less for the circumstances in which they arose than for the actions they elicited – no doubt fittingly so for events which the Greeks called *krisis*, literally decisions. Crises are without doubt history material.

Three types of decisions seem the most common. The first, exemplified by St. George – deliberate and purposeful – is probably scarcest. The second type is the one exhibited by the swimmer caught in an undertow: we see a flailing of arms and legs and only in time can we determine if the effort was in vain or whether the apparent disorganization masked an effective strategy. The third type is a response only in part, if at all – it consists of those actions and strategies whose ultimate purpose is only partly related to the crisis, almost as if the crisis presented an opportunity to achieve other, preexisting, goals.

Volcker and Inflation

An example of the first type of response can be found in Paul Volcker's stint at the Federal Reserve. In August 1979, President Jimmy Carter selected Volcker as Fed chairman. At the time, the U.S. economy was in the throes of what had come to be known as "stagflation." Inflation, normally associated with periods of economic expansion, had been rising steadily even as the economy slowed. The situation was unprecedented and a policy conundrum. Inflation is typically reined in by hiking interest rates until credit becomes expensive enough to prompt a reduction of consumption demand. Because people buy less, more goods become available than are now in demand, putting downward pressure on prices. But in an economy that is stagnating, what one wants are policies that revive demand, not ones that reduce it further. And this is indeed the policy that Volcker's predecessor, G. William Miller, had chosen. Demand, however, did not pick up and the economy ground to a halt. Meanwhile the interest rate reductions had sparked an inflationary spiral.

On October 8, 1979, in a press conference that would be remembered as the Saturday Night Special, Volcker announced that he would reverse course and let interest rates rise until inflation had been wrung out of the economy. In the months and years that followed, interest rates were raised several times with the fed funds rate eventually reaching 20% in June 1981, plunging the economy in a severe recession. Unemployment reached 10.8% while street demonstrations unseen since the 1920s took place in Washington.

The U.S. economy has experienced low inflation for such a long time that we sometimes have difficulty grasping how pernicious the effects of inflation truly are and how quickly they get out of control when left unchecked. Beyond the vicious circle that sets in everyday transactions, inflation has its biggest impact on savings, the value of which gradually goes down, sometimes to the point of wiping them out entirely. Social unrest, capital flight, a weakened currency are the result.

Ultimately, however, Volcker's determination paid off: inflation was overcome, retreating to less than 3.5% in 1983. This would usher in a period of price stability and sustained economic expansion that was to last, with brief interruptions in 1991-1992 and 2001-2002, for over two decades.

The Run on the Peso

An example of the second type of response can be found in the Mexican fiscal crisis of 1995. After a period of reform and stabilization that came to be known as the "Mexican miracle," the country's economy had slowed, sparking sporadic political unrest. [2] The incoming administration of Ernesto Zedillo had an identified culprit – exchange rates that were pricing Mexican goods out of world markets – and a strategy to deal with it – devaluation. The devaluation was poorly executed, however, and made worse by a mishandling of the public relations. Before long, the Mexican peso was under attack in the currency markets and dropping steadily in value. Soon other Latin American currencies followed suit.

The International Monetary Fund and the U.S. Treasury joined forces to avert a full-blown regional crisis. Putting together a rescue plan, however, was hampered by the fact that none of Japan, European countries or Congress was inclined to step in. Congress, in particular, had just gone through a bruising debate over NAFTA, which had ultimately passed narrowly. Now the Mexican currency crisis seemed to prove the critics right, making it unlikely that the House would intervene with U.S. taxpayer money.

Ultimately, the U.S. Treasury resorted to a creative solution which within weeks restored order to the currency markets and pushed the peso back up. This it did by tapping the Exchange Stabilization Fund and lending $50 billion to Mexico on an emergency basis, actions it had the authority to take without prior appropriation or a vote from the legislature. While the plan was successful, it was clear to all that market psychology had been the main protagonist and that $50 billion would not have been sufficient in a continued and sustained speculation against the peso.

In the words of one expert:

> "we failed to understand the extent to which both Mexico and Washington simply got lucky. The rescue wasn't really a well-considered plan that addressed the essence of the crisis: it was an emergency injection of cash to a beleaguered government, which did its part by adopting painful measure less because they were clearly related to the economic problems than because by demonstrating the government's seriousness they might restore market confidence." [3]

Channeling the Crisis

The third response – the pursuit of a pre-existing or alternative plan aimed partly or entirely at unrelated objectives – is much more frequent than we realize. Prior to the fall of the Iron Curtain, most crises led to countries intervening ostensibly to assist a friendly

[2] Political turmoil was particularly pronounced in the Chiapas region.
[3] The Return of Depression Economics and the Crisis of 2008, Paul Krugman, WW Norton, 2009.

state only to turn it into a satellite. Corporate concessions from the East India Company to Aramco and the Anglo-Persian Company similarly were viewed as adept at furthering their interests in times of crises. ITT, Anaconda and Del Monte are other examples of powerful interests believed to have prospered from knowing when to step with assistance offers.

In which category does the government's response to the 2007-08 credit crisis fall – a determined set of actions against a clearly identified culprit, the disorganized flailing of arms that may ultimately work, or the execution of a plan that has an alternative purpose only partially related to the crisis? What does this response in turn tell us about the crisis?

1. The Events

The Housing Crisis

Few disagree that the crisis began with the bursting of the so-called "housing bubble" in late 2006 and the spike in subprime defaults that followed. What ended in 2007 was actually a remarkable housing boom that had started around 1998-1999 as the age of the internet was gaining full momentum.[4] Housing prices embarked around that time on a sustained surge upward that was interrupted only briefly by the combination of the 2001-2002recession, the dramatic deflating of technology stocks that had started a year earlier and the attacks of September 11, 2001.

The recession itself is now mostly remembered for its relative brevity and shallowness (even though its impact in the manufacturing sector was much more severe than is sometimes recognized). In part because of this, many economists today have come to attribute the housing bubble to the low interest rates that prevailed under Alan Greenspan in those days. Indeed, from 6.5% in early 2001– a level that had remained unchanged for eight months – the Fed Funds target rate was steadily reduced in 25 to 50 basis points increments throughout the year, eventually reaching 2.0% in December 2001 and 1.0% in June 2003, a level at which it stayed for the ensuing year.

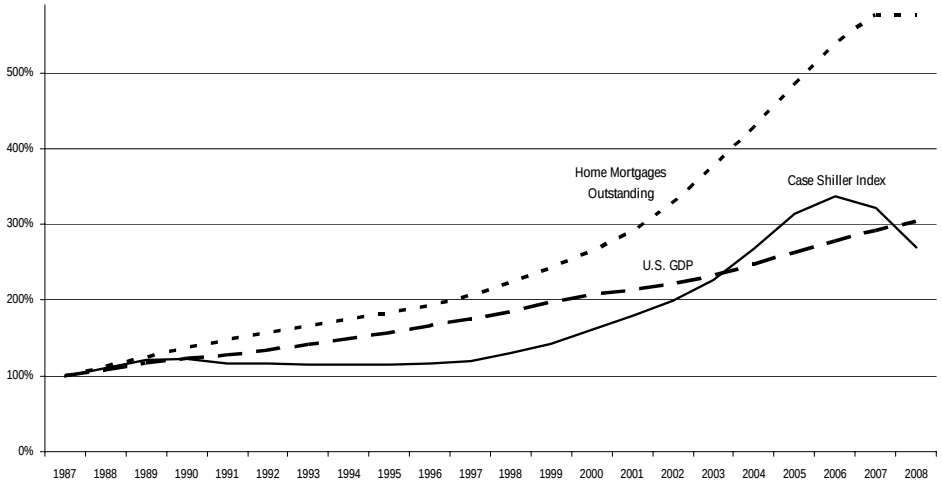


Figure 1.1 shows how growth in outstanding mortgages outstripped increases in GDP and house prices
Source: Bureau of Economic Analysis, Inside Mortgage Finance, Standard & Poor's

In reality, these interest rate reductions took place against a background where significant uncertainty prevailed. The impact of the terrorist attacks on the economy remained an unknown. Unemployment had continued rising for another 18 months after the recession was officially declared over.[5] Concerns over what Greenspan called the danger of "corrosive deflation[ary]" pressures and a Japan-style stagnation had come to the fore. And confidence threatened to be shaken by the litany of corporate scandals that had just started unfolding.

[4] Netscape went public in July 1995, raising $140 million in an IPO that is often considered to mark the beginning of the dot com era.
[5] The National Bureau of Economic Research is viewed as the authority on when recessions begin or end.

As it were, no sooner had the recession receded into the background and the stock market recovered than the U.S. economy began experiencing a renewed sense of prosperity. Once the danger had passed, it was realized that inflation had remained low, that dramatic productivity improvements had offset the traditional impact of higher unemployment, and that a leap in quality of life stemming from the internet had issued into the overall economy with only marginal cost to the consumer. An overpowering sense that the economy had somehow changed in fundamental ways permeated the period.

As one scholar summed it:

> "Global growth is the story of our times. It explains the rise of liquidity – the ever-growing piles of money moving around the world – that has kept credit cheap and assets (including real estate, stocks, and bonds) expensive…America has benefited massively from these trends. Its economy has received hundreds of billions of dollars in investment – a rarity for a country with much capital of its own. Its companies have entered new countries and industries with great success and used new technologies and processes, all to keep boosting their bottom lines. Despite two decades of a very expensive dollar, American exports have held ground." [6]

In the housing sector these trends were most strikingly epitomized by a sudden acceleration in home prices and new construction. Year after year, skeptics who warned of an overheated housing market and unsustainable prices had been proven wrong. Now, though, owners started witnessing even greater buoyancy in the market. Their newly acquired homes were appreciating within mere months rather than years. People began hearing stories about bids topping asking prices. Speculators appeared in hot markets in Florida, Arizona and elsewhere, taking out loans to build houses which would be "flipped" before they were even finished. What was new was that that this brand of speculators often looked no different than your next door neighbor – in fact, they often *were* your next door neighbor.

These trends translated into an explosion in new home mortgages, with a notable acceleration beginning in 2004/05. New mortgages began rising again. Home equity loans proliferated, enabling households to "extract equity" from their homes to finance consumption spending. Home ownership as a percent of the population increased from 64% in 1990 to 69% in 2005. People who had never owned a home were acquiring their first abode. For the first time, home ownership began extending to poor, often minority, households and neglected neighborhoods.

The Rise of Subprime

A closer look in fact reveals that most of the growth in mortgages from 2003 to mid-2006, when the market began to falter, came from this part of the population – applicants who heretofore had not been sufficiently qualified to obtain mortgages of any sort, people who were now taking out so-called Alt-A and subprime mortgages[7] and becoming homeowners with little or no money down. Entire communities in fact sprung up to accommodate this influx of newly empowered buyers.

[6] The Post-American World, pp. 27 and 183, Fareed Zakaria, WW Norton, 2008.
[7] In this section, we group the two under the general rubric of "subprime."

The dominance of subprime mortgages as the prime growth driver in the mortgage market became apparent in 2004. That year, the value of subprime mortgage origination jumped over 76% to $740 billion while traditional 30-year mortgages actually declined. Almost 29% of all mortgages granted in 2004 were either Alt-A or subprime. In each of 2005 and 2006, subprime origination passed the $1 trillion mark and accounted for 36% and almost 40% of total mortgages granted in those years.

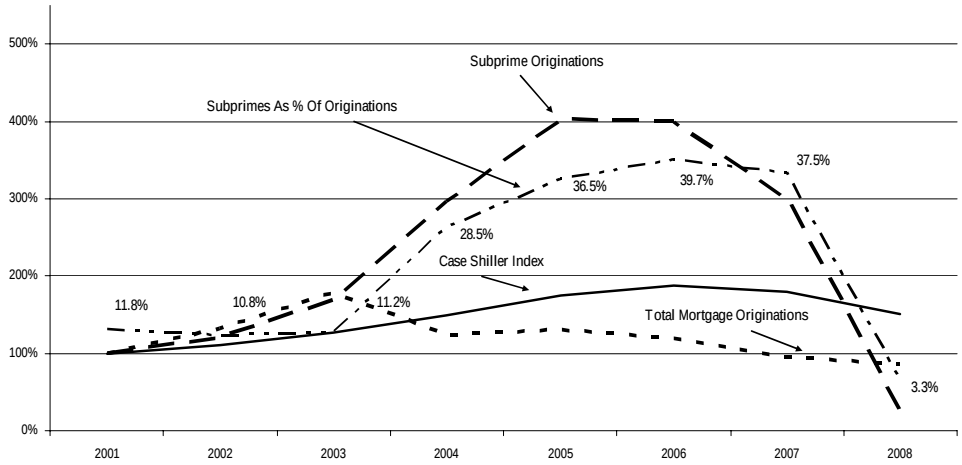


Figure 1.2 shows the predominant role played by subprimes in the 2004-2007 mortgage boom
Source: Inside Mortgage Finance

Mortgages in general were benefiting from a unique confluence of disparate trends, some of which have already been mentioned: very low interest rates which made mortgages in general (not just subprime) more affordable than they had ever been, soaring real estate prices which encouraged lenders to overlook credit blemishes, scaled-up marketing reach through the internet and portable communications, new legislative initiatives promoting homeownership, and positive sentiments that the economy.

However, subprime lending would probably not have grown so rapidly without two distinct forces operating in addition to those trends. At the front end, processes at every step of the traditional banking transactions were being computerized and the mortgage industry was no exception: applications were increasingly reviewed electronically, standardized scores using the Fair Isaacson & Co. (FICO) system became the norm, same-day approvals the expectation. At the other end was the sudden popularity on Wall Street for securities that could be manufactured with subprime mortgages as an ingredient. Demand was crystallizing for precisely the type of cash-flow characteristics that could be structured thanks to these risky loans.

This feeder aspect linking a heretofore obscure part of the housing market with the financial markets transformed both the mortgage origination process and Wall Street in fundamental ways. New entrants appeared – firms like Countrywide Financial and Washington Mutual. Wall Street investment houses, eager for a steady supply of subprime paper, not only forged alliances with originators and servicers, but in many instances acquired them outright. Lehman Brothers, the leading underwriter of mortgage-backed securities during the housing boom, acquired BNC Mortgage and Aurora Loan Services. Bear Stearns, another large underwriter, bought EMC Mortgage and Encore Credit. Merrill Lynch, Citigroup and HSBC also made acquisitions, of First Franklin; Argent; and Beneficial and Household, respectively.

These changes were sure to give the downturn, when it eventually materialized, greater potency than it could have had otherwise. The importance of housing in the U.S. economy is such that a contraction was bound to have serious consequences, particularly after several years of strong growth. But this was amplified by the fact that subprime mortgages had grown to be such a significant market, with many more new participants, a larger homeowner population base and distinctly regional centers of gravity as subprime had become concentrated in states such as California and Michigan.

What Is Securitization?

Securitization has been around since the 1980s. It refers to the process in which assets, whether receivables, loans or mortgages, are pooled together in a trust with the trust then issuing securities to investors entitling them to specified cash flow streams from the pool. Salomon Brothers is widely recognized as the firm that launched the first securitized offering in June 1983. That month, working with Lawrence Fink [8] of First Boston, Lewis Ranieri (of Liar's Poker fame [9]) successfully structured and sold certificates (then called collateralized mortgage obligations, or CMOs) against a pool of Freddie Mac mortgages. The offering represented a major innovation in financial markets.

Because of prepayments and refinancings, mortgage pay-down patterns and duration were inherently difficult to predict. As a result, mortgages had remained the preserve of thrifts and some banks and insurance companies. Other investors had little appetite for these long-dated commitments that could suddenly prepay and pose a reinvestment quandary. Yet, it was clear that mortgages were not only a huge market but one that was ripe for change.

Many new financing techniques, like commercial paper and swaps, were emerging in those days, all of which had in common that they were putting investors in more direct contact with borrowers, not only cutting across market boundaries but also bypassing traditional intermediaries such as banks, savings and loans, and credit unions. How could the staid home financing market be similarly unlocked?

Ranieri and Fink's insight was to see that mortgage cash flows could be repackaged to suit investor preferences. By judiciously pooling mortgages and then issuing certificates against the pool, cash flow patterns could be made more predictable than would ever be the case for the individual components. But where Ranieri and Fink made their decisive contribution was in taking things a step further: structuring the certificates in varying classes (or tranches) so a particular class could be entitled to cash flows on a priority basis before the next class got paid. In this fashion, the cash flows could be divided up so that the various classes behaved like as many traditional bond issues (or close to it) – that is, with specific maturities, coupons and claim level. In this scheme, only the bottom-most certificates assumed the residual risk of erratic cash flows (in other words, the equity risk).

Now investors who would never have bought portfolios of mortgages because of their long maturities and unpredictable prepayment patterns had a new type of paper they could invest in,

[8] Laurence Fink is currently the chairman of Black Rock.
[9] Liar's Poker, 1989, Michael Lewis, Penguin Putnam Ltd.

with a choice of shorter, medium-term or longer maturities as well as various other features. This was the insight; the innovation was in making it work.

Salomon Brothers' CMOs met with unmitigated success and in a few years led to tens of billions of dollars in new issues. CMOs constituted a signal development in two major respects. First, by turning mortgages into tradable securities they opened up the U.S. real estate financing market directly to investors, both domestic and foreign. Secondly, by addressing investors' vastly different investment horizon preferences, they injected liquidity in a part of the market that had not existed before. Soon, mortgage-backed securities turned into a buoyant source of financing for home loans and, following the bailout of the saving and loan institutions of the late 1980s, in fact became the *primary* source of funding for new mortgages.

The market for mortgage-backed securities grew rapidly, if at times unevenly, jumping from $3 billion in 1983 to $50 billion in 1996 and then $200 billion in 1998.[10] Back then, mortgage-backed paper was all so-called agency paper, that is, securities from 30-year loans acquired by Fannie Mae and Freddie Mac for this purpose. Thus emerged the secondary market that would serve as the terrain onto which subprime could be grafted.

Subprime Securitization

As seen, securitization after 2004 drove much of the growth of subprimes. This phenomenon was given a strong initial boost by the massive compression in risk premiums that had taken hold around that time in financial markets. The low yield environment which this brought about fuelled a boom on Wall Street for all manners of riskier structures capable of producing attractive returns.

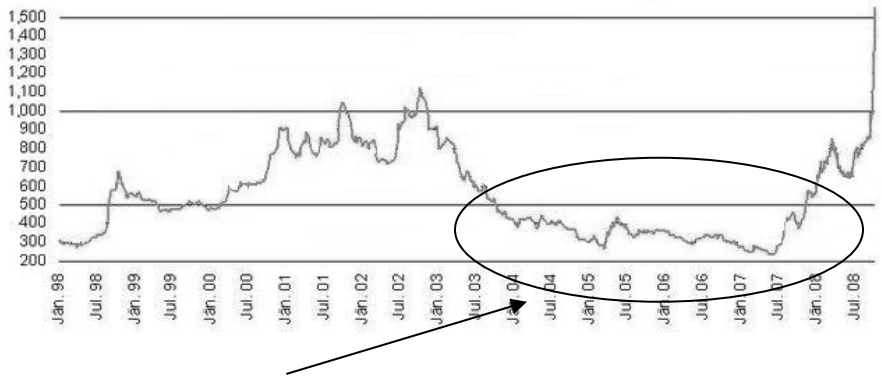


Figure 1.3 "Junk" bond yields[11] over Treasuries dropped to historical lows and stayed there during the entirety of the 2004-2007 mortgage boom. This period corresponded to a debt frenzy further described on p.44

[10] Handbook of Fixed Income Securities, Frank Fabozzi, McGraw-Hill,2002, p. 620

[11] In the credit markets, spreads are calculated in basis points over a reference rate such as Libor, Prime, or, as here, Treasuries. A basis point is one-hundredth of 1%; so 300 basis points is equivalent to 3%

the unique subprime paper's combination of high interest rates, prepayment penalties and short reset structures, often with a 2- to 5-year horizon.

From the outset, subprime mortgages encompassed a diversity of structures and risk profiles, in contrast to the uniformity of 30-year mortgages. In spite of this diversity, they did have key things in common: they were risky (less than 20% money down for hybrid ARMs, and only slightly more in the case of Alt-A loans), they paid high interest rates to compensate for this, they had steep interest rate resets after the initial 2- to 5-year period, and they had expensive compensatory mechanisms to reduce the likelihood of prepayment before the reset date.

In this fashion, they provided reasonable assurance that the high interest would be forthcoming during the initial period (the prepayment penalty acting as a refinancing disincentive) and that the equity buildup would be recaptured into the deal to provide the credit support for the reset of the mortgage or its liquidation (through refinancing) – either event meaning enhanced cash flows for the securitized structure. While lenders defended the prepayment and steep reset mechanisms as necessary features to incentivize and compensate them for making these loans,[11] the equity was thus also being diverted away from the homeowner. The presumption was that borrowers would understand all this worked, the marketing materials and pitches notwithstanding.

So now we had a family of instruments that had an attractive interest rate, enhanced likelihood of prepayment within a foreseeable interval, and relative safety, when pooled, so long as either the home prices continued rising or the overall default rate across the pool remained within acceptable levels, or both. And indeed, while the paper could theoretically remain outstanding for years, most securities based on them had expected lives of 3-5 years. These characteristics made subprime mortgages ideal for securitization on their own or as an ingredient that could be mixed in with pools of more traditional paper to provide the needed octane.

Subprime Mortgages

Type	Description
Alt-A	Nontraditional, poorly documented mortgages; eventually offered with hybrid (reset) and option features.
ARM	Spread (typically 2%+) over a reference base
Hybrid ARM	Interest fixed for 2-,3- or 5-years, then reset to a higher floating rate 2/28, 3/27 and 5/25 most widespread
IO	ARMs with the option to pay only interest for 5-10 years; balance does not change
Option ARM	Option to pay only interest or a "minimum" payment (which is lower than interest only and results in a growing balance called negative amortization)
40-Year	Variation on Option ARM extending 40 years

As the market grew, excesses became more frequent and widespread and standards declined. This was perhaps inevitable since securitization meant that lenders were increasingly less likely to maintain these loans on their balance sheets. This phenomenon which was soon amplified by the emergence of pure mortgage originators – new players who collected a fee for generating mortgages but passed them on down a chain of servicers, warehousers, securitizers, managers, trusts, and ultimately investors.

[11] Center for Responsible Lending, various presentations

This question is often referred to as the "agency-principal" issue and occurs whenever someone is making a decision but someone else bears the consequences of that decision.[12]

Resecuritization

The securitization chain did not end with the packaging of mortgages into pools, however. As time went by, mortgage-backed securities sold directly to actual investors declined. A new type of buyer emerged: structured investment vehicles (SIVs) and collateralized debt obligations (CDOs). These special purpose entities obtained their funding by issuing notes to investors and in turn invested the proceeds in mortgage-backed paper and other assets. It is through these notes that actual investors increasingly gained an exposure to mortgage securities. In the process, they were in reality two steps removed from the constituent assets (unless, that is, they had acquired notes in CDOs of CDO or CDO^2 vehicles, in which case they were three steps removed). As we will see later, there are actually two types of CDOs: cashflow CDOs and synthetic CDOs.

Synthetic CDOs are portfolios of credit default swaps (CDSs), not physical assets. CDSs are contracts similar to insurance, where in exchange for periodic payments one party (or set parties) stand ready to compensate another for any predefined change in value of a portfolio of loans, securities or indices. Although synthetic CDOs have played a significant role in the credit crisis, in this section we limit our discussion to the former since only cashflow CDOs involve a true form of securitization: synthetic CDOs are really complex derivatives and to that extent perhaps confusingly named; therefore here by CDO we mean cashflow CDOs.

SIVs and CDOs had features in common: they were thinly capitalized, they typically did not have independent management or employees and they usually could only perform administrative tasks (mainly making payments) through the services of a trustee following prescribed rules.

SIVs and CDOs can be thought of as privately-traded variants of mutual funds. SIVs were mostly structured and launched by banks for whom they represented a way to remove assets from their balance sheets and free up precious capital for other activities (or sometimes more of the same). SIVs did behave very much like mutual funds, the main differences being that they were not traded on an exchange, they were not obligated to divulge much information and that they were mostly incorporated in sunny jurisdictions such as the Cayman Islands. An important feature of SIVs which contrasted with mutual funds and would set off a string of events in late 2007 was that investors could put the SIVs back to the bank if certain cash flow or asset tests failed.

CDOs for their part were different from mutual funds in one important respect. When one purchases a share in a mutual fund, one secures fractional ownership in the entire portfolio of assets of the mutual fund. The prime purpose of CDOs, on the other hand, was to permit a reengineering of the cash flows in different tranches, with the senior most having priority of payment on the tranches below it so that the notion revolved less around ownership of assets than around claims on cash flows. In this fashion, they were structured around the same principles as CMOs.

[12] Resulting in agency costs – activities and procedures designed to align the interests of managers, trustees with those of clients, shareholders. Jensen and Meckling have advanced that family firms (SC Johnson, Corning, Wegmans) which often have little formal governance, tend to be devoid of agency issues.

We described earlier how in mortgage securitization a similar apportionment of the cash flows into different classes, or tranches, occurred. The result was that the cash flows followed a waterfall pattern where one class had first priority, the next one second priority and so on. With CDOs the same "tranching" and waterfall features were used to achieve the desired characteristics. But because CDOs had their own subordination features – typically 20% of the tranches were subordinated – a tranche holding BBB-rated mortgage-backed paper could obtain a AAA-rating as a result.

As CDOs evolved, they held increasingly larger proportions of mortgage-backed securities – often 80% or more – enabling them to offer the best of both worlds: – a AAA-rating on paper that, held directly, would not have qualified for investment by many funds but at the same time significantly higher yields than similarly rated paper. Of course, the disbursement of these yields (and the principal payments) had this peculiarity of being waterfalls of waterfalls… to say nothing of the even more remote situation of CDO^2s. Presumably, these sophisticated investors understood this.

The Financial Crisis Begins

Eventually, signs of a top began emerging in late 2006 and early 2007. The growth in home prices slowed markedly in 2006 to 4.1% from the prior year's 9.6% pace according to data from the Office of Federal Housing Enterprise Oversight (OFHEO).[13] Delinquency rates were beginning to rise. Investor appetite for non-agency mortgage-backed securities slackened. The first to be affected were the mortgage originators and warehousers, some of whom had repurchase obligations in certain default events. This set off an early wave of bankruptcies at the end of 2006, primarily smaller players such as Ownit and People's Choice (in April 2007, they would be followed by a much larger firm – New Century).

Another aspect of the market had also changed in 2006. In January that year, Markit had introduced a family of indices referencing 20 mortgage-backed security tranches by rating category, AAA, AA, A, BBB and BBB-. The indices were designated ABX.HE.[Rating] [Year]-[Semester]. So for example, the double-A index for issues dating to the second half of 2006 was denoted ABX.HE.AA 07-1.[14] Now there were indices to track the overall market. By the same token, there were now also indices that investors could short – to hedge their long positions or simply to bet against continued froth in mortgage-backed paper.

The ABX became a subject of some controversy. Questions were raised whether some of the subindices were not overstating overall default risk in certain individual rating categories. Additionally, a number of experts in time would raise the question of which followed which in the early stages of the credit crisis: that is, whether the indices reflected the decline in the market or precipitated it beyond any relationship with real world developments.

[13] The Fannie Mae House Price Index appreciation slowed to 1.1% from 2005's 12.9%. Federal National Mortgage Association, 10-K for the year ended Dec 31, 2007

[14] To make things simple, the market jargon designates each semester by the next succeeding semester. So 07-1 references paper issued in the second half of 2006 and 07-02 paper issued in the first half of 2007.

In any event, when the ABX.HE.BBB- 07.1 was introduced in late January 2007, it fell almost immediately. This was followed by severe drops in February, concurrently with widespread reports of financial stress within several funds.

Then in May, UBS' Dillon Read Capital Management hedge fund failed. While the repercussions were limited, the same was not the case when two Bear Stearns funds began facing liquidity problems. In order to the leverage these funds, which totaled $20 billion in assets, Bear Stearns had agreed to giving lenders immediate collateral call and loan repayment rights. With rumors of rapidly declining liquidity in mortgage-backed securities, these rights were being exercised. Eventually, spurning a cash infusion proposal from Bear Stearns, Merrill Lynch's prime brokerage division moved to sell over $800 million of the funds' assets, some for as low as 30 cents on the dollar. This was the first in a series of events that eventually triggered their collapse.

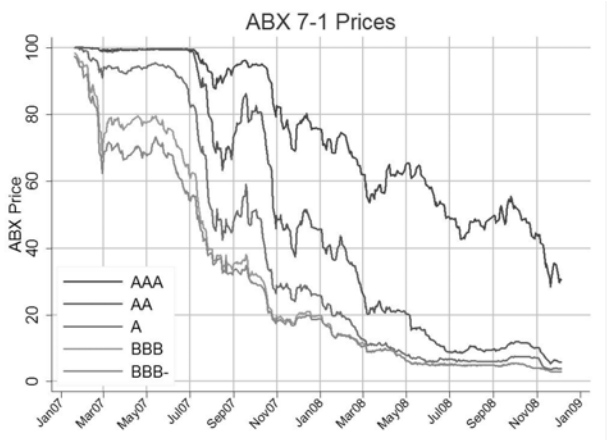


Figure 1.4 The ABX index began falling soon after its introduction as short-sellers were jointed by firms seeking to hedge their long positions in mortgage securities.

By the summer of 2007 investors were shunning these issues, unwilling to purchase bonds that were not backed by Fannie Mae and Freddie Mac. Given that, at this point, securitized mortgage debt exceeded the size of U.S. government debt, one could expect the consequences to be serious and to eventually impact the economy in more insidious ways than previous housing downturns.

For now, however, the stock market was holding up. In fact, banks were willing to continue lending large amounts, at unprecedented multiples of company earnings and with so-called covenant-light terms. As summed up by William Conway, co-founder of private equity firm Carlyle Group:

> "Frankly there is so much liquidity in the world financial system that lenders (even "our" lenders) are making risky credit decisions. This debt has enabled us to do transactions that were previously unimaginable (e.g. Hertz, Kinder Morgan, Nielsen, Freescale) and has resulted in (generally) higher exit multiples than entry multiples. I EXPECT THIS EXCESS LIQUIDITY, LEADING TO HUGE AMOUNTS OF RELATIVELY CHEAP FINANCING, WILL CONTINUE FOR AT LEAST THE NEXT 12-24 MONTHS. FRANKLY, I SEE NO CATALYST THAT WILL LEAD TO A QUICK, LARGE OR DRAMATIC CHANGE IN THE GLOBAL LIQUIDITY (emphasis in original)." [15]

[15] Internal Memorandum to all Carlyle investment professionals, January 31, 2007

The result was a continuation of the LBO boom well into 2007, keeping stock prices strong. KKR agreed to acquire First Data for $26 billion, this on the heels of a $44 billion deal for TXU, Blackstone struck a $26 billion agreement with Hilton Hotels, Harrah's shareholders approved its sale to Apollo Group and TPG for $17 billion, Goldman Sachs and TPG disclosed they would acquire Alltell for $25 billion. Rumors even surfaced that Dow Chemical might be taken over for more than $50 billion.

In fact, despite the weakening mortgage-backed securities market, the financial industry itself remained highly active. In late 2006, ABN-AMRO had begun marketing a new structure called constant proportion debt obligations (CPDOs), a type of index-based derivatives. In 2007, these were encountering significant interest. ABN-AMRO itself was viewed as so attractive that a bidding war had erupted between Barclays and a group headed by Royal Bank of Scotland (in partnership with Fortis and Gruppo Santander). In April, buyout shop JC Flowers offered to take Sallie Mae private in a $25 billion deal. Bear Stearns itself attracted the interest of Joe Lewis and his Tottenham group, which took a 7% interest in the firm for $600 million, and would continue building on the position, at a rumored $118-per-share, to more than $1 billion by year-end 2007.

In August and September, however, new signs of stress in financial markets surfaced. Axa-managed funds began receiving redemption notices. In August, Sentinel Management Group collapsed. By October, signs of an incipient financial crisis multiplied. Merrill Lynch loses $2 billion. Stan O'Neil dismissed in October. Insurers who had provided credit enhancement began announcing loss exposures in CDOs. Now we had crossed from mortgages and an underwriting draught to CDOs. For the first time, the public began realizing how large the mortgage-backed securitization line had become and the extent to which traditional firms had become active in the sector. Although overall mortgage-backed issuance stood at $784 billion for the first three quarters of 2007, down only 1.3% from the prior year, the pace had actually slowed to a crawl by the fall. The dam was breaking.

All of a sudden signs of a credit crunch were emerging here and there. Questions about whether Washington Mutual had sold mortgages to Fannie Mae and Freddie Mac bearing on homes appraised at artificially high prices had prompted an investigation by the New York Attorney General. Financings for high profile deals such as United Rental, Affiliated Computer, Huntsman and Sallie Mae began falling apart. Tyco International pulled a planned bond offering and Cerberus withdrew an attempt at selling $4 billion of notes in its Chrysler transaction.

The Markets Bifurcate

Nonetheless, disproving the adage that the stock market cannot perform well when financial stocks are ailing, shares recovered driven by strong performance in industrials, technology and commodities, and as LBOs were replaced on the front scene by strategic mergers. Stocks of companies as different as Alcoa, Freeport-McMoran, Mosaic (the result of a merger deal between ICM and Cargill), Peabody Energy, Flowserve, National Oilwell Varco, Apple, and Research in Motion, all embarked on a seemingly unstoppable ascent that in some instances would double or triple their value within months. On the transaction front, large strategic combinations had been announced throughout the year – BHP Billington had been seeking a merger with Rio Tinto since the spring, and Italy's Enel had agreed to merge with Endesa of Spain in the first quarter as well. Now, however, theirs was the limelight as the pace continued unabated while LBOs receded: Transocean Drilling bought Global SantaFe, Rio Tinto offered to buy Alcan in a defensive move,

and Akzo Nobel said it would buy Imperial Chemicals. On October 9, 2007, the Dow Jones Industrials reached an all-time high of 14,164.

As 2007 came to a close and 2008 began, the financial crisis suddenly seemed to deepen and become international in scope, engulfing commercial banks, investment banks, insurers, specialized lenders. Asset-backed commercial paper conduits (ABCPs) and SIVs were especially vulnerable because they funded themselves in the short-term markets while investing in quintessentially long-term paper. The Treasury had been working with Citigroup and other large sponsors of SIVs to devise a solution – in the form of a super-SIV. Events overtook them, however. Canadian conduits with names like Aurora, Gemini, Planet and Rocket were the first to not able to roll-over commercial paper. In November, Rhineland, a conduit, and Rhinebridge, a SIV, faced a shortage of $17.5 billion, requiring German bank IKB to be rescued by a state-owned bank. In December it was the turn of WestLB and HSH Nordbank. Finally, in December Northern Rock, the first UK lender to embrace securitization and Britain's largest real-estate player, failed.

The Federal Reserve's reaction was energetic: it decided to tackle the problem on two fronts simultaneously – announcing an ambitious program to enhance liquidity in the banking system and cutting interest rates. Meanwhile, one after another financial institutions were raising capital as they prepared to report dismal results for the fourth quarter. UBS announced that it had raised $9.7 billion from the Government of Singapore Investment Corp. within weeks of Citigroup disclosing a $7.5 billion investment from Abu Dhabi Investment Authority. Another Singapore fund, Temasek Holdings, meanwhile, injected $9.2 billion in Standard Chartered plc and $4.4 billion in Merrill Lynch. Not to be outdone, Morgan Stanley raised $5 billion from China Investment Corp.

When earnings were disclosed, they were indeed disappointing. State Street's fourth quarter earnings were down 28%.; US Bancorp's down 21%. Merrill Lynch and Citigroup both announced massive writedowns. The Merrill Lynch announcement in particular, by revealing heavy losses across the full breadth of its subprime-backed holdings triggered a succession of events that would precipitate the fall of several funds and culminate in the insolvency of Bear Stearns. Paradoxically the problem began with Alt-A mortgage-backed securities – the comparatively less risky and better quality issues within the family of subprime instruments – and rather prosaically, not with a writedown or a large trade loss announcement by one or another participant, but simply with lenders requesting that cash be posted as supplemental collateral on borrowings secured by Alt-A paper.

Carlyle Capital, KKR Financial and Peloton Partners, a hedge fund founded by Goldman Sachs alumni, were among the firms receiving these calls. Initially, capital infusions from their parent companies – buyout firms Carlyle Group and Kohlberg Kravis Roberts – bolstered the first two of these firms enabling them to meet the collateral calls. Peloton Partners would fail before the end of February, however. Rumors of its imminent downfall combined with a surprise increase in jobless claims had caused a sudden widening of credit spreads which made overnight borrowings more expensive and increasingly inaccessible to firms which could not post top-rated bonds such as Treasuries as security. [16]

[16] Financial institutions obtain short-term funding by selling commercial paper (bonds issued in the public markets for less than 270 days); drawing on bank credit lines; or borrowing in the repo market (where funds are lent against securities). Banks have two additional alternatives: the interbank lending market banks or purchases of excess reserves at the Federal Reserve. See p. 111. Bear Stearns counterparts in repos began requiring cash or Treasuries as collateral.

The collapse of Peloton unleashed a flurry of collateral calls from nervous lenders and was eventually followed by the failure of Carlyle Capital on March 13, 2008. Bear Stearns' situation, meanwhile, was deteriorating rapidly: with its large inventory of subprime securities it had been the target of collateral calls similar to Peloton and Carlyle Capital; now this was accompanied by cancellations of overnight credit lines by European banks such as Rabobank, Deutsche Bank and ING. The fatal blow came when hedge fund customers began withdrawing their assets from Bear Stearns' prime brokerage division: like other institutions routinely do, the parent company had borrowed against these assets and now had to unwind these arrangements at the worst time.

Effectively insolvent, Bear Stearns attempted to sell itself during the weekend of March 15-16. JC Flowers, headed by a former Goldman Sachs partner, offered $3 billion for 90% of the firm but could not firm up its financing in time. JP Morgan, backed by a loss-sharing arrangement from the Treasury (see p. 28), sealed the deal, buying the firm for $2 a share or less than $250 million, eventually raising the price a few weeks later to $10 per share.

Still, panic was hardly the dominant emotion. The stock market was, in fact, holding up. as commodity stocks took over leadership from the financials. Oil had passed the $100 per barrel mark just after the New Year and was continuing on a steep ascent. Meanwhile, March 2008, a joint sub-committee of the House Financial Services Committee held a hearing to examine the role of sovereign funds in the economy and the threat they might pose to the independence of the financial sector.

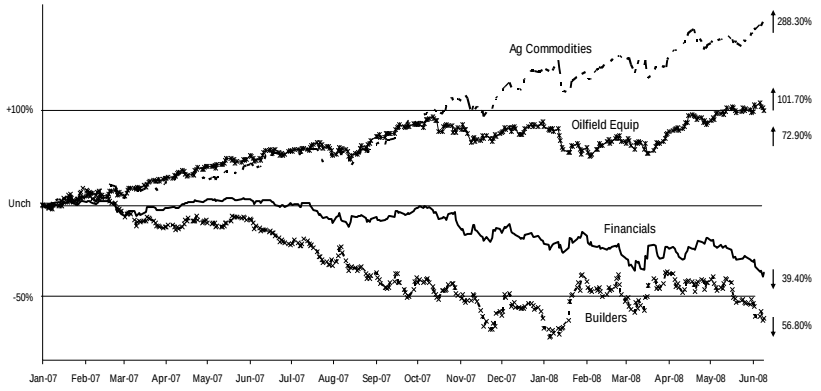


Figure 1.5 In mid-2008, the markets gravitated awayy from financial and housing stocks to commodities and oil-related firms

By the late spring and early summer, the talk in the market centered on whether these sovereign funds had struck unfair sweetheart deals, whether the price of oil was driven by speculation, and whether the Federal Reserve might not have overdone things once again by pushing interest rates excessively low. "…The possibility of $150-$200-per-barrel oil seems increasingly likely over the next six to 24 months" opined Goldman Sachs in May 2008. In a rejoinder from Morgan Stanley barely a month later, we were being told that we might not need to wait that long after all: due to much lower inventory levels than in 2007, $150 a barrel would be a reality by July 4th. All seemed to agree with a UBS assessment that "a number of secular themes have emerged to support an extended cycle, which we do not believe will end any time soon."

With respect to interest rates, "the latest round of increases in energy prices has added to the upside risks to inflation and inflation expectations" conceded the Federal Reserve chairman, Ben Bernanke, in June 2008. Some went farther – to wit the following commentary by William Gross in the PIMCO Investment Outlook that same month:

> "I'll tell you another area where we've been fooling ourselves and that's the belief that inflation is under control. I laid out the case three years ago in an Investment Outlook titled, "Haute Con Job." I wasn't an inflationary Paul Revere or anything, but I joined others in arguing that our CPI numbers were not reflecting reality at the checkout counter."

But overall, more people agreed than disagreed with the views of Donald Kohn: that given the challenges, it was a matter of choosing the lesser evil, that, in effect

> "it may be efficient to allow some adjustment period in which both overall inflation exceeds its desired low level and the unemployment rate is higher than its long-run sustainable level."

These comments were made on June 11, 2008. The week before, Lehman Brothers' stock had closed at $32.02, Morgan Stanley at $37.13 and American International Group at $33.26. Freddie Mac was at $23.96 on June 6; Fannie Mae at $25.71.

The Crisis Turns Tidal Wave

Just three months later, both the picture and the discourse changed drastically.

Between September 2 and 12, financial stocks dropped steadily, led by Lehman Brothers which declined 77% in just ten days, from $16.13 to $3.65. On September 8, the Treasury Department announced that it would take over Fannie Mae and Freddie Mac. Both had seen their stock decline as earnings announcement had disappointed investors time and again. On September 8, they closed at $0.73 and $0.88, respectively, down from $7.04 and $5.10 the previous session. This was only the beginning.

In the evening of September 14, a Sunday, Lehman announced that it would file for bankruptcy. The following morning, as it did so Merrill Lynch announced that it would be acquired by Bank of America in a $50 billion merger. The day after that, American International Group (AIG) announced that it would borrow $85 billion from the Federal Reserve in exchange for an 80% equity interest in the insurer. Meanwhile, in Britain amid rumors that Barclays and Lloyds TSB needed upward of $25 billion in fresh equity each, Royal Bank of Scotland (RBS) was foundering. RBS which had completed the acquisition of ABN Amro in October 2007 in a contested takeover, had already raised $20 billion earlier in the year. The British government was now bailing out RBS through a concurrent merger of the bank with Lloyds, capital injection and $570 billion (£325 billion) government guarantee.

Over the ensuing weekend, on September 20, barely a week after Lehman's announcement, the Treasury sent a three-page $700 billion bailout request to Capitol Hill seeking to be granted discretionary authority to embark on a massive purchase of troubled financial assets. In the ensuing weeks, the Federal Reserve and the Treasury were to engage in frantic activities to stem a

rapidly deteriorating situation – only to be greeted by repeated and dramatic stock market downdrafts that reflected the depth of investors' unease.

The pattern of adverse market reaction to ever larger governmental rescue efforts began emerging in late September. On September 29, the Fortis rescue by the British banking authorities was announced just hours before Paulson's bailout plan would be voted down in the House of Representatives. In response the market dropped almost 7% to 10,850. The next day, it recovered more than half of the loss despite the announcement that it was Dexia's turn to be taken over in a $9 billion rescue. About a week later, however, when the Federal Reserve announced that it was raising the ceiling on its Emergency Loan Facilities (Tuesday, October 6), the markets closed down 3.5% after having dropped almost 8% intraday. The next day, when this was supplemented with an announcement that the Fed would buy commercial paper on the open market, the averages dropped 5%, after being up 2.5% and down 8% from there.

Then in the pre-market hours of Wednesday, October 8, as Dow Jones futures pointed to a downward open of more than 500 points, central banks in the U.S., Europe, Canada, Britain, Switzerland and Sweden announced a concerted rate cut of 50 basis points (to 1.5% in the U.S. and 3.75% in Europe). That day, the markets rose and then dropped, then recovered, ending down 2% for the day; the next day, they dropped 7%. The Dow Jones closed at 8,579, a ten-year low.

Reflecting this volatility, the CBOE VIX stock options index had jumped to 54 the week before – a level not seen since the Russian bond default crisis a decade earlier – and then passed 70 that week. Unprecedented flight to safety triggered Treasury purchases in excess of $340bn per day, sending yields on 3-month bills and two-year notes to 0.39% and 1.58%, respectively – historic lows and negative rates in real terms.

Significant hedge fund declines, reportedly reaching 40-60% of asset values in select cases in October (following $210bn industry-wide losses in the third quarter), and mutual fund redemptions estimated at $5bn per day through October 17, triggered a sell-off in commodities and stocks. In the two weeks to October 17, the Dow Jones Industrial and S&P500 fell 18.4% and 19.2% respectively, to 10-1/2 and 11 year lows

What Caused The Crisis?

Looking back, it clearly seems that the crisis proceeded in two steps. What caused circumstances to change abruptly? Why did the tone shift and lead to an almost indiscriminate selloff? How did we come to a point of total paralysis in financial markets, not just in the U.S. but abroad as well? Subprime mortgages do appear to come anywhere close to providing a satisfactory explanation.

Observers have generally pointed to several causes, not all mutually exclusive, for the groundswell that materialized in late 2008.

Reverberations Of Lehman Collapse.

In this view, Lehman's failure caused a shock that spread through the entire system. Lehman was one of the largest players in mortgage-backed securities; this meant that there were likely to be more trades and more complicated ones than realized – trades

always holding the potential for significant disruption as we learned during the failure of Long Term Capital Management a decade earlier.

A second reason, in this view, was that by stepping back from Lehman, the government made counterparty risk a key concern. In this way, some have contended that the government weakened the market confidence that it is now trying to restore.

Loss Of Information Due To The Securitization Chain

Others have pointed to the distribution chain and the gradual loss of transparency as paper was packaged and repackaged into yet more complicated structures and traded in private transactions and foreign markets. In the words of one of the experts in this field:

> "Subprime mortgages were…financed via securitization…. Subprime securitization tranches were then often sold into CDOs. Tranches of CDOs were, in turn, often purchased by…off-balance sheet vehicles, and money market mutual funds. Additional subprime risk was created…with derivatives. … When the U.S. housing prices did not rise as expected, this chain of securities, derivatives, and off-balance sheet vehicles could not be penetrated by most investors or counterparties in the financial system to determine the location and size of the risks. Faced with this lack of information, financial intermediaries refused to deal with each other and began to hoard cash. The panic began."[17]

Lack of information is especially striking in CDOs. At other times the sheer complexity of structures where information was available resulted in a similar loss of clarity

Contagion

A growing contingent has argued that what started in the subprime sector has reached well beyond that and spread to CDSs and synthetic CDOs. Initially, this happened because many of the institutions that bought mortgage-backed securities or CDOs with heavy concentrations in them had acquired protection through CDSs and synthetics to shift the risk on those holdings, particularly if they had leveraged against them. This was aggravated by the fact that many of the sellers and underwriters holding inventories of securities waiting to be sold had also resorted to CDSs for risk protection.

Finally, the network of CDSs was further scaled up by the participation of insurance companies. We discuss synthetic CDOs later on. However, the following comment will give a preview of what is at stake:

> "Some people who've invested in CDOs have no idea of the default risk… The worst case scenario is that as credit events happen, your principal may be wiped out." [18]

Mutation

Here the contention is that what started with subprime mortgages has transformed itself into an entirely different problem than contagion, one going beyond specific securities,

[17] The Subprime Panic, Gary B Gorton, National Bureau of Economic Research Working Paper 14398, October 2008
[18] "The Pricing Puzzle," Nikki Marmery, US Credit, April 2005 issue

structures or commitments. In this view, as the U.S. economy was growing more diverse and complex, significant changes were simultaneously taking place in financial markets that many were not fully aware of. Now, these newfangled products had run out of control and turned the problem into a systemic one. Any solution that concerned only a narrow set of products or activities would be wide of the mark – the problem had mutated from a corner of the financial world into general risk aversion and illiquidity at every level, from the consumer on up to corporations.

While the mutation hypothesis is certainly a dire read on what has happened, it does contain – perhaps unwittingly – a kernel of hope. It is that since risk aversion has a large psychological component, things could change rapidly and markets could snap back as suddenly as they collapsed.

Mark-To-Market

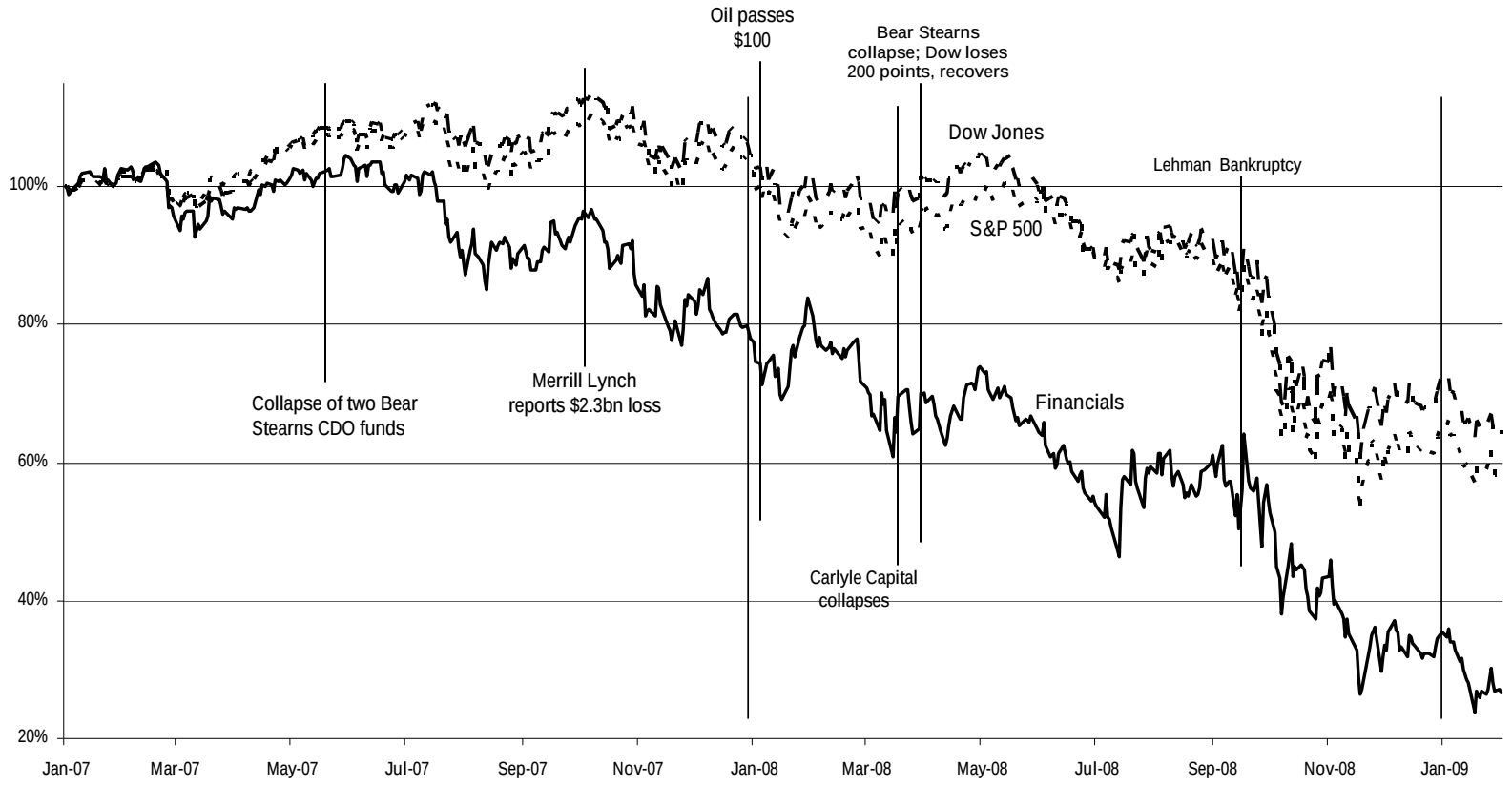
FASB 157, "Fair Value Measurement", was adopted in late 2006 and required to be implemented in companies' statements for fiscal years beginning after November 15, 2007. FASB 157 codifies specific methods for mark-to-market accounting. It divides assets subject to mark-to-market into three categories depending on how active a market exists for them. Level 1, consists of assets for which there are quoted prices ("observable inputs"). Level 2, known as mark-to-model, applies to assets for where there are no such quotes; in this case, an estimate relying on (other) observable inputs must be formulated to serve as a basis for how they are reflected in financial statements.

Level 3, finally, bears on assets with unobservable inputs: an estimate must be developed using the best information available "without undue cost and effort," typically requiring the reporting entity to provide its own assumptions about what market participants would use to price the asset. There is no verification requirement if the assumptions are in line with those of market participants. The criticism of Level 3, despite the latitude it provides, is that it made it significantly harder to avoid a market valuation of the assets falling in this category.

The Level 3 provisions have generated significant controversy and been blamed for risking to significantly aggravate the credit crisis by forcing banks to take writeoffs at a particularly unpropitious time.

> "'The heat is on and it is inevitable that more players will have to revalue at least a decent portion' of assets they currently value using 'mark-to-make believe,' Bob Janjuah, Royal Bank's chief credit strategist, reportedly wrote in a note published Wednesday… Janjuah noted that, for example, Morgan Stanley has the equivalent of 251 percent of its equity in Level 3 assets, Goldman Sachs has 185 percent, Lehman Brothers has 159 percent and Citigroup has 105 percent, according to Bloomberg."[19]

[19] 'FASB 157 Could Cause Huge Writeoffs," Stephen Taub, CFO Magazine, November 7, 2007.


Oil passes
$100
Bear Stearns
collapse; Dow loses
200 points, recovers
Dow Jones
Lehman Bankruptcy
S&P 500
Financials
Collapse of two Bear
Stearns CDO funds
Merrill Lynch
reports $2.3bn loss
Carlyle Capital
collapses
100%
80%
60%
40%
20%
Jan-07
Mar-07
May-07
Jul-07
Sep-07
Nov-07
Jan-08
Mar-08
May-08
Jul-08
Sep-08
Nov-08
Jan-09

Breakdown In Standards

Pointing to anecdotal evidence of cynicism, the occasional incriminating email, and statistical data showing that defaults have risen more or less in lock-step with the vintages of the securities, the assertion is that a breakdown in standards compromised each link in the chain: from loan origination and credit approval to securitization and underwriting. The wrong compensation incentives then motivated everyone to structure ever more deals and devise ever more ways to sell them to investors. To quote from a recent commentary:

> "Washington and Wall Street are … playing the blame game. But most financial experts agree that a cocktail of bad economic policies and lax government oversight led lenders, borrowers and investors to take huge risks. Greed and recklessness trumped fear and reason, and they led banks to the brink.[20]

The Minsky Moment

Named after economist Hyman Minsky, this view emphasizes the shortcomings of Keynesianism economic policy in overlooking the workings of the financial system at the micro level. It centers on what Minsky contended was the financial system's inherent tendency toward instability. This instability comes from the fact that as regulations are put in place to align the financial system with the needs of the economy at large, financial institutions through innovation will devise ways to profit from these regulations – by circumventing them. In turn, the resulting excess equally predictably will eventually trigger its own abrupt reversal. [21]

We will return to Minsky later. (p.114)

None of these explanations are, of course, entirely satisfactory. First of all, the facts do not always corroborate some of the contentions. For example, the government may have let Lehman collapse, but did step in with respect to AIG. Yet the *de facto* insolvency of AIG which the rescue effort confirmed had repercussions that seem to have been at least as far-ranging, if not more. The loss of information argument also has its weaknesses – in particular if all the ingredients for a panic were there in late 2007, why is it that it set in a year later? And when it did, even assuming that the almost indiscriminate selloff that occurred across all sectors can be explained by the need for cash to meet margin calls and redemptions, why did the markets react as neurotically to policy announcements and produce the downdrafts that we witnessed in the last three months of 2008.

The role of mark-to-market in accelerating the crisis also appears overdone. First of all, mark-to-market is not new. What was new with FASB 157 was that a more rigorous methodology was required so that model-based valuations were accompanied by some effort to relate the model inputs to observable real world phenomena (interest rates, for example, or more remotely, assumed default probabilities).

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[20] The Rise and (almost) Fall of US Banks, February 7, 2009, Stevenson Jacobs and Erin McClam, Associated Press

[21] "The Financial Instability Hypothesis: An Interpretation of Keynes and An Alternative to 'Standard' Theory," Hyman Minsky, Nebraska Journal of Economics and Business, Winters 1977.

The role of certain factors which were clearly at play is also missing from these explanations. One of them is predatory behavior, which was no doubt much more rampant than readily recognized. Much of the discussion during the summer of 2008 focused on short-sellers in explaining repeated plunges in some financial stocks (Lehman stood out the most because of the outspoken criticism from Greenlight Capital) – along with the role of speculators in the unrelenting rise of oil prices. But relatively has been said about predatory trading against weaker financial firms by competitors.

While difficult to document, Wall Street denizens well know that there is more banter and exchange of "views" than regulators or the public realize. CNBC commentator Jim Cramer in an interview aired under the title "Wall Street Confidential" described as little as $5 million is required to push stocks higher or lower. "A lot of times when I was short, I would create a level of activity beforehand that would drive the futures," he stated in the interview. Cramer asserted that much of this activity is legal. He also mentioned how rumors were used to push a stock down "What's important when you are in that hedge-fund mode is to not do anything remotely truthful because the truth is so against your view, that it's important to create a new truth, to develop a fiction."

Margin calls are another such factor that needs mentioning. Margin calls increase when securities prices go down, in turn resulting in more sales. Soon these sales become distressed and a vicious circle sets in. In an environment of credit derivatives,

> "buyers of protection can make collateral calls when spread increase, that is, when marks suggest an increase in the likelihood that protection seller will have to pay… Dealer banks, which have written and purchased protection, will both make collateral calls and face collateral calls. *Collateral typically earns Libor so a collateral call means paying Libor in an environment where the bank will have to pay much more than Libor to borrow* [emphasis added]. So there is a lot at stake… For the party calling for collateral, collateral becomes a form of funding.. it is difficult to convey the ferocity of the fights over collateral." [22]

Response to the Crisis

There have not only been several government instrumentalities involved in responding to the crisis but each has pursued more than one response at a time. Altogether the government's efforts to tame the credit crisis and revive the economy have been estimated to exceed $8 trillion. This is an all-encompassing figure that takes into account all the rescue measures that have been put in place so far, regardless of whether they entail an expenditure of real cash or merely a guarantee or a backup commitment.

For example, the figure includes the total amount of insurance which the Federal Deposit Insurance Corporation (FDIC) provided as guarantee to back up individual retail deposits up to $250,000.00 – that is, the checking, money market, and savings accounts at commercial banks. This meant that if a bank failed, the FDIC stood there to make sure that little depositors were protected from any losses to $250,000.00 face amount of such. Clearly, this commitment on the part of the FDIC is not equivalent to a hard cash disbursement in the same sense as the close to

[22] The Panic of 2007, Gary Gorton, August 4, 2008, p. 66

$350 billion that the Treasury invested in banks around the country as part of the Troubled Asset Rescue Program (TARP) or the $85 billion that the Federal Reserve initially stood ready to lend to failing insurer American International Group.

Liquidity Enhancement Measures

Most of the liquidity enhancement measures put in place have involved the **Federal Reserve** and all five were aimed at financial institutions. They did principally three things: they lengthened the maturity of discount window loans, they enabled primary dealers (that is, firms which were not depositary institutions or member of the Fed) to borrow directly from the Fed, and they allowed more collateral for these loans

The first measure was the Term Auction Facility (TAF), under which the Fed auctioned 4- and 12-week loans to depositary institutions (i.e. commercial banks). The Primary Dealer Credit Facility replicated this for broker-dealers, that is, by enabling them to borrow from the Fed's discount window by means of securities repurchase agreements (repos). The Term Securities Lending Facility enabled financial institutions to borrow from the Fed by posting a broad category of collateral, including collateral other than Treasury securities.

The Commercial Paper Funding Facility (CPFF) was put in place in October 2008 to acquire commercial paper directly from issuers, primarily banks. [23] Finally, the Term Asset-Backed Securities Loan Facility (TALF) which became operative in early 2009 encouraged new lending by extending financing against asset-backed securities on freshly originated loans.

The **FDIC** also provided liquidity enhancement through the Temporary Liquidity Guarantee Program under which eligible institutions could issue securities to the public backed by the FDIC's guarantee.

Troubled Asset Relief Program (TARP)

The Troubled Asset Relief Program was enacted by Congress on October 3, 2008 and granted new powers to the **Treasury**. The original objective of the TARP was buying soured investments and loans from financial institutions to straighten out their balance sheets and enable them to resume lending.

It quickly became apparent that the forensic challenge was daunting: what assets should be considered soured assets – mortgages, mortgage-backed securities, CDOs, CDSs? Within any of these, where should thresholds be placed with respect to subprirme content – 10% of the issue, more, less? Should the purchases focus on certain tranches only? But then what would be the impact on the other tranches? How did one determine distress – by rating, by the fact that it had already defaulted, by other factors? Beyond these questions, was the issue of the purchase price: how would it be determined – by fiat, reverse auction, privately-negotiated?

[23] The proportion of commercial paper accounted for by banks is discussed p. 40

Instead of buying illiquid assets, TARP funds were thus used to make capital infusions into financial institutions. Same objective, different method: bolstering balance sheets and getting credit to creditworthy businesses and consumers flowing again.

Repurchases of Agency Debt

Under the Housing and Economic Recovery Act enacted on July 23, 2008, the Federal Reserve began purchasing debt issued by Fannie Mae and Freddie Mac in the open market. In November 2008, this was expanded under the Federal Housing Finance Regulatory Reform Act to $100 billion of direct debt and $500 billion of mortgage-backed securities. In March 2009, this was further expanded to $750 billion.

Guarantees/backstops

The first type of guarantee was under the TARP, which included a section related to the **Treasury** insuring or guaranteeing certain types of troubled assets rather than buying them. The guarantee of $301 billion in Citigroup debt occurred under this rubric.

The second type of guarantees were the **FDIC**'s initiatives mentioned earlier of increasing to $250,000 per deposit account at commercial banks until December 31, 2009 and guaranteeing securities issued by financial institutions.

Loans

The **Federal Reserve** provided several loans for special situations outside of the liquidity facilities described above. The $29 billion loan to JP Morgan, in connection with the Bear Stearns acquisition, and the initial $85 billion credit line to AIG are two instances of such loans. In the case of JP Morgan, the loan was secured by $30 billion of doubtful securities in Bear Stearns' portfolio and accompanied by an agreement that JP Morgan would absorb the first $1 billion in losses and the Fed the remainder. For its part, the AIG facility was eventually expanded twice, reaching a total of $180 billion.

Direct Intervention

The government also intervened directly, either through the **FDIC** or the **Treasury**'s Office of Thrift Supervision, seizing over 25 banks, including Indymac which was resold to private equity investors six months later.[24] The Treasury placed Fannie Mae and Freddie Mac under conservatorship in September 2008. The merger of National City with PNC was engineered and support was provided or offered in the Bear Stearns and Wachovia transactions.

What is striking is that all these measures are not only dramatically large but have been pursued at the same time. Were we at the outset dealing with a multi-layered crisis calling for action on

[24] Indymac was actually in the process of being sold in July 2008. The Treasury seized it to stabilize it in the wake of a run on its deposits and to resume the sale process.

several fronts? Or were the responses – the succession of multiple responses, in fact – more about acting swiftly and with determination? As time wore on and the crisis failed to abate, it became harder to avoid the feeling that its nature had come to matter less to policymakers than its dimensions, and that the imperative of delivering a correspondingly all-encompassing and powerful response took precedence over tactical precision. At times some of the measures would seem *ad hoc* and haphazard as a result, in some instances appearing to be taken mostly to forestall sharp stock market drops that occurred regardless.

Despite the tendency toward second-guessing and Cassandra-like predictions on the part of pundits [25], what is equally striking is that the general rejoinder has consisted of discourse interspersed mind- numbing, debate-inhibiting figures which, like the $8 trillion figure, shrouds more than they inform. We then hear that, as estimated by Goldman Sachs, retrieving bad assets from financial institutions' balance sheets could cost up to $4 trillion in the aggregate.[26] Where does all this money come from? How are these sums arrived at? In being so proffered, the shock effect has a tendency to abscond the debate rather than invite true participation. In protecting from the wolves, is the economic caravan making itself vulnerable to highwaymen?

What is at Stake?

Other policy options as well as alternatives recommended by private sector experts seem for the most part to have been discarded by the government. They include a return to the bad assets purchase concept and extend all the way to a "let them fail" prescription. In between are arguments that banks should be nationalized outright, that a bad bank/good bank structure should be explored or that banks should sell off their best assets to reacquire defaulted paper in the market.

If we will not be determining the precise nature of the current crisis right away, perhaps we might look at where it could lead us in the meantime. On this score, the specialists are not very encouraging Professional observers warn that serious dangers still lie ahead. We are told that the sub-prime mortgage crisis could deteriorate further as a result of continuing delinquencies in a weakening economy and as a wave of Alt-A resets approaches.

Beyond that, we are told that we are on the verge of a similar catastrophe in commercial mortgages, with next in line car loan defaults and credit card debt. As if these questions were not momentous enough, there are warnings that the current credit crisis could parallel the banking crisis of the 1930s and turn, as the latter did then, an economic recession into a depression.

Where are we really headed? Is this a temporary situation caused by a confidence crisis from which we might snap out as quickly as we came into it? Should we look to a Japan-style drift as the prospect for the next decade? Are we headed into a depression? If and when we recover, will it be a return to the world as it existed in the mid-2000s? Or will we travel farther back to thriftier times when one had to save in order to acquire a coveted object.

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[25] "It is now frighteningly clear that the world's dramatic financial rescue efforts are both unprecedented in scope and creativity, and wholly inadequate." The Big Bang of Bailouts, Jeffrey E. Garten, Newsweek, December 22, 2008.

[26] "Bank Bailout Could Cost Up To $4 Trillion: Economists," Reuters, January 29, 2009

It is generally difficult to imagine that we could get close to what the Great Depression evokes. Today, most of us carry smart phones which keep us in communication whenever we wish and give us ready access to information; we use navigation devices that considerably enhance the driving experience; we can shop on-line and receive shipment the following day, if not the same day at our doorstep. More prosaically, when we are thirsty we just turn the tap on and have potable water; we have running warm water so we can shower whenever we wish; food can be kept for days in our refrigerators. In the 1920s, outhouses were a common sight; polio was a disease that people could witness; the idea that one could run out of food was neither unheard of nor so farfetched.

On the other hand, if a depression were indeed to develop the consequences could well be unprecedented and sweeping. The world is more populous. Without desalination, fertilizers, engineered crops and strain grafts, severe imbalances in food supply would exist between regions. We were reminded of this when temporary disruptions in the food supply chain caused riots in Haiti, Bangladesh and Egypt during the summer of 2008.

2. The Dimensions

Note on Sources of Information

Most of the information in this paper is available from free public sources. The main ones are:

- Board of Governors of the Federal Reserve. The website is www.federalreserve.gov It features information on the programs that the Federal Reserve put in place to fight the crisis, as well as information on bank activities, the public debt and other matters. Every quarter, the Federal Reserve publishes the Flow of Funds Accounts of the U.S. Economy. This is one of the most widely used tools by economists and can be found by going to the Economic Research & Data tab at the top of the homepage, then choosing Statistical Releases and Historical Data in the left menu.

- Bureau of Economic Analysis. The website for the bureau is www.bea.gov Detailed information on GDP can be found there as well as updates on the economy. The Bureau of Economic Analysis is the agency that officially declares when recessions start and end. GDP information can be found by clicking on Gross Domestic Product (GDP) in the homepage and clicking on Interactive Tables: GDP and the National Income and Product Account (NIPA) Historical Tables.

- All the financial information on companies and banks in this paper comes from the reports that public companies are required to file with the Securities and Exchange Commission, whose website is www.sec.gov All the reports in question can be found on this site. 10-Ks are the annual reports, 10-Qs the quarterly reports. 8-Ks are informational filings companies must make when they disclose information that is material or important, such in industry conferences and other settings. Companies will also file 8-Ks in which they comment on their financial results: these comments sometimes provide a useful complement to the information in 10-Ks and 10-Qs; they can be identified by the identifier "Current report, items 2.02 and 9.01" under the description; reference to item 2.02 indicates that the 8-K have information on financial results.

  On this site, you can also find information on money managers' equity holdings (13F-HR filings) or funds' investment portfolios (N-Q filings).

- While it is always better to go to the original filings of companies and use a pocket calculator to figure out ratios, growth rates, equity values, and the like, fee sites such as Yahoo! offer a wealth of information that is often useful as a first cut. The site is unparalleled in the richness of resources it provides, enablng you to check stock prices and much more. (Yahoo! also enables you to download historical stock prices. In this paper, all the stock charts were generated using this Yahoo! function).

  Once you type in a stock symbol, a summary page will appear showing the last trade, 52-week high and low and other data; it also has a chart in the upper right hand and a headlines section which provides the latest new on the company. Under the "Company" subheading in the left menu, there are several very useful links such as "Profile", "Key Statistics" and "Competitors." Key statistics give the most critical information about a company, including the value of its equity ("Market Cap") and the total value of the company ("Enterprise Value"), concepts we discuss on p. 45.

  Under the "Analyst Coverage" subheading, there is also a link called "Analyst Estimates" which gives the average forecast revenues and net income which analysts who follow the company expect.

Frame of Reference: The U.S. Economy In Overview

How large is the mortgage market in the U.S.? How does it compare to consumer credit, which we are told may be the next problem area? Is it really as large as one year's economic output?

Economies are measured by their gross domestic product (GDP), which for the U.S. was approximately $14.2 trillion at the end of 2008.

Once we want to go one level lower, we find that there is no single way of conveying the relative weights of the different components of the economy. This is because when a product is manufactured or distributed, it includes components made by others, call them suppliers. Suppliers in turn started with a mix of raw materials and semifinished parts which they modified, treated, painted, assembled and then sold on to their customers. The raw materials themselves were obtained from companies that mined them, refined them, sometimes melded them with strengthening elements, before packaging and delivering them.

At every level, then, the work and input of others is included in the finished product. The same is true of services such as distribution, where a chain of regional distributors, warehousers, truckers, railroad operators, and others are involved. The only way to account for all these activities is to look at the value that is added at each of these levels and reflect them in the national statistics to show what the various participants do in the economy.

On the other hand, just looking at the value-added is usually not enough. This will not reflect the size of a particular activity in terms of the number of people employed there, an important piece of information in understanding how the economy works and evolves. When we say that automobile industry is a critical part of the economy, employment is primarily what we are referring to – in fact, employment not only at the automakers' level, but all the way down the chain of suppliers, dealers, repair shops, etc.

But that too is not enough. Neither value-added nor employment figures will reflect the importance of a particular activity in terms of the amount of money households spend on it. When we talk about the spiraling cost of health care, this is what we refer to – the growing proportion of households' budgets that goes to paying for health care.

Thus, a complete picture of the economy really needs to look at overall activities from these three perspectives. We begin by looking at GDP from the standpoint of employment, then value-added and conclude with spending before looking at the debt picture.

The table shows a breakdown of the labor force by type of activity in 1998, 2002 and 2007.

We see that in 2007, the total labor pool represented 129.6 million people employed full-time. In reality, there were over 140 million people holding jobs, but not all were full-time.[27] On a full-time equivalent basis, then, we see that the labor pool increased by a compound rate of 0.97% a

[27] This too is an imperfect measure since it does not recognize in a numerical way the role of parenting, home making, community services such as legal aid or mentoring.

year between 1998 and 2007. This compares to a compound growth of about 5% for GDP in nominal terms – meaning the size of the economy would double in 14 years [28] – and almost 2.5% in real terms (that is, in constant dollars). It is this that economists are referring to when they talk about the growth of productivity in the U.S. economy.

The table also shows importance of services, distribution and the government in the economy. These are essential functions, but typically modestly paid. We can also see that when people talk about the decline in manufacturing, what they refer to is this gradual reduction in the proportion of the population employed there.

U.S. Gross Domestic Produc by Employment	1998	2002	2007
Full-time equivalent employees (millions)	118.8	123.3	129.6
Agriculture, forestry, fishing, and hunting	1.0%	1.1%	1.0%
Oil & Gas, Mining	0.5%	0.4%	0.5%
Utilities	0.5%	0.5%	0.4%
Construction	5.2%	5.5%	5.9%
Manufacturing	14.5%	12.2%	10.6%
Wholesale trade	4.8%	4.4%	4.5%
Retail trade	10.4%	11.0%	10.8%
Transport (air, rail, truck) & warehousing	3.3%	3.3%	3.3%
Information, entertainment, publishing	2.6%	2.6%	2.2%
Finance, insurance, real estate & renta/leasing	6.0%	6.1%	6.2%
Professional and business services	14.0%	14.4%	15.4%
Computer systems design and related services	1.0%	0.9%	1.0%
Hospitals	2.9%	3.1%	3.3%
Hospitals, clinics and care centers	6.2%	6.6%	7.1%
Accommodation and food services	6.8%	6.8%	7.2%
Other services, except government	4.4%	4.7%	4.6%
Government	22.2%	22.2%	21.3%
Rest of the world	-0.3%	-0.4%	-0.6%

Source: National Income and Product Accounts, Bureau of Economic Analysis

Finally, one can note the importance of the government sector in the economy. Although there was a slight decline in 2007, this shows that more than one in five person works in some governmental capacity, whether at the federal or local level. Approximately four million people earn a living serving in the federal government, one and half million of them in the military; more than 16 million people work at the state or local government level, eight million of them in education.

The next table shows GDP broken down by value-added for the same three years, 1998, 2002 and 2007, as well as the twelve months to September and December 2008.

Here we can see the importance of finance, insurance and real estate activities as well as that of distribution. The latter is almost as large as finance if we include all the relevant activities – wholesale trade, retail trade, transport and warehousing.

What these figures do not show are the qualitative changes behind these figures. Specifically, what is not captured are the effects of the internet and electronic revolution. In manufactured

[28] A rule of thumb for figuring out the number of years or the growth rate required for a sum to double if we know one or the other is to divide 72 by the known factor to get the other factor. So if it takes 8 years for something to double, it means that the yearly growth rate is 9%. Conversely, if something grows at 12%, it will double in approximately 6 years.

goods, for instance, whether automobiles or earth moving equipment, electronics have changed the utility derived from them. In real terms, an automobile is less expensive than it was fifteen years ago, but offers the greatly enhanced amenities – assisted steering, automatic windows, ABS, etc. to say nothing of GPS, automatic lights, wireless communications. Similarly, today a Caterpillar off-highway vehicle is a veritable computer on 78" wheels.

U.S. Gross Domestic Product by Activity - $ billions	1998	2002	2007	2008-III	2008-IV
Gross Domestic Product - constant curency (2000 $)	9,237	10,096	11,621	11,712	11,522
Gross Domestic Product	8,954	10,591	14,031	14,413	14,200
National income bef. capital consumption adjustment	7,661	9,119	12,528	12,421	12,236
Agriculture, forestry, fishing, and hunting	79	73	121	104	100
Oil & Gas, Mining	73	88	213	247	241
Utilities	139	148	224	220	220
Construction	367	476	542	517	511
Manufacturing	1,112	1,092	1,475	1,450	1,392
of which: Durable goods	*60.5%*	*57.5%*	*57.3%*	*53.9%*	*55.2%*
Nondurable goods	*39.5%*	*42.5%*	*42.7%*	*46.1%*	*44.8%*
Wholesale trade	505	557	755	773	782
Retail trade	591	717	908	869	844
Transport (air, rail, truck) & warehousing	235	257	359	340	340
Information, entertainment, publishing	274	307	485	469	449
Finance, insurance, real estate & rental/leasing	1,329	1,614	2,200	2,087	2,049
Professional and business services	975	1,217	1,743	1,807	1,706
Educational, health care, and social assistance	583	795	1,101	1,118	1,147
Arts, sports and recreation (incl lodging and food)	268	336	456	454	450
Other services, except government	197	242	303	302	301
Government	916	1,151	1,479	1,539	1,551
Rest of the world	21	50	165	127	154

Source: National Income and Product Accounts, Bureau of Economic Analysis

Economists have focused on the productivity improvements that the internet and electronics age have brought about. What has perhaps been overlooked is the fact that this value has been injected into the economy at no or little actual cost to the consumer. One might in fact say that high stock values were perhaps the indirect (and temporary) manner in which that remuneration materialized for a time – resulting in stratospheric multiples in the process. From a historical perspective, this transfer of value into the real economy replicated in scope something that had happened half a century earlier when government-sponsored research spawned commercial breakthroughs ranging from the transistor to radars.

(One particularly interesting sign of the times has been the vagaries of the Microsoft/Yahoo *pas-de*-one. The Yahoo board was severely criticized when it was revealed that it had rejected a $55 per share offer, only for the stock price to drop to the low $30s a year later. This eventually prompted shareholder activists to move for an ousting of the board and a resumption of negotiations with Microsoft. Aside from the fact that this tactic deprived Yahoo of all negotiation leverage, little focus was given to what might the true value of a company like Yahoo – which survived where the Altavistas, the Lycoses and the Excites had passed and went on to deliver unparalleled value to the American consumer, albeit it much of it un- or under-remunerated. The considerable inherent value of Yahoo's future potential which may have been at the heart of the board's decision was somehow lost in the brouhaha over stock premiums). [29]

[29] Such as that Microsoft did not submit a formal proposal that the board needed or could respond to.

Finally, we look at GDP by expenditures for the same three years and the twelve months to September and December 2008. We can immediately see the importance of consumer spending. When people say that consumer spending represents more than two thirds of GDP, they are referring to this $10 trillion figure as a proportion of the entire $14.2 trillion of GDP.

U.S. Gross Domestic Product by Expenditure Type - $ billions	1998	2002	2007	2008-III	2008-IV
Gross Domestic Product - constant curency (2000 $)	9,237	10,096	11,621	11,712	11,522
Gross domestic product	8,954	10,591	14,031	14,413	14,200
Personal consumption expenditures	6,026	7,453	9,893	10,164	9,928
Durable goods	794	922	1,083	1,016	946
Motor vehicles and parts	*46.5%*	*46.1%*	*40.4%*	*36.5%*	*34.2%*
Furniture and household equipment	*35.2%*	*35.1%*	*38.3%*	*40.5%*	*42.0%*
Other	*18.3%*	*18.8%*	*21.2%*	*23.1%*	*23.8%*
Nondurable goods	1,720	2,110	2,906	3,045	2,839
Food	*49.3%*	*47.9%*	*46.8%*	*46.6%*	*48.7%*
Clothing and shoes	*16.0%*	*14.5%*	*12.8%*	*12.3%*	*12.8%*
Gasoline, fuel oil, and other energy goods	*7.7%*	*9.0%*	*13.9%*	*15.2%*	*11.2%*
Other	*27.0%*	*28.5%*	*26.4%*	*25.9%*	*27.4%*
Services	3,512	4,422	5,904	6,103	6,143
Housing	*26.0%*	*25.6%*	*25.1%*	*24.9%*	*24.9%*
Electricity and gas	*3.5%*	*3.6%*	*3.7%*	*3.8%*	*3.8%*
Other household operation	*6.4%*	*5.8%*	*5.3%*	*5.3%*	*5.3%*
Transportation	*7.5%*	*6.5%*	*6.1%*	*6.2%*	*6.1%*
Medical care	*26.6%*	*28.1%*	*29.2%*	*29.4%*	*29.6%*
Recreation	*6.7%*	*6.9%*	*6.9%*	*6.8%*	*6.7%*
Other	*23.2%*	*23.4%*	*23.6%*	*23.6%*	*23.6%*
Gross private domestic investment	1,549	1,600	2,092	2,011	1,906
Exports	971	1,016	1,760	1,969	1,725
Imports	1,145	1,491	2,457	2,677	2,270
Government spending and investment	1,553	2,013	2,743	2,946	2,911

Source: National Income and Product Accounts, Bureau of Economic Analysis

Of note is the amount of household spending on motor vehicles/parts and on medical care.

Domestic Debt Market

Next we look at the total amount of debt outstanding in the U.S. domestic market. The first table presents a summary of the main components. All in there was $52.6 trillion of debt outstanding, of which $17.2 trillion were borrowings by financial institutions and $33.5 trillion were borrowings by the non-financial sector. Of this total, household debt is $13.8 trillion.

Tota Debt - $ in billions	1998	2002	2007	2008-III	2008-IV
Household sector	$6,012.5	$8,514.0	$13,815.3	$13,921.2	13,821.0
Business sector	5,174.1	6,847.6	10,375.0	10,767.4	10,870.5
Farm sector	163.9	169.8	214.0	223.9	225.3
State and local governments	1,138.3	1,447.3	2,191.7	2,224.7	2,239.6
Federal government	3,752.2	3,637.0	5,122.3	5,800.6	6,361.5
Non-financial sector	16,241.0	20,615.7	31,718.3	32,937.8	33,517.9
Financial sector	6,542.6	9,996.9	16,154.8	16,904.1	17,216.5
Foreign debt held in US	639.3	1,072.3	2,016.5	1,961.7	1,858.3
Adjustment	0.1	0.1	(7.3)	(7.3)	0.0
Debt Outstanding in the Domestic Market	$23,423.0	$31,685.0	$49,882.3	$51,796.3	$52,592.7

Source: Flow of Funds Accounts of the United States, Board of Governors of the Federal Reserve System

The table below provides a further breakdown of non-financial sector debt. In particular, we can see that total mortgages outstanding – residential, commercial, REIT-issued, etc. – tally up to $14.5 trillion. As we will see, the amount of mortgages held by households is about $10.7 trillion, or approximately three quarters. It is within this $10.7 trillion that the subprime and Alt-A mortgages are buried. The statistics for the latter are compiled by private organizations such as SIFMA and Inside Mortgage Finance.

Non-Financial Sector - $ in billions	1998	2002	2007	2008-III	2008-IV
Commercial paper	$193.0	$119.9	$123.8	$146.5	131.6
Treasury securities	3,723.7	3,609.8	5,099.2	5,777.5	6,338.2
Agency and GSE securities	28.5	27.3	23.1	23.1	23.3
Municipal bonds	1,402.9	1,762.9	2,618.6	2,669.0	2,690.1
Corporate bonds	1,846.0	2,710.3	3,559.1	3,703.8	3,763.5
Loans and advances, incl bank	1,976.3	2,082.9	3,291.7	3,468.4	3,499.5
Mortgages	5,640.1	8,302.8	14,450.7	14,559.0	14,475.4
Consumer credit	1,430.6	1,999.9	2,551.9	2,590.5	2,596.2
Total Non-Financial Sector	$16,241.1	$20,615.8	$31,718.1	$32,937.8	$33,517.8

Source: Flow of Funds Accounts of the United States, Board of Governors of the Federal Reserve System

In addition, we can also note the amount of consumer credit outstanding. This includes credit card debt, auto loans and other forms of consumer borrowing. We can see that when people talk about consumer credit being the next problem to face the financial sector, they are talking about something which is quite a bit smaller than mortgage debt.

Mortgage Debt Market

Now we get to the breakdown of mortgage debt by type and debtor category. Here we can readily see that the $14.5 trillion is mostly residential and less than 20% farm-related or commercial (total mortgages sum to $14.6 trillion on this table because it includes $164.5 billion of REIT mortgages that are included in financial institutions debt). Of the $11.9 trillion of residential mortgages, $10.7 trillion as we said is owed by households.

Mortgages - $ in billions	1998	2002	2007	2008-III	2008-IV
By Type					
Residential	$4,694.2	$6,922.6	$12,007.8	$12,057.2	11,930.2
Farm/commercial	1,287.6	1,476.7	2,600.2	2,663.0	2,709.7
By Debtor category					
Household sector	$4,527.9	$6,208.2	$10,779.2	$10,818.1	10,697.9
Business sector	1,285.7	1,999.2	3,563.8	3,630.6	3,666.3
Farm sector	96.6	95.4	107.8	110.3	111.1
REITs	71.6	96.5	157.2	161.2	164.5
Total Mortgages	$5,981.8	$8,399.3	$14,608.0	$14,720.2	$14,639.8

Source: Flow of Funds Accounts of the United States, Board of Governors of the Federal Reserve System

Altogether, there are 54 million households with mortgages in he U.S. In addition, many homeowners do not have mortgages. In fact, the Federal Reserve reports on schedule B.100 of its quarterly Flow of Funds the total value (at then market prices) of real estate owned by households. At September 30, 2008, this figure stood at $19.1 trillion.

In a presentation to investors, Freddie Mac illustrated this phenomenon with the following slide:

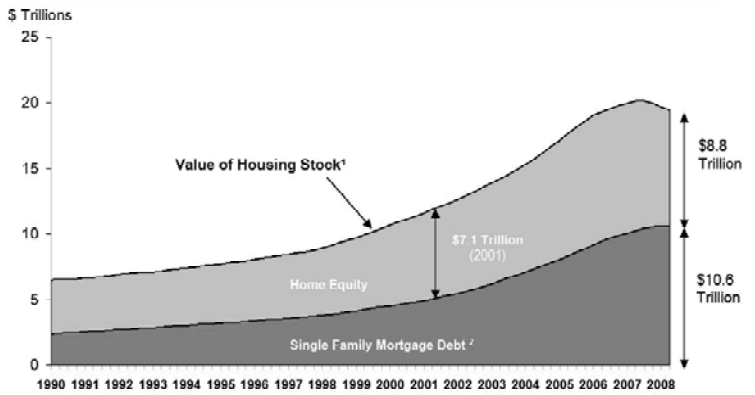


Figure 2.1 shows the value of housing stock as reflected in the Flow of Funds Accounts for September 2008 and total mortages outstanding.

Freddie Mac commented as follows on this matter: "mortgage debt is protected [by home equity equaling close to 44% of the] … total value of housing stock." [30]

The table below shows originations across the various classes of mortgages.

$ billions	FHA/VA	Prime	Jumbo	Subprime	Alt-A	HEL	Total
2001	175	1,265	445	160	55	115	2,215
2002	176	1,706	571	200	67	165	2,885
2003	220	2,460	650	310	85	220	3,945
2004	130	1,210	510	530	185	355	2,920
2005	90	1,090	570	625	380	365	3,120
2006	80	990	480	600	400	430	2,980
2007	101	1,162	347	191	275	355	2,431
1Q07	19	273	100	93	98	97	680
2Q07	25	328	120	56	96	105	730
3Q07	26	286	83	28	54	93	570
4Q07	31	275	44	14	27	60	451

Source: Inside Mortgage Finance

Total outstanding at year-end 2007 were $1.7 trillion. Jumbo loans were another $470. [31]

As can be seen below, serious delinquencies rose significantly in 2008. It is not possible to establish a direct link between delinquencies and protection from overcollateralization in mortgage-backed securities (see p. 45) due to differences in structure from one issue to another.

[30] Federal Home Loan Mortgage Corp. 8-K.
[31] Mortgage Bankers Association.

However, one can readily see why with subprime ARM delinquencies in excess of 25%, many issues would have had top tranches downgraded from AAA to below A.

Seriously Delinquent Loans (90+ and Foreclosures)

	Prime FR	Prime ARM	Subprime FR	Subprime FR	FHA Loans	VA Loans
1Q04	0.67%	0.99%	7.88%	6.90%	5.29%	3.05%
2Q04	0.62%	0.86%	7.98%	6.45%	5.32%	3.05%
3Q04	0.69%	0.83%	7.55%	5.93%	5.51%	3.13%
4Q04	0.72%	0.78%	7.44%	5.93%	5.74%	3.22%
1Q05	0.66%	0.70%	6.24%	5.23%	5.15%	2.87%
2Q05	0.62%	0.63%	6.21%	5.13%	5.07%	2.75%
3Q05	0.63%	0.67%	5.72%	5.15%	5.40%	2.82%
4Q05	0.78%	0.84%	6.25%	6.07%	6.13%	2.93%
1Q06	0.68%	0.82%	6.00%	6.28%	5.48%	2.74%
2Q06	0.63%	0.92%	5.72%	6.52%	5.40%	2.53%
3Q06	0.65%	1.14%	5.65%	7.72%	5.66%	2.64%
4Q06	0.69%	1.45%	6.04%	9.16%	5.78%	2.65%
1Q07	0.66%	1.66%	5.89%	10.13%	5.26%	2.45%
2Q07	0.67%	2.02%	5.84%	12.40%	5.18%	2.35%
3Q07	0.83%	3.12%	6.61%	15.63%	5.54%	2.50%
4Q07	0.99%	4.22%	8.18%	20.40%	6.00%	2.83%
1Q08	1.11%	5.43%	8.73%	24.11%	5.59%	2.88%
2Q08	1.30%	6.78%	9.60%	26.77%	5.43%	3.00%

Source: Mortgage Banker's Association

Select Aspects Of The Financial System

We do not wish to discuss the entire banking system. Rather we review here only a few aspects which are important for our purposes in discussing the financial crisis.

Financial Sector Funding

The first aspect we look at is the composition of financial firms' debt.

Financial Sector/Other - $ in billions	1998	2002	2007	2008-III	2008-IV
Commercial paper	$979.6	$1,195.2	$1,664.8	$1,408.8	1,467.9
Agency and GSE securities	3,292.0	5,509.0	7,373.7	8,049.7	8,189.2
Corporate bonds	2,328.4	3,482.8	7,734.0	7,557.7	7,406.0
Loans and advances, incl bank	510.3	726.0	1,234.3	1,681.0	1,847.2
Mortgages	71.6	96.5	157.2	161.2	164.5
Total Financial Sector and Foreign Issues	$7,181.9	$11,009.5	$18,164.0	$18,858.4	$19,074.8

Source: Flow of Funds Accounts of the United States, Board of Governors of the Federal Reserve System

As we can see, debt issued directly by Fannie Mae and Freddie Mac and securities packaged by them represent the largest portion of the financial sector's debt at $8 trillion. Commercial paper of $1.4 trillion is what is noteworthy: the bulk of this commercial paper relates to subprime securitization through conduits and off-balance sheet vehicles. We will return to these vehicles, which were the source of significant losses for financial institutions. See pp. 58-59 and p.120.

Banking Disintermediation

The second characteristic of the financial sector that is noteworthy is that the role of banks as an intermediary between savers (depositors) and borrowers has been steadily declining. In other

words, the role of banks as allocators of funds in the economy has become less important. Increasingly this allocation has been provided by the securities markets. See p. 42-44 below.

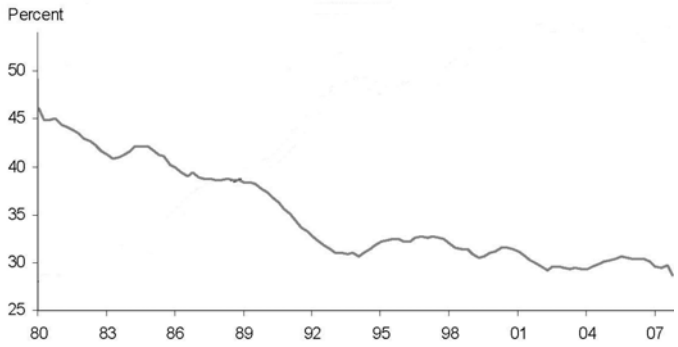


Figure 2.2 Bank loans as a % of total borrowings through loans and securities issuance
Source: Flows of Funds Accounts

Banking System and The Federal Reserve's Management Of The Economy

Despite banks' smaller role in the allocation of credit and investment funds in the economy, they remain the primary tool through which the Federal Reserve manages the economy.

The creation of cash is open only to the government. The mechanism through which this happens is the banking system. Let us imagine that a bank agrees to extend a loan. The bank has a deposit of $10 and is required by to keep $1 (10% in this example) with the Federal Reserve. Suppose for simplicity that the bank decides to lend out the entire amount that it is not required to maintain as a reserve, or $9. When the loan agreement is signed, the bank thus deposits $9 in the customer's account. That $9 is now counted as part of the money supply. Money has been created through the bank.

The customer uses the loan to purchase equipment. The supplier now has $9 which he deposits in his bank. That bank must maintain 10% in reserve with the Fed as well, that is, $0.90, but decides to lend out the rest, which is $8.10. That $8.10 is used to make a purchase which in turn leads to a deposit in a third bank. This bank will in turn post a reserve with the Fed and lend out the rest.

This continues on, expanding the money supply at every stage to finance transactions in the economy. This is called the money multiplier effect.

Bank	Deposit	Loan	Reserve
1	$10.00	$9.00	$1.00
2	9.00	8.10	0.90
3	8.10	7.29	0.81
4	7.29	6.56	0.73
5	6.56	5.90	0.66
6	5.90	5.31	0.59
7	5.31	4.78	0.53
.	.	.	.
.	.	.	.
.	.	.	.
26	0.72	0.65	0.07
27	0.65	0.58	0.06
28	0.58	0.52	0.06
29	0.52	0.47	0.05
30	0.47	0.42	0.05
.	.	.	.
.	.	.	.
.	.	.	.

Now, imagine that the Federal Reserve wants to expand the money supply to foster growth in the economy. In order to do this it increases the banks' reserves by, say, $1. It does so by purchasing $1 of Treasuries and crediting the proceeds to bank reserves. It now has fewer Treasuries and more cash. As a result of this, the bank also has $1 more of excess reserves and the ability to lend out up to $9 of customer deposits. Then the second bank where the proceeds are deposited needs to keep $0.90 as a reserve but can lend out the rest. So by increasing the banks' reserves, the Federal Reserve can stimulate growth in the money supply and thus spending. *However, for the money supply to grow, we can see that the banks must be willing to lend.*

Now, suppose conversely that the Federal Reserve is concerned that the economy is expanding too quickly and that this is sparking inflation. It will then move to reduce banks' reserves in order to rein in lending. It will do this by selling off Treasuries, depleting the cash in the reserve system. It now has more Treasuries and less cash (it used the cash to buy Treasuries). The banks will now have access to fewer reserves; demand for reserves will be high while supply will have been reduced. With reserves scarcer, banks with excess reserves will require a better return in exchange for loaning reserves to banks with a shortage of them. This will increase the interest rate on reserves. The banks will make fewer new loans while raising interest on time deposits to attract more money for both reserves maintenance and (reduced) lending activities; they will also raise interest rates to their customers to reflect their higher funding costs. Slowly money is becoming more expensive and consumers and companies will respond by reducing spending.

This process of purchasing and selling Treasuries in order to regulate the amount of reserves available and thus the level of economic activity is conducted by an arm of the Federal Reserve called the Federal Open Market Committee (FOMC). The interest rate on reserves at the Fed is the Fed Funds rate. The discount rate is the rate at which banks can borrow reserves from the Fed for seasonal and emergency needs. This is the only interest rate that the Fed controls directly. It does not control the Fed Funds. When it announces changes in the target Fed Funds rate it is signaling it will increase or reduce reserves to push the Fed Funds rate up or down through changes in the supply of reserves. Because the discount rate is the lowest rate in the market, banks will sometimes borrow from the discount window even in non-emergency situations. The Fed discourages this because it reduces its control of the money supply.

Securities and Derivatives

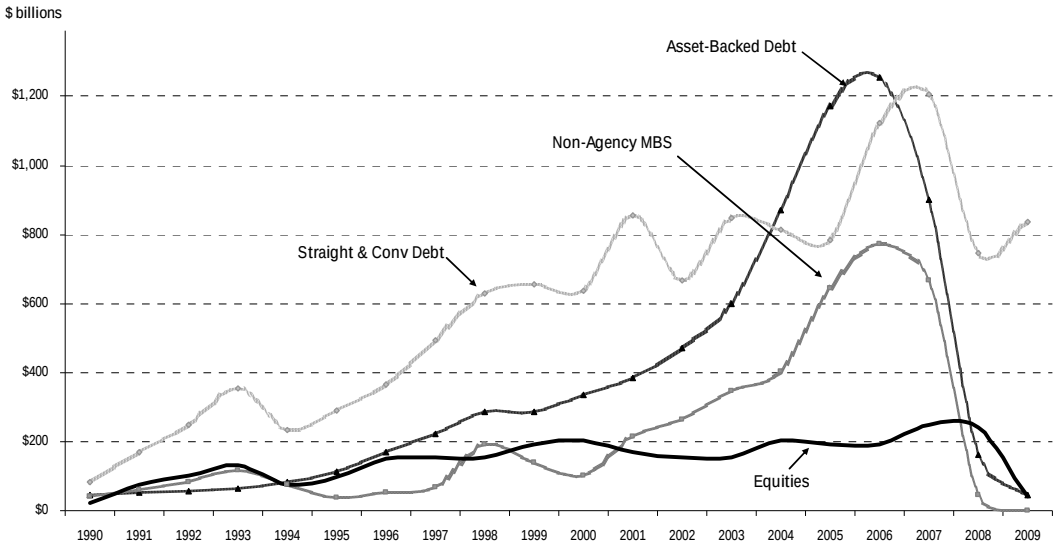
In addition to loans, investment funds can be accessed directly through the issuances of securities in the bond or equity markets. As mentioned earlier, securities have been gradually displacing banks in this allocation process, resulting in what is commonly called banking disintermediation.

There are three broad categories of securities: stocks, bonds and pooled issues (such as CMOs, mortage-backed securities and the like). Securities are typically[32] issued through a process called underwriting, in which a financial firm will acquire the entire amount of securities from the issuer, say a corporation, and then place the paper with investors such as insurance companies, funds, money managers, etc. The underwriting firm will earn its fee through the small mark-up between the price at which it acquired the issue and the price at which it was able to place it in the market.

The table below shows the phenomenal growth in underwritings beginning in the mid-1980s and the three main categories. Issuance of stock through initial public offerings and secondaries can

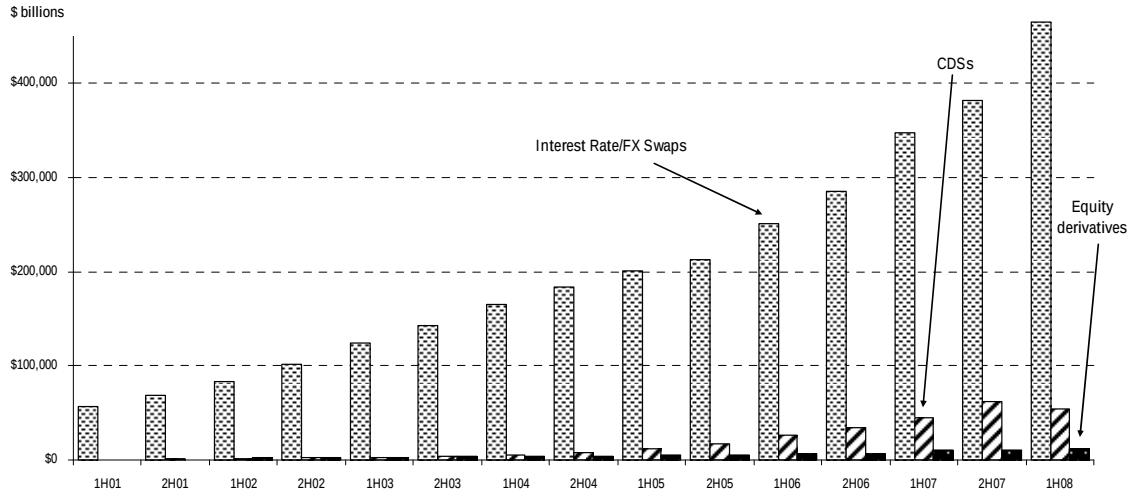
[32] One of the few exceptions was Google's 2004 initial public offering which was conducted as an auction.

be seen to be a relatively small proportion of overall underwritings. Bonds, denoted here as straight and convertible debt, were significantly higher. Pooled issues are denoted here as asset-backed debt. The curve below it identified as non-agency mortgage-backed securities is the subprime component.



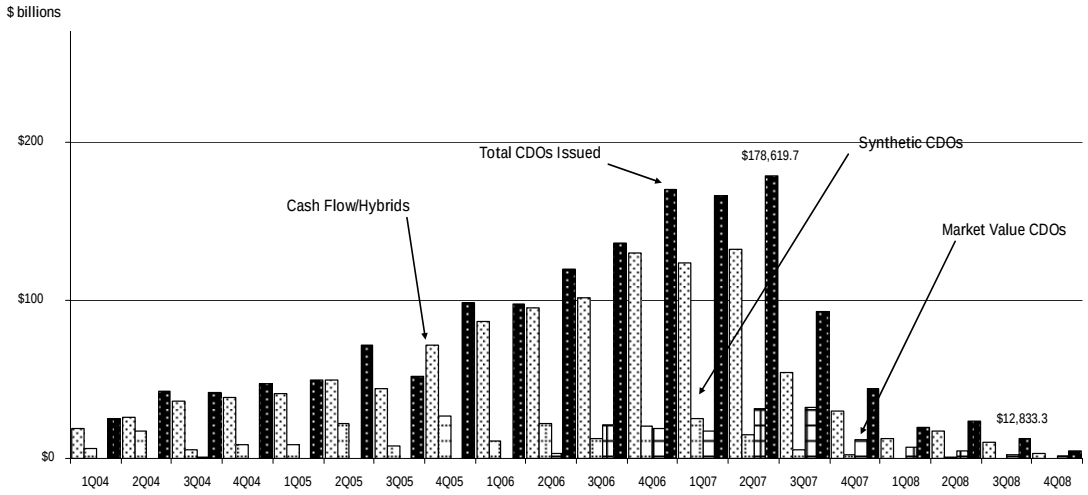
Source: Securities Industry and Financial Markets Association (SIFMA)

The period also witnessed the advent of interest rate and foreign exchange swaps. By the turn of the century, IR/FX swaps had become a huge market bearing on $50 trillion of notional amount. Today, the notional outstanding with respect to IR/FX swaps is approximately nine times the $54 trillion in CDS notional that was outstanding at the beginning of 2008.



Source: International Swaps and Derivatives Association Inc. (ISDA)

With respect to CDOs, we can see that issuances peaked in mid-2007 at $179 billion. Note also the importance of cash flow CDOs relative to synthetic CDOs in the U.S. The proportions were reversed in Europe. We will return to this issue.



Source: International Swaps and Derivatives Association Inc. (ISDA)

Evolution of the Financial Sector; Growth of the Stock Market

In 1980, a strict separation existed between commercial and investment banks. The latter were privately-owned partnerships specializing in underwritings and mergers and acquisitions advice. When capital was at risk, it was the partners' capital that was at stake. Client relationships had been built over many years, based on reciprocal trust and loyalty. Ford and General Motors were Goldman Sachs and Morgan Stanley clients, respectively, and competitors knew that attempting to gain a toehold with these companies was time wasted. While the days of the Bobby Lehmans were long gone, senior bankers still viewed themselves less as technicians than confidants to whom clients could turn for objective advice. Their firms operated out of the limelight and seldom advertised their services. It is not that profit was not a motive, but rather in the words Gustave Levy, the long-time head of Goldman Sachs, it was about being "long-term greedy."

Similarly, commercial banks were for the most part conservative institutions which provided financing to corporate clients that they had known for decades. Their other mainstay activities were equally prosaic: custody and trust services, private banking to wealthy clients, and estate services.

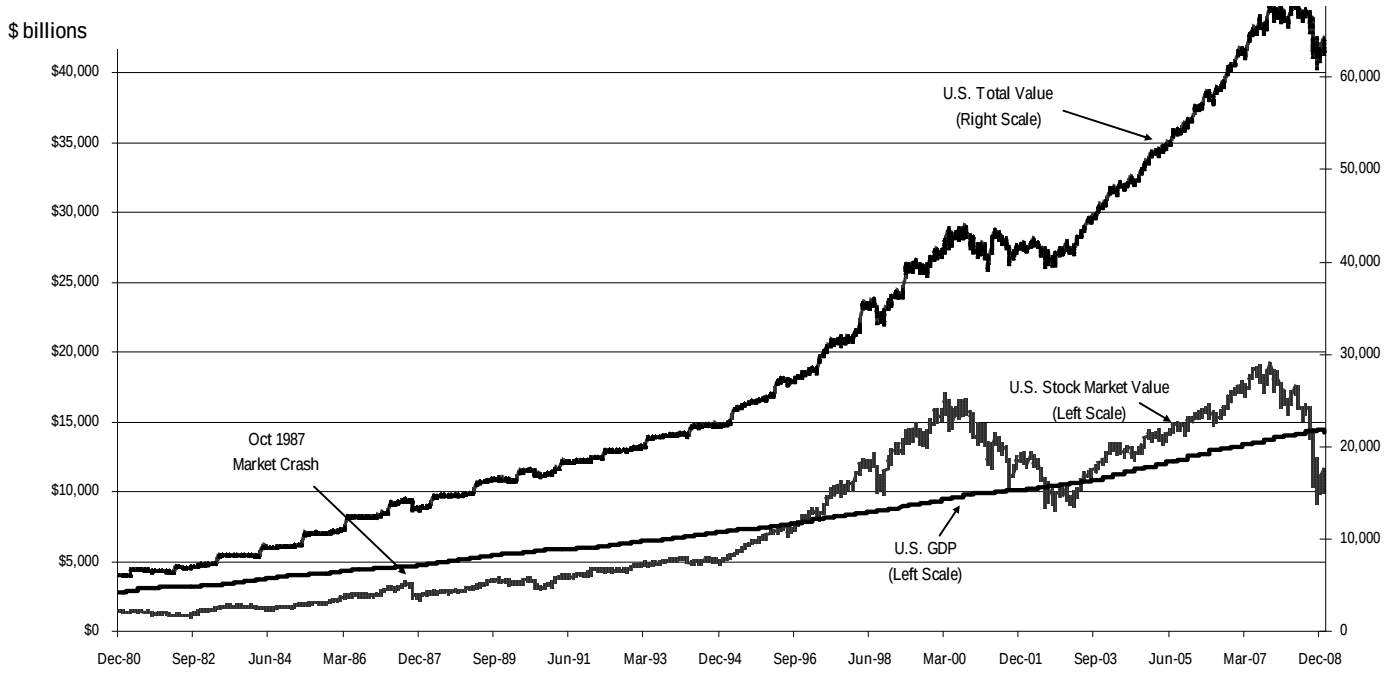
By 2000, the Glass-Steagall Act which had kept investment and commercial banking separate was no more. Goldman Sachs, Morgan Stanley, Merrill Lynch and Lehman Brothers were all publicly-traded companies. Large-scale mergers had transformed the banking landscape, epitomized by Citigroup, the financial empire spawned by the mergers of Citibank, Salomon Brothers, Smith Barney and Travelers. Even as banks were playing a dramatically reduced role

as intermediaries for corporations, the financial industry had grown into the largest sector of the economy.

This phenomenal expansion of the financial sector was matched by a relentless rise in stock market valuations after 2004. The chart below shows the total capitalization of all stocks traded on exchanges in the U.S. against GDP. Between 1989 and 1994, the stock market capitalization of the U.S. hovered between 65% and 75%, dropping after the October 1987 crash into the low 60s% and mid 50s% until mid-1989.

In the mid 1990s, as Wall Street recovered from the 1992-1993 recession and the internet revolution gathered momentum, the sock market began taking off and stock capitalization soon exceeded 100% of GDP, eventually reaching 160% in March 2000. We can see that debt also began rising rapidly, as shown by the "Total Value" line which reflects stock and debt.

As indicated previously, the internet stock phenomenon can be interpreted as *a form of indirect remuneration for the value that internet innovations injected into the economy* and for which individual internet firms remained largely uncompensated. Investors would marvel when later in the cycle companies with no revenues but a large following would be awarded high valuations. These valuations were based on the prospect that they might someday realize attractive returns through advertising, for example. Meanwhile, there was a strong realization that on-line searching, email, wireless communication, and other innovations were transforming the world there and then, enriching human interaction and business practices in heretofore unimaginable ways without any corresponding increase in the money supply.



Source:Wilshire Associates, National Income and Product Accounts, Flow of Funds Accounts, Prism Group computations

After the collapse of internet stocks, the market would once again rise to exceed the value of GDP. Beginning in 2003, stock capitalizations remained above that level and gradually rose, reaching 140% of GDP in October 2007 as the credit crisis was beginning to unfold.

While most sectors benefited from the multi-year rally that peaked in 2007, this time around financial stocks played a particularly prominent role, relentlessly raising the proportion of market capitalization represented by financial firms. The real story, however, went well beyond stock values and had two components. The first is an explosion of debt without parallel in the post-war period. At the peak of the financial boom, the sum of stock values and debt outstanding in the domestic market was almost five times the nation's GDP, almost two-and-a-half times what had prevailed in the 1980s.

The second is that by 2007, the importance of the corporate sector had become largely marginal in most of the activities that mattered to financial firms. Financial institutions were trading more and more among themselves. Club deals and consortiums became commonplace. Private equity firms bought companies from one another. Proprietary trading and principal transactions had over the years become the largest and most profitable activities of Wall Street firm, dwarfing fee income from serving corporate clients. Only a handful of firms remained which did not have a private equity arm or some other activity that conflicted with clients on Main Street.

In sum, unlike the internet-driven surge in stock market valuation, the 2004-2007 rally contained a significant component of speculative tendencies that revolved around financial institutions and financial products. Prices rose steadily but there was little or no "validation" by participants in the real economy.

A Note On The Relationship Between Debt And Equity

There is an important relationship between debt and equity that must always be kept in mind. As even finance professionals sometimes overlook it, a special effort must be made to always think in terms of this debt to equity relationship. The relationship is a simple one – debt plus equity equals total value – and its rationale is straightforward. Where the effort comes in is that in our everyday world, we almost always encounter total value or the equity value first and so we must force ourselves to think of the relationship in reverse order in order to capture the debt: if this is the total value, what is the deduction I must make on account of the debt to arrive at the equity value – the value that is really going to the owners. Or: if this is the equity value, what is the addition I must make for the debt to arrive at the total value that is really being paid?

Whether we are dealing with an individual, a company or a country, the presence of financial obligations means that not all available cash flows go to the owner (the equity holder). Rather a portion of these cash flows must go to pay interest and eventually to repay the debt principal.

Similarly, whether we are selling a house, a business or something else, the value that is due to the shareholders is the value attributable to the house, the business or that something else *minus* the value which the financial creditors are owed. If there is no debt, then the total value is entirely the shareholders'. If there is some debt, then only that portion remaining after the debt has been deducted is truly the shareholders' ownership. This is illustrated as follows:

	No debt case	**25% debt case**
Value of Enterprise	100%	100%
Financial debt	0%	25%
Value of Equity	100%	75%

Most of the times, for example, when newspapers report a merger or an acquisition they report it in terms of what is being paid for the equity. That is not the total value. The total value is what the newspapers are reporting plus the total amount of financial debt that the acquired company has. For example, when Dow Chemical acquired Rohm & Haas recently, it was reported as a $15 billion deal. In reality that is what was being paid for the equity: there were 195 million Rohm and Haas shares outstanding and Dow was paying $78 per share. However, Rohm & Haas also had $3 billion in debt, which must either be paid off or assumed (and eventually paid of at a later date) by Dow Chemical – in other words what it really paid was $18 billion.

Similarly, when we look at a company's stock price, we are only looking at the equity portion of the picture. For example, when we say that the price of Alcoa has dropped 82% from its 52-week high, we are only commenting about the equity. The total value of Alcoa actually dropped 64%: that is because it has approximately $10 billion of debt that must be taken into account.

Alcoa, Inc

$ billions except share data	Current		52 week High	Decline
Stock price	$7.9	-	$44.8	-82.3%
Equity value	$6.3		$35.9	-82.3%
Total value	$16.3		$45.9	-64.5%
	Shares outstanding	-	801 million	
	Debt outstanding	-	$10 billion	

Another aspect about debt and equity that must be remembered is that debt leverages the equity both on the upside and on the downside. That is, the presence of debt maximizes both profits and losses. This is the principle behind leveraged buyouts: placing enough debt on a company's balance sheet to maximize profits, but without risking bankruptcy since that would wipe out the equity. Unfortunately, excessive leverage has been at the root of many crises, both at the micro and the macro level, and the current crisis is no exception (although as we will argue later on, leverage was neither the only nor the main culprit in this crisis).

Leveraging Returns

Investment	$300	→	$450	50.0%
Debt	$200		$200	
Equity	$100	→	$250	150.0%
Investment	$300	→	$200	-33.3%
Debt	$200		$200	
Equity	$100	→	$0	-100.0%

The debt to equity relationship is thus a very important one to always keep in mind. The current financial crisis is really a debt crisis first and foremost: it is about loans, mortgages, leverage, interest spreads, creditworthiness – all matters that relate to the debt part of the relationship. What has been particularly worrisome, of course, is that it is an equity crisis as well: stock values have dropped dramatically, home equities have in some instances been wiped out, the "wealth effect" has disappeared. Because both sides of the relationship have been affected, we sometimes forget to think in terms of what a development in one means for the other.

The following examples may help keep this fresh in our minds:

- When we hear that a company's bonds are trading below face value, it means that investors are requiring an extra return for holding the bonds. This is because if a bond pays interest of 6%, but investors are not willing to pay 100¢ on the dollar it reflects the market's feeling that the interest rate should be really be much more than 6%. However, when we hear that certain bonds are trading at say 60¢, what it means is that beyond wanting a better yield investors are also not certain the company could actually repay the full face value of its bond. *When this is the case, the equity cannot be worth much*: if debt holders are not sure that total debt can be repaid, this is tantamount to saying the value of the company is less than its debt – it means the equity is underwater.

- When we hear that a company's stock price has dropped to a mere fraction of what it was previously trading for, *this does not mean the company has become worthless*. What it means is that its total value has fallen to a point where all of it is spoken for by debt holders, so there is nothing left for shareholders. They have been wiped out, but that does not mean the company itself has been wiped out.

- When pundits talk about the stock market and predict that a bottom has formed, that confidence is returning, that valuations will turn around, we are similarly looking at only a partial picture of the investment world. In a crisis such as we are in, we must also ask ourselves how bonds are performing and what this says about the debt to equity relationship. [33]

[33] Commentators sometimes point out that when the stock market rises, bonds tend to move lower as investment flows shift from one market to the other. Such shifts are only meaningful in normal market circumstances, when the rise in one and the decline in the other are both modest and orderly. In the current financial crisis, a normal resumption of bond activities will be a prerequisite for equity markets to recover. See also p. 101.

3. Securitization: From Originators To Investors

"Publicity is justly commended as a remedy for social and industrial diseases. Sunlight is said to be the best of disinfectants; electric light the most efficient policeman."

Louis D. Brandeis, U.S. Supreme Court Justice

The Originators

The list below illustrates the multiplicity of players who emerged and were active in the mortgage boom of 2004-2006.

Originator	Headquarters	Acquirer	Comment
ABN Amro Mortgage	Ann Arbor, MI	Citigroup	
Accredited Home Lenders	San Diego, CA		
American Home Mortgage	Tucson, AZ		
Ameriquest Capital (Argent)	Orange, CA	Citigroup	
BNC Mortgage Inc.	Irvine, CA	Lehman Brothers	Closed 8/07
Bank of America	Charlotte, NC	Bank of America	
Beneficial Corp.	Prospect Heights, IL	HSBC	
Cendant Mortgage	Mt. Laurel, NJ		
Chapel Funding LLC	Lake Forest, CA	Deutsche Bank	
Chase Home Finance	Edison, NJ	JPMorgan Chase	
CitiFinancial	Baltimore, MD	Citigroup	
CitiMortgage, Inc.	St. Louis, MO	Citigroup	
Countrywide Financial Corp.	Calabasas, CA	Bank of America	
Decision One Mortgage	Charlotte, NC	HSBC	
EMC Mortgage Corp.	Irving, TX	Bear Stearns, now JPMorgan	
Encore Credit Corp.	Woodland Hills, CA	Bear Stearns, now JPMorgan	
Equifirst Corp	Charlotte, NC	Sold by Regions Financial to Barclays	
Equity One, Inc.	Marlton, NJ		
First Franklin Financial	San Jose, CA	Sold by National City to Merrill Lynch, now BofA	
First Magnus Financial	Tucson, AZ		Chapter 11 8/077
Fremont Investment & Loan	Santa Monica, CA		
GMAC Residential Holdings	Horsham, PA		
Greenpoint Mortgage Funding	Novato,CA	Capital One	Closed 8/07
H&R Block Mortgage	Irvine,CA		
Homecomings/GMAC RFC	Bloomington, MN		
Household Financial Services	Prospect Heights, IL	HSBC	
IndyMac Bank	Los Angeles,CA		
Lehman Brothers Bank	New York, NY		
Long Beach Mortgage	Orange, CA	WaMu, now Bank of America	
MortgageIT Holdings	New York, NY	Deutsche Bank	
Nation Point	Lake Forest, CA	Merrill Lynch	
National City Mortgage	Miamisburg, OH	National City, now PNC Financial	
New Century Financial Corp.	Irvine, CA		Chapter 11
NovaStar Mortgage Inc.	Kansas City, MO		
Option One Mortgage Corp.	Irvine, CA	Sold by H&R Block to Cerberus	
Ownit Mortgage Solutions	Agoura Hills, CA		Chapter 11 12/06
People's Choice	Irvine, CA		Chapter 11 3/07
People's First Financial Corp.	San Diego, CA		
Principal Residential Mortgage	Des Moines, IA		
Resmae Mortgage	Brea, CA	Sold to Citadel	Chapter 11 2/07
Washington Mutual	Seattle, WA	Bank of America	
Wells Fargo Home Mortgage	San Francisco, CA		
Wilmington Finance	Plymouth Meeting, PA	AIG	Closed 9/08
World Savings	Irvine, CA	WaMu, now Bank of America	

Many of these firms have closed, filed for bankruptcy or been acquired. Especially notable are the acquisitions of originators by Wall Street firms.

The Servicers

The servicers are the firms which for a fee collect interest and principal payments, monitor delinquencies, negotiate loan modifications and enforce foreclosures.

Servicer	Headquarters	Comment
Ameriquest Mortgage Corp.	Orange, CA	Citigroup
Bank of America	Charlotte, NC	
Chase Home Finance	Edison, NJ	JP Morgan
CitiFinancial	Baltimore, MD	Citigroup
Countrywide Financial Corp.	Calabasas, CA	Bank of America
EMC Mortgage	Irving, TX	Bear Stearns/JP Morgan
Equity One, Inc.	Marlton, NJ	
Fairbanks Capital Corp.	Salt Lake City, UT	
Homecomings/GMAC RFC	Bloomington, MN	
Household Financial Services	Prospect Heights, IL	HSBS
Litton Loan Servicing	Houston, TX	
NovaStar Mortgage, Inc.	Kansas City, MO	
Ocwen Financial Corp.	West Palm Beach, FL	
Option One Mortgage Corp.	Irvine, CA	Owned by Cerberus
Saxon Mortgage	Glen Allen, VA	Morgan Stanley
Washington Mutual	Seattle, WA	JP Morgan
Wells Fargo Home Mortgage	San Francisco, CA	Wells Fargo
Wendover Financial Services	Greensboro, NC	
Wilshire Credit	Los Angeles, CA	

Loan servicing is a highly profitable activity and the driver behind transactions such as Bank of America's purchase of Countrywide Financial.

The Agency Sector

Fannie Mae and Freddie Mac played a crucial role in the securitization process. Their customers were predominantly "lenders in the primary mortgage market" such as mortgage banking companies, commercial banks, savings banks, community banks, credit unions, state and local housing finance agencies and savings and loan associations.

Fannie Mae describes its activities as follows:

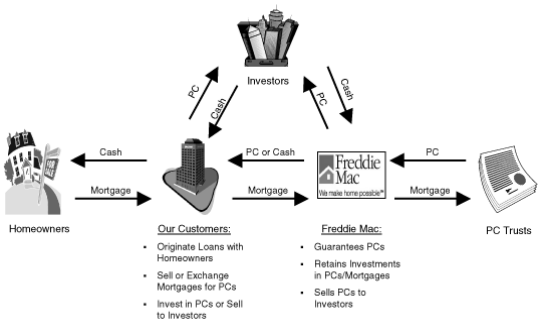
> "Fannie Mae's activities enhance the liquidity and stability of the mortgage market [by] … providing funds to mortgage lenders through our purchases of mortgage assets, and issuing and guaranteeing mortgage-related securities that facilitate the flow of additional funds into the mortgage market."[34]

Freddie Mac's description of its business is not significantly different:

> "Freddie Mac is a stockholder-owned company chartered by Congress in 1970 to stabilize the nation's residential mortgage markets and expand opportunities for homeownership [by] … purchasing residential mortgages and mortgage-related securities in the secondary mortgage market and securitizing them into mortgage-related securities that can be sold to investors."[35]

[34] Fannie Mae 10-K
[35] Freddie Mac 10-K

Freddie Mac illustrates thus the central role of securitization in its activities:



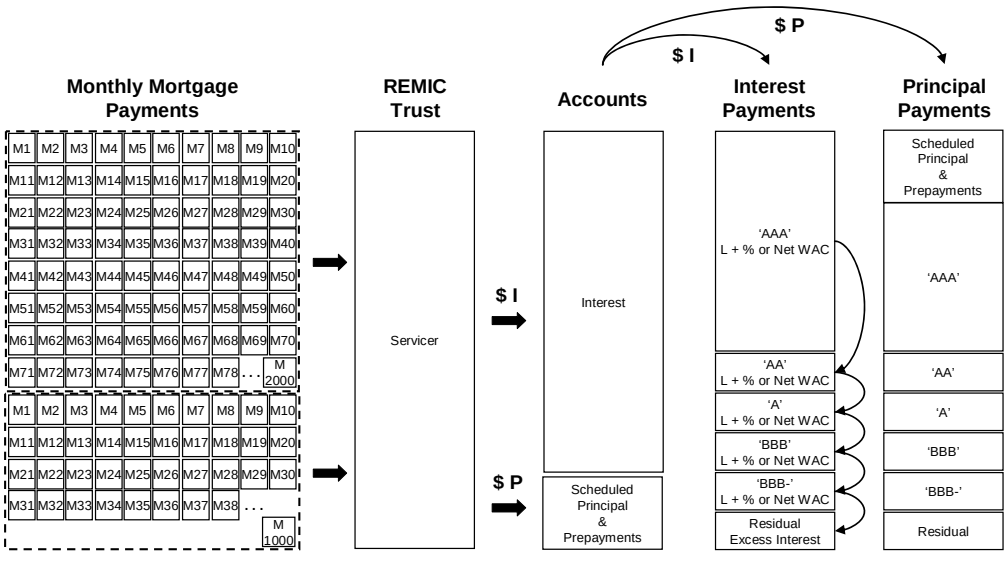
Source: Freddie Mac

In 2006, the Office of Federal Housing Oversight (created by Congress in 1992 to oversee the GSEs) announced that both Fannie Mae and Freddie Mac were found to have engaged in massive accounting fraud for several years. Fannie Mae suspended filing financial results until mid-2007, when restated results became available (Freddie Mac restated its financials prior to its IPO).

Fannie Mae and Freddie Mac were placed under the conservatorship of the Federal Housing Administration in September 2008.

Mortgage-Backed Securities

Mortgage-backed securities were structured to partition losses on mortgages into an equity tranche and issue bonds on the protected cash flows above it. This enabled bond issues to obtain investment grade ratings no lower than BBB- (non-investment grade ratings are BB+ and less).



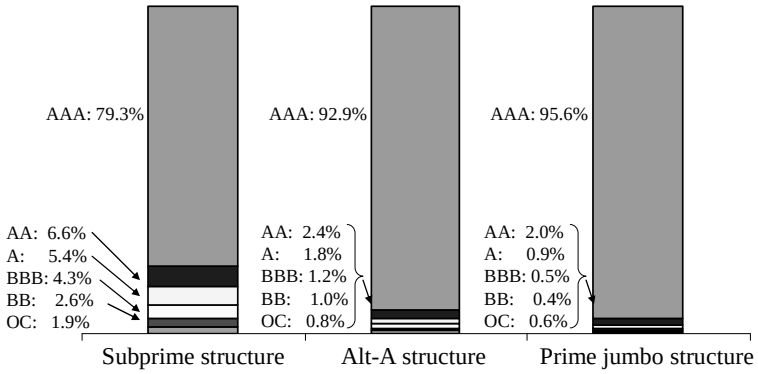
Source: Fitch Ratings

Like to CMOs described earlier, mortgage-backed securities were structured so that individual tranches had different levels of priority in the pool's cash flows. This applied first to principal payments, which normally went to pay down only the senior-most tranches for a period of time. This was referred to as **shifting interest**. During this period, known as the **lock out period** and typically lasting 3 years (36 months), only the interest was paid on the lower level "mezzanine" tranches.

Subprime mortgage-backed securities differed from CMOs in two critical respects: whereas CMOs rely on a partitioning of cash flows in order for some tranches to have shorter maturities, subprime mortgage-backed securities relied partitioning *and* prepayments at reset. As it was important that the prepayment not occur before the resets, hefty penalties applied; however, *prepayments at reset were critical for subprime paper to retain investment grade status and not violate its triggers* (discussed below). The second difference was that subprime mortgage-backed securities were issued by a "bankruptcy-remote" trust rather than the originator and the securities payments came from the underlying collateral pool of mortgages, not the originator. Essentially, the originator could go bankrupt without this affecting the mortgage-backed securities or the trust. *Conversely, there would also be no recourse to an originator* except by the trust itself to the limited extent that the originator had delivered defective assets in the first place.

Following the lock out period, a **step-down date** occurred, at which *point the cash flows would be temporarily reapportioned to pay down the equity* if certain conditions were met. The step-down date was typically the earlier to occur of the end of the 36 months or when the senior tranches were either fully paid off or so substantially so that most of the issue consisted of mezzanine holders. At the step-down date, if certain **performance triggers** were met – delinquencies not exceeding a given percentage of the mortgage pool, cumulative realized losses (measured as a proportion of the original pool balance) not exceeding certain thresholds – then the cash flows temporarily changed so the "overcollateralization" could be released to the equity.

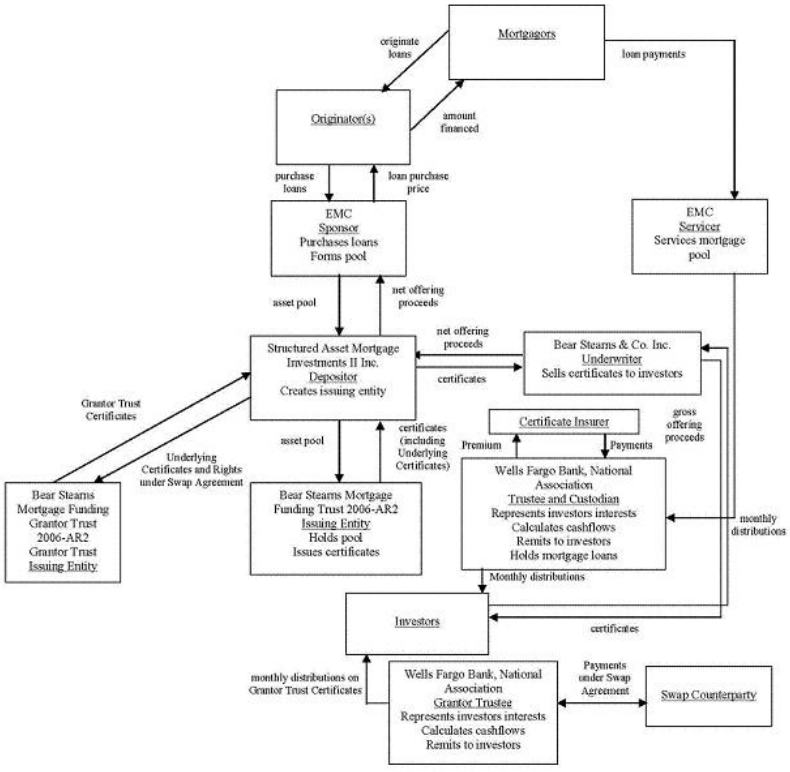
The top tranches' protection against losses was obtained in two ways: issuing securities with a face value lower than the principal balances of the underlying mortgages and what was called **overcollateralization**. Overcollateralization (seldom more than 2% of the issue amount), sometimes also referred to as the first loss tranche, is nothing other than equity. This equity was typically funded by hedge funds or the arrangers of the issue.



Thus the higher the tranches, the greater the protection from losses through overcollateralization. The degree of protection is designated by a subordination percentage, which represents the amount of the issue on which losses are absorbed by tranches lower down. So, as an example, for a top-most AAA-rated tranche to have a subordination of 78.2% means that the tranches below it that will be absorbing losses – beginning first with the equity tranche, and then moving up to the tranche immediately above the equity, and so on until the level just below the protected AAA tranche is reached – represent a combined 78.2% of the issue. This 78.2% is also referred to as the amount of **credit enhancement** that tranche has in the issue.

In addition to overcollateralization, buyers of the securities were also protected from losses by the **excess spread** in the issue. Excess spread refers to the excess of the interest rate on the mortgages over the interest rate paid to investors in the issue. For example, a AAA-rated tranche in early 2006 might have earned an average coupon of 25 basis points (a quarter of a percent) above LIBOR. At that time, with LIBOR at 5.30%, this would have meant an interest of 5.55% to the investor. However, the average interest on the underlying mortgages was 8.25%, this meant that the issue featured an excess spread of 218 basis points for that AAA-rated tranche, after taking into account the trust's 40 basis points of servicing costs and 12 basis points of swap payments[36] (8.25% - 5.30% - 0.40% - 0.12% = 2.18% excess spread).

Transaction structures could get fairly complicated quite quickly. Below is a graphic for Bear Stearns Mortgage Funding Trust 2006-AR2.



One can see that this is a sector filled with jargon and inclined toward complicated structures

[36] The swap arrangement provided protection against interest rate fluctuations during the period when the underlying mortgages paid a fixed rate prior to resetting.

Let us now look at three issues discussed in the literature. We present updated information and review the conclusions that were drawn then. We then look a recently downgraded issue.

GSAMP Trust 2006-NC2

In their March 2008 Staff Report "Understanding the Securitization of Subprime Mortgage Credit," Adam Aschcraft and Til Schuermann review the GSAMP Trust 2006-NC2 transaction.

The issue was for $854,173,200 and was completed in June 2006. The parties were various Goldman Sachs entities as underwriter, sponsor, depositor and swap provider. Deutsche Bank was trustee and Wells Fargo administrator. The principal balance at inception was $881,499,701, so here overcollateralization was slightly more than 3%.

The pool contained 3,949 conventional, subprime, adjustable- and fixed-rate loans, about half of which were fully amortizing and half balloon loans. The top-most tranche could be expected to be paid down in 24 years with no prepayment, and as quickly as 16 to 38 or so months with prepayments. The slowest paying tranche could expect to be fully paid down in just under 30 years, but in about 6 years with prepayments.

The table below summarizes how the issue has performed:

CLASS	INITIAL BALANCE	TYPE	RATINGS (S&P/MOODY'S)	1/09 BALANCE	LAST RATING
A-1	$239,618,000	Senior	AAA/Aaa	$101,076,000	AAA Neg
A-2A	$214,090,000	Senior	AAA/Aaa	-0-	
A-2B	$102,864,000	Senior	AAA/Aaa	$ 68,670,000	AAA Neg
A-2C	$ 99,900,000	Senior	AAA/Aaa	$ 99,900,000	AAA Neg
A-2D	$ 42,998,000	Senior	AAA/Aaa	$ 42,998,000	AAA Neg
M-1	$ 35,700,000	Subordinate	AA+/Aa1	$ 35,700,000	A
M-2	$ 28,649,000	Subordinate	AA/Aa2	$ 28,649,000	BB
M-3	$ 16,748,000	Subordinate	AA-/Aa3	$ 16,748,000	B
M-4	$ 14,986,000	Subordinate	A+/A1	$ 14,986,000	CCC
M-5	$ 14,545,000	Subordinate	A/A2	$ 14,545,000	CCC
M-6	$ 13,663,000	Subordinate	A-/A3	$ 13,663,000	D
M-7	$ 12,341,000	Subordinate	BBB+/Baa1	-0-	
M-8	$ 11,019,000	Subordinate	BBB/Baa2	-0-	
M-9	$ 7,052,000	Subordinate	BBB-/Baa3	-0-	
R	$ 50	Senior/Residual	AAA/N/A	-0-	
RC	$ 100	Senior/Residual	AAA/N/A	-0-	
RX	$ 50	Senior/Residual	AAA/N/A	-0-	

At the time Aschcraft and Shuermann were writing, the loss statistics for this transaction had risen just enough for the step-down to not occur even though cumulative losses remained modest.

	Delinquencies							C Prepay	Pool
Distr.Date	30 d	60 d	90 d	Forecl.	Bankrup	RE Owned	Cum Loss	Rate	Balance
Jan 2009	7.81%	5.43%	1.23%	19.34%	1.86%	12.71%	8.97%	33.62%	$433,481
Aug 2008	4.99%	4.89%	1.15%	16.74%	1.41%	10.645	5.00%	31.40%	$496,795
Aug 2007	6.32%	3.39%	1.70%	7.60%	0.90%	3.66%	0.25%	20.35%	$619,105
Jan 2007	4.58%	2.85%	0.88%	5.04%	0.36%	0.00%	0.00%	28.54%	$709,989

When it came to evaluating this transaction, however, Aschcraft and Shuermann made a detour, referencing a pipeline default formula UBS. According to the latter, 70% of the 60-day, 90-day and bankrupt loans and 100% of the foreclosed and RE owned would total to the expected pipeline default – 15.45% in this case.

The authors then discussed what they considered to be a more realistic model, also developed by UBS, which took into account the lower prepayment speeds associated with refinancing stress to come up with a lifetime loss estimate of 17.16%.

AMSI 2005-R2 and SAIL 2006-2

These two issues are discussed in Gary Gorton's "The Panic of 2007."

The Ameriquest Mortgage Securities, Inc. (AMSI) Pass-Through Certificates, Series 2005-R2 was for $1,164,600,000 and was completed in March 2005. The issue was sponsored by Ameriquest Mortgage Company, with Deutsche Bank as trustee; underwriters were UBS, RBS Greenwich Capital, Morgan Stanley and Wachovia Securities.

The pool contained 6,814 fixed- and adjustable-rate loans on one- to four-family homes.

Under the hypothetical prepayment scenarios, the top-most tranche could be expected to be paid down in about 11 years if no prepayment occurred, but in 9 to 18 montsh depending on prepayment levels. The slowest paying tranche could expect to be fully paid down in just under 30 years, but anywhere from 3 to 18 years under different prepayment assumptions.

The principal balance at inception was $1,200,000,437, so here overcollateralization was approximately 3%. The table below summarizes how the issue has performed:

CLASS	INITIAL BALANCE		MARGIN	RATINGS (S&P/MOODY'S)	1/09 BALANCE	LAST RATING
A-1A	$ 258,089,000	0.315	0.630	AAA / Aaa / AAA	$ 21,463,000	
A-1B	$ 64,523,000	0.290	0.580	AAA / Aaa / N/R	$ 5,997,000	
A-2A	$ 258,048,000	0.250	0.500	AAA / Aaa / AAA	$ 30,417,000	
A-2B	$ 64,511,000	0.300	0.600	AAA / Aaa / N/R	$ 9,233,000	
A-3A	$ 124,645,000	0.100	0.200	AAA / Aaa / AAA	-0-	
A-3B	$ 139,369,000	0.200	0.400	AAA / Aaa / AAA	-0-	
A-3C	$ 26,352,000	0.340	0.680	AAA / Aaa / AAA	$ 24,227,000	
A-3D	$ 32,263,000	0.300	0.600	AAA / Aaa / N/R	$ 3,218,000	
M-1	$ 31,200,000	0.450	0.675	AA+ / Aa1 / AA+	$ 31,200,000	
M-2	$ 49,800,000	0.480	0.720	AA / Aa2 / AA	$ 49,800,000	
M-3	$ 16,800,000	0.520	0.780	AA- / Aa3 / AA-	$ 16,800,000	
M-4	$ 28,800,000	0.700	1.050	A+ / A1 / A+	$ 28,800,000	
M-5	$ 16,800,000	0.730	1.095	A / A2 / A	$ 16,800,000	
M-6	$ 12,000,000	0.780	1.170	A- / A3 / A-	$ 9,006,000	BBB
M-7	$ 19,200,000	1.270	1.905	BBB+/ Baa1/ BBB+	$ 9,915,000	B
M-8	$ 9,000,000	1.350	2.025	BBB / Baa2/ BBB	$ 4,548,000	B
M-9	$ 13,200,000	2.000	3.000	BBB / Baa3/ BBB-	$ 6,670,000	B
NON-OFFERED CERTIFICATES						
M-10	$ 7,800,000	2.500	3.750	BB+/ Ba1 / BB+	$ 3,943,000	CCC
M-11	$ 12,000,000	2.500	3.750	BB / Ba2 / BB	$ 6,330,000	CCC
CE	$ 15,600,337	N/A	N/A	N/R/ N/R / N/R	$ 3,326,000	
P	$ 100	N/A	N/A	N/R/ N/R / N/R	-0-	
R	N/A	N/A	N/A	N/R/ N/R / N/R	-0-	

Gorton notes that by the first quarter of 2007, AMSI 2005-R2 had passed its triggers. In January 2009, the issue had paid down substantially; overall, it had the following characteristics:

	Delinquencies							C Prepay	Pool
Distr.Date	30 d	60 d	90 d	Forecl.	Bankrup	RE Owned	Cum Loss	Rate	Balance
Jan 2009	4.58%	2.26%	---	9.77%	4.47%	7.06%	3.14%	14.78%	$281,693
Aug 2008	2.56%	1.66%	---	9.56%	3.60%	7.83%	2.29%	13.60%	$303,201

By contrast, Gorton comments that "things are much different for SAIL 2006-2… This deal is in trouble." Below we look at what happened.

The Structured Asset Investment Loan Trust 2006-2

This was a structure arranged by Lehman Brothers and launched in September 2006.

The total issue was $1.3 billion. Especially noteworthy was the thinness of the mezzanine tranches. This transaction was structured with the expectation of significant prepayments. If these prepayments did not occur, the mezzanine tranches and even the Class 2 tranches might not pay down. In fact, in 2008 the mezzanine tranches defaulted.

CLASS	INITIAL BALANCE	MARGIN	RATINGS (S&P/MOODY'S)			1/09 BALANCE	LAST RATING
A1	$607,391,000	4.87813%	Aaa	AAA	AAA	-0-	
A2	$150,075,000	4.93813%	Aaa	AAA	AAA	$ 46,277,000	
A3	$244,580,000	4.99813%	Aaa	AAA	AAA	$ 244,580,000	
A4	$114,835,000	5.11813%	Aaa	AAA	AAA	$ 114,835,000	Aaa/A/A
M1	$ 84,875,000	5.12813%	Aa2	AA	AA	$ 84,875,000	Ba3/CCC/B
M2	$ 25,136,000	5.20813%	Aa3	AA-	AA-	$ 25,136,000	Ba3/CCC/CCC
M3	$ 20,124,000	5.29813%	A1	A+	A+	$ 16,233,000	Caa2/CCC/CCC
M4	$ 20,124,000	5.31813%	A2	A	A	-0-	
M5	$ 15,428,000	5.38813%	A3	A-	A-	-0-	
M6	$ 15,428,000	5.91813%	Baa1	BBB+	BBB+	-0-	
M7	$ 11,404,000	6.06813%	Baa2	BBB	BBB	-0-	
M8	$ 10,733,000	7.06813%	Baa3	BBB-	BBB-	-0-	
B1	$ 7,379,000						
B2	$ 7,379,000						
X	$ 6,708,733						

	Delinquencies							C Prepay	Pool
Distr.Date	30 d	60 d	90 d	Forecl.	Bankrup	RE Owned	Cum Loss	Rate	Balance
Jan 2009	5.74%	2.94%	1.47%	21.14%	2.34%	18.03%	10.68%	31.67%	$531,937
Aug 2008	6.32%	3.39%	1.70%	7.60%	0.90%	3.66%	6.82%	27.58%	$623,544

Countrywide ALT 2007-19

Countrywide ALT 2007-19 was an issue for $1,136,003,947 covering three pools of fixed, adjustable-rate and interest-only loans. The issue was completed in June 2007 after S&P and Moody's adjusted their ratings on some of the tranches. The structure was relatively simple with Countrywide Home Loans serving as sponsor and seller, a Countrywide unit as the servicer and Bank of New York as trustee.

CLASS	INITIAL BALANCE	TYPE	RATINGS (S&P/MOODY'S)	1/09 BALANCE	LAST RATING
1-A-1	$355,000,000	Senior	AAA/NR	$330,269,000	
1-A-2	$ 60,000,000	Senior	AAA/NR	$ 60,000,000	
1-A-3	$295,065,000	Senior	AAA/Aaa	$274,509,000	Caa2
1-A-4	$ 68,008,000	Senior	AAA/Aaa	$ 68,008,000	Caa2
1-A-5	$ 50,714,000	Senior	AAA/NR	$ 47,181,000	
1-A-6	$ 60,000,000	Senior	AAA/NR	$ 60,000,000	
1-A-7	$295,065,000	Senior	AAA/Aaa	$274,509,000	Caa2
1-A-8	$146,700,000	Senior	AAA/Aaa	$125,618,000	Caa2
1-A-9	$ 5,501,000	Senior	AAA/NR	$ 4.710,000	
1-A-10	$ 50,714,000	Senior	AAA/NR	$ 47,181,000	
1-A-11	$295,065,000	Senior	AAA/Aaa	$274,509,000	Caa2
1-A-12	$ 9,221,000	Senior	AAA/NR	$ 8,578,000	
1-A-13	$ 9,221,000	Senior	AAA/NR	$ 8,578,000	
1-A-14	$ 9,221,000	Senior	AAA/NR	$ 8,578,000	
1-A-15	$295,065,000	Senior	AAA/Aaa	$274,509,000	Caa2
1-A-16	$304,286,000	Senior	AAA/NR	$283,087,000	
1-A-17	$ 50,714,000	Senior	AAA/NR	$ 47,181,000	
1-A-18	$ 2,027,000	Senior	AAA/NR	$ 2,027,000	
1-A-19	$ 1,500,000	Senior	AAA/NR	$ 1,500,000	
1-A-20	$ 41,718,000	Senior	AAA/NR	$ 40,880,000	
1-A-21	$ 2,565,000	Senior	AAA/NR	$ 2,565,000	
1-A-22	$ 41,904,000	Senior	AAA/Aaa	$ 41,904,000	Caa2
1-A-23	$ 6,984,000	Senior	AAA/NR	$ 6,984,000	
1-A-24	$ 1,520,000	Senior	AAA/NR	$ 1,520,000	
1-A-25	$ 253,000	Senior	AAA/NR	$ 253,000	
1-A-26	$165,939,000	Senior	AAA/Aaa	$151,343,000	Caa2
1-A-27	$ 27,656,000	Senior	AAA/NR	$ 25,224,000	
1-A-28	$ 6,019,000	Senior	AAA/NR	$ 5,489,000	
1-A-29	$ 1,003,000	Senior	AAA/NR	$ 915,000	
1-A-30	$ 1,677,000	Senior	AAA/NR	$ 1,677,000	
1-A-31	$ 279,000	Senior	AAA/NR	$ 279,000	
1-A-32	$ 61,000	Senior	AAA/NR	$ 61,000	
1-A-33	$ 10,000	Senior	AAA/NR	$ 10,000	
1-A-34	$244,439,000	Senior	AAA/NR	$227,410,000	
1-A-35	$ 8,866,000	Senior	AAA/NR	$ 8,248,000	
1-A-36	$217,119,000	Senior	AAA/NR	$201,993,000	
1-A-37	$209,519,000	Senior	AAA/NR	$194,923,000	
1-A-38	$ 7,599,000	Senior	AAA/NR	$ 7,070,000	
1-A-39	$ 36,186,000	Senior	AAA/NR	$ 33,665,000	
1-A-40	$ 48,888,000	Senior	AAA/NR	$ 48,888,000	
1-A-41	$ 1,773,000	Senior	AAA/NR	$ 1,773,000	
1-A-42	$200,617,000	Senior	AAA/NR	$182,970,000	
1-X	$901,378,000	Senior	AAA/NR	$838,347,000	
2-A-1	$162,510,000	Senior	AAA/NR	$142,414,000	
2-A-2	$ 6,091,000	Senior	AAA/NR	$ 5,338,000	
2-X	$125,729,000	Senior	AAA/NR	$108,688,000	
PO	$ 5,649,000	Senior	AAA/NR	$ 5,266,000	
PO-1	$ 3,189,000	Senior	AAA/NR	$ 2,994,000	
PO-2	$ 2,460,000	Senior	AAA/NR	$ 2,272,000	
A-R	$ -0-	Senior	AAA/NR	$ -0-	
M	$ 34,883,000	Subordinate	AA-/NR	$ 34,514,000	
B-1	$ 13,007,000	Subordinate	BBB+/NR	$ 12,870,000	
B-2	$ 10,051,000	Subordinate	B+/NR	$ 9,945,000	
B-3	$ 5,913,000	Subordinate	B+/NR	$ 5,851,000	
B-4	$ 5,321,000	Subordinate	B+/NR	$ 5,265,000	
B-5	$ 4,730,000	Subordinate	B-/NR	$ 976,000	

As was customary, besides describing the loans in some detail, the prospectus contained information on the parties and their experience in mortgage securities and statistics on the market, the loans and other matters. It also showed how the loans were expected to perform

under five different hypothetical scenarios. The top-most tranches could be expected to be paid down in 25-30 years if no prepayment occurred, but in as quickly as 4 months to 4 years depending on prepayment patterns. Slower paying tranches could expect to be fully paid down in just under 30 years with no prepayments, but in 4-7 years under different prepayment assumptions.
Now, if we look at the performance statistics for this issue, the default rates are quite low. In fact the cumulative loss as a percentage of the original issue balance is very low at 0.31%.

	Delinquencies							C Prepay	Pool
Distr.Date	30 d	60 d	90 d	Forecl.	Bankrup	RE Owned	Cum Loss	Rate	Balance
Jan 2009	5.86%	3.79%	2.25%	2.98%	0.77%	0.89%	0.31%	6.18%	$1,091,646
Aug 2008	4.92%	1.29%	0.84%	2.47%	0.25%	0.61%	0.05%	7.14%	$1,116,860

The eight downgrades here were part of 2,464 others by Moody's. Many of the other issues also exhibited low cumulative losses and comparatively mild default rates. As with CWALT 2007-19 reviewed here, however, those other issues also had low prepayment rates.

For these issues, low prepayment rates in a contracting economy have become the problem. Moody's warned that its loss assumptions for mortgage-backed securities had been revised to more than 25% for issues completed in 2007, and 17%-22% for those that came to market in 2006. This compared with 15% and 11% for 2007 and 2006 deals just nine months earlier.

SIVs, VIEs and SPQEs

SIVs are separate legal structures set up for the purpose of buying and holding assets from their sponsor banks. They are the same as special purpose vehicles or entities (SPVs/SPEs). [37] SIV assets were typically AAA-rated investments, the purchase of which was funded with short-term borrowings such as commercial paper. SIVs at one point are believed to have held some $400 billion in assets.[38]

Because the assets were of the highest quality (or at least had the highest ratings), these SIVs typically had very modest capital. They earned a profit for their investors from the difference between the relatively low cost of short-term funding (mostly commercial paper as mentioned) and the return on the mortgage- or asset-backed securities. For the sponsor, the benefit was that assets had been moved off their balance sheet and freed up capital for other activities. In selling SIV structures, the sponsoring banks generally wrote "puts" which allowed investors to resell (put back) the SIV's assets to them in the event that the value of the assets declined below the level of the short-term borrowings; in fact, without these puts, commercial paper would likely not have been available as a funding source.

The main difference with Enron, of course, is that the recourse back to the sponsor – and therefore the absence of a "real" arms'-length transfer of risk – was spelt out here (whether this was done clearly or not, or in a way that the average investor could fully appreciate, is, of course, another matter). In any event, with exotic names such as Rhinebridge, Dorada, and Centaur, the mostly Cayman Island-based SIVs all ended up being repurchased by their sponsors and their

[37] The SIV designation was simply to avoid the taint of SPEs in the wake of Enron.
[38] Searching for a Silver Lining In the Subprime Collapse, Ronald S Borod, Caleb B Piron, Steve Bereit, International Securitization and Finance Report, January 5 2008

assets put back on their balance sheets – in the case of HSBC these assets amounted to $45 billion, in that of Westdeutsche Landesbank $25 billion, and in the case of Citigroup $83 billion.

Links Finance Corp	Bank of Montreal
Parkland Finance Funding Ltd	Bank of Montreal
Victoria Finance	Ceres Capital Partners
Cheyne Finance Plc	Cheyne Capital
Beta Fiance Corp	Citigroup
Centauri Corp	Citigroup
Dorada Corp	Citigroup
Five Finance Corp	Citigroup
Sedna Finance Corp	Citigroup
Zela Finance Corp	Citigroup
Vetra Finance Corp	Citigroup
K2 Corp	Dresdner Kleinwort
Eaton Vance Variable Leveraged Fund	Eaton Vance
Orion Finance Corp	Eiger Capital
Sigma Finance corp	Gordian Knot Ltd
Cullinan Finance Ltd	HSBC Bank Plc
Asscher Finance Ltd	HSBC Bank Plc
Carrera Capital Finance	HSH Nordbank
Rhinebridge Plc	IKB Credit
Cortland Capital Lt	IXIS/Ontario Teachers
Hudson Thames Capital Ltd	MBIA
Abacas Invtesments Ltd	NSM Capital
Tango Finance Cpro	Rabobank
Premier Asset Collateralized Ltd	Societe Generale
Harrier Finance Funding Ltd	Standard Chartered Ba
Whistlejacket Capital Ltd	Standard Chartered Ba
White Pine Corp Ltd	West DeutshcesLB
Kestrel Funding Plc	West DeutshcesLB

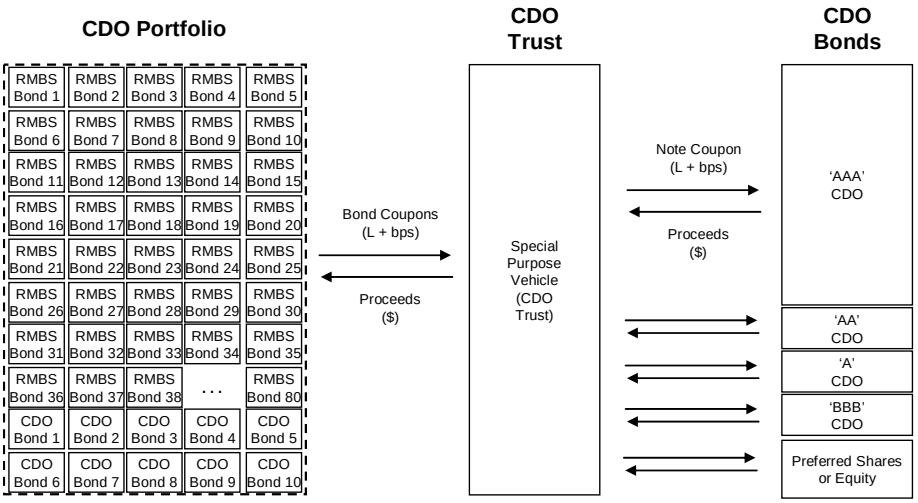
Owing to the put feature, SIVs did not have specific default provisions. In 2007, however, when liquidity began drying up, SIVs increasingly found themselves required to pay interest rates on their short-term funding that exceeded the returns they were realizing on their assets. As short-term debt maturities approached and they could not generate liquidity, SIVs began selling assets. Because these sales bore on their choicest assets, this in turn restricted the activities they could engage in. The vicious circle that was set off resulted in their being put back on bank balance sheets in December 2007.

SIVs have thus all been repurchased by their sponsors. This does not mean, however, that financial institutions do not still have off-balance sheet vehicles, as the purpose fulfilled by SIVs shifted to Variable Interest Entities (VIEs) and Qualified Special Purpose Entities (QSPEs). VIEs are accounting rules-driven entities, some of which must be consolidated. Depending on the tests they meet, many of them remain off balance sheet. In February 2008, Citigroup disclosed that its VIEs totaled $320 billion in assets. Goldman Sachs, for its part, warned of the possibility of writeoffs on $11 billion of VIEs.

CDOs or Is Anyone Home?

CDOs (here we discuss only so-called cashflow CDOs), first launched by Drexel Burnham Lambert in 1987, are similar to bond mutual funds, except for two differences: they issue notes rather than units or shares and the notes are tranched, meaning that the noteholder is entitled to a

preestablished cash streams in the underlying portfolio rather than a fractional interest in the entirety of that portfolio.



Source: Fitch Ratings

Earlier versions of CDOs were mostly focused on high-yield bonds (junk bonds) and experienced considerable difficulty during the recession of 2001. A wave of junk bond defaults, particularly among industrial issuers, impacted many CDOs as sponsors found they had significantly overestimated the diversification effect of holding issues of different companies spread out geographically on their portfolios. As they turned to mortgage-backed securities and other asset classes, they felt they would do a much better job this time around.

Typically, CDOs were issued in four tranches: senior, mezzanine, subordinated, and equity. Because the senior was entitled to being paid in full before the remaining cash flows could be channeled to the mezzanine tranche (which in turn was then entitled to paid in full before the subordinated could be paid), a AAA rating could secured for the top tranche, an AA for the second in line, and so on down to the equity, or first-loss tranche, which was unrated.

The idea behind CDOs was that diverse assets could be pooled – corporate bonds, bank loans, credit card receivables, junk bonds, commercial mortgage-backed securities, residential mortgage-backed securities, etc. – and fashioned to appeal to investors' different maturity, risk, asset class weighting and geographic sector preferences. In fact, CDO notes were often issued on the basis of a promised set of portfolio features so that the CDO, now funded, could go out and purchase the assets that would correspond to these features and deliver the cash flows.

There are two main types of CDOs: balance sheet CDOs and arbitrage CDOs. **Balance sheet CDOs** involve the transfer of the credit risk on bank loans or other assets on a sponsoring bank's balance sheet to the CDO. Balance sheet CDOs are thus a mechanism for banks to remove assets, free up regulatory capital, manage credit risk and diversify or reduce financing costs.

Arbitrage CDOs are simply CDOs that concentrate on taking advantage of the spread between the yield on the underlying portfolio and the interest paid on the notes issued to investors. Typically, the spread (or arbitrage) tends to come from the mismatch of maturities, that is holding

long-term assets and funding oneself in the shorter-term market. This should not be confused with swaps on synthetic CDOs with average spread triggers. See pp. 60-61.

CDOs have different names depending on the underlying assets. When these are bank loans, one refers to CLOs (Collateralized Loan Obligations); when they are bonds, CBOs (Collateralized Bond Obligations). The term structured finance CDO, or SFCDO, is also used when the vehicle invests primarily in structured products such as asset-backed securities, mortgage-backed securities, and other CDOs.

An important feature of CDOs is that because of the first-loss tranche structure, the top tranches of CDOs could obtain AA to AAA ratings even though the securities in the CDO would contain, or in some instances consist entirely of, BBB or lesser paper. This is how subprime CDOs and mezzanine CDOs could be launched with AAA-ratings despite the subprime or mezzanine paper they held: sufficient subordination was deemed to protect the senior tranches from losses; worst-case defaults would eat away at the lower tranches but leave enough of a cushion for the A- to AAA-rated tranches to be protected. At the same time, disagreements over how precisely losses would impact CDOs given expected delinquencies or losses were the primary reason why they seldom traded at all in many cases.

Because the paper they held was higher yielding BBB, CDOs could offer high coupons while qualifying as an investment for funds that could only hold AAA-rated instruments. For example, in February 2004, a time when yields had come down significantly and were putting pressure even on CDOs, the differentials between a 10-year corporate bond and a similarly dated CDO were as follows [40]:

Rating	CDOs	Corporate Bonds
AAA	L + 48 - 53 bps	L - 5 bps (e.g. Johnson&Johnson)
AA	L + 75 - 120 bps	L + 9 bps (e.g. B. Dupont)
A	L + 150 - 175 bps	L + 44 bps (e.g. Alcan)
BBB	L + 285 - 320 bps	L + 96 bps (e.g. Eastman Chemical)

L = 3 month USD Libor

Let us look at some CDO examples.

Newcastle CDO VIII

Newcastle Investment Corp filed the following information on form 8-K on November 22, 2006.

> **On November 16, 2006, Newcastle Investment Corp. ("Newcastle") issued $807.5 million face amount of collateralized debt obligations in its ninth CBO financing, which it refers to as CBO IX, through three of its consolidated subsidiaries, Newcastle CDO VIII 1, Limited, Newcastle CDO VIII 2, Limited and Newcastle CDO VIII LLC.**

[40] As discussed in footnote 11, p. 13, a basis point is one-hundredth of 1%. So 120 basis points is equivalent to 1.2%

$807.5 million face amount of senior investment grade rated bonds and $33.9 notional amount of interest-only notes were sold to third parties.Newcastle has retained all of the subordinate non-investment grade bonds and preferred shares. CBO IX has an expected weighted average life of 7 years. The table below sets forth further information with respect to the structure of CBO IX (dollars in thousands).

CLASS	FITCH/MOODY'S RATINGS	NOTIONAL OR FACE AMOUNT	COUPON	EXPECTED MATURITY (1)
S	AAA/Aaa	$33,869	(2)	November 2011 (2)
Senior Bonds:				
I-A	AAA/Aaa	$462,500	LIBOR + 0.28%	December 2013
I-AR	AAA/Aaa	60,000	LIBOR + 0.34%	December 2013
I-B	AAA/Aaa	38,000	LIBOR + 0.36%	December 2013
II	AA+/Aa1	42,750	LIBOR + 0.42%	December 2013
III	AA/Aa2	42,750	LIBOR + 0.50%	December 2013
IV	AA-/Aa3	28,500	LIBOR + 0.60%	December 2013
V	A+/A1	28,500	LIBOR + 0.75%	December 2013
VI	A/A2	27,313	LIBOR + 0.80%	December 2013
VII	A-/A3	21,375	LIBOR + 0.90%	December 2013
VIII	BBB+/Baa1	22,562	LIBOR + 1.45%	December 2013
IX-FL	BBB/Baa2	6,000	LIBOR + 1.80%	December 2013
IX-FX	BBB/Baa2	7,600	6.8000%	December 2013
X	BBB-/Baa3	19,650	LIBOR + 2.25%	December 2013
Total		$807,500		

(1) Reflects expected maturities except for Class S. Contractual maturities are November 2052.
(2) Fixed-rate interest-only notes due November 2011.

The total face amount of the underlying collateral is expected to be $950.0 million and consist of approximately 38% mezzanine loans, 18% bank loans,16% commercial mortgage backed securities, 8% B-notes, 10% real estate related asset backed securities and 10% in other assets, including whole loans and senior unsecured debt of real estate investment trusts.

Newcastle has an approximately $126 million retained equity interest in the portfolio.

On January 21, 2009, Fitch downgraded Newcastle as follows:

--$33,869,009 class S	to AA-	from AAA	Outlook Stable;
--$462,500,000 class I-A	to AA-	from AAA	Outlook Stable;
--$60,000,000 class I-AR	to AA-	from AAA	Outlook Stable;
--$38,000,000 class I-B	to A+	from AAA	Outlook Stable;
--$42,750,000 class II	to A	from AA+	Outlook Stable;
--$42,750,000 class III	to A-	from AA;	Outlook Stable;
--$28,500,000 class IV	to BBB+	from AA-	Outlook Stable;
--$28,500,000 class V	to BBB	from A+	Outlook Negative;
--$27,312,500 class VI	to BBB-	from A;	Outlook Negative;
--$21,375,000 class VII	to BBB-	from A-	Outlook Negative;
--$22,562,500 class VIII	to BB+	from BBB+	Outlook Negative;
--$6,000,000 class IX-FL	to BB	from BBB	Outlook Negative;
--$7,600,000 class IX-FX	to BB	from BBB	Outlook Negative;
--$19,650,000 class X	to BB-	from BBB-	Outlook Negative;
--$26,125,000 class XI	to B	from BBB-	Outlook Negative;
--$28,500,000 class XII	to B-	from BB	Outlook Negative.

Fitch commented that about 55% of the CDO is backed by securities for which an updated analysis methodology now indicated a poolwide expected loss (PEL) of 40.5% as compared to a PEL covenant of 30.625% . Since Fitch's last review a year ago, two residential mortgage-backed tranches representing 1.6% of assets had defaulted; there was also a REIT bond representing 3.3% of assets which was rated "CC" with a negative outlook.

Fitch also noted that the collateral pool experienced about 3.5% in realized losses due to asset sales. What is interesting is that many of the asset sales were at 60% of face or less and were replaced with other heavily discounted purchases.

Harbourview CDO III

Harbourview III is a SFCDO sponsored by Oppenheimer & Co and underwritten by Lehman Brothers. It was launched in April 2001. The assets in which it was intending to invest the proceeds were REIT securities, corporate bonds and synthetic securities.

CLASS	FITCH RATINGS	NOTIONAL OR FACE AMOUNT	COUPON	EXPECTED MATURITY (1)
A	AAA	$311,250	LIBOR + 0.49%	March 15, 2013
B	AA	22,500	LIBOR + 0.70%	March 15, 2013
C	BBB	26,250	LIBOR + 2.30%	March 15, 2013
Preference Shares		15,000	NA	
Total		$375,000		
Combination Notes	AA/Aa2	10,000	NA	March 15, 2013

Stated maturities on the notes extended into 2031 and 2036. In other words, through management of the portfolio, redemptions and prepayments, the CDO expected that assets which extended into the 2030s would in reality mostly mature within twelve years. Later vintage CDOs increasingly anticipated average maturities to not extend much more than 7 years from deal inception.

By January 2006, the Class C notes had defaulted, causing losses of $3.5 and $4 million in Rabobank's Solstice ABS and Solstice ABS II CBOs. This shows the entwinement that occurs when CDOs own notes of other CDOs.

Fitch's current rating on Harbourview CDO III is a "B" on Class A and a "C" on Class B.

ACA Aquarius 2006-1 Ltd.

The ACA issue was sponsored by ACA Management, the CDO asset management subsidiary of ACA Capital (which also owned ACA Financial Guaranty Corp) and underwritten by UBS. It was launched in September 2006.

CLASS	FITCH/MOODY'S RATINGS	NOTIONAL OR FACE AMOUNT	COUPON	EXPECTED MATURITY (1)
A1S	AAA/Aaa	$1,266,000	LIBOR + 0.32%	September 2013
A1J	AAA/Aaa	255,000	LIBOR + 0.43%	September 2013
A2	AA/Aa2	177,000	LIBOR + 0.53%	September 2013
A3	A/A2	80,000	LIBOR + 1.55%	September 2013
B1	BBB+/Baa1	17,500	LIBOR + 2.60%	September 2013
B2	BBB/Baa2	74,500	LIBOR + 3.25%	September 2013
B3	BBB-/Baa3	20,000	LIBOR + 3.70%	September 2013
Class I sub	BBB-/NR	86,000	6.00%	September 2013
Class II sub		24,000	NA	September 2013
Total		$2,000,000		

The CDO was to be backed by a portfolio of residential and commercial mortgage-backed securities, other asset-backed securities and CDSs. This structure did not use over-collateralization or pay-in-kind notes in an attempt to make it attractive to equity investors.

> Buried in the prospectus was the fact the CDO terms allowed for high levels of CDSs and in fact anticipated having about 83.5% of its holdings in CDSs at the closing. It therefore anticipated being mostly synthetic. Up to 90% of the CDS were to be on residential mortgage-backed securities rated BBB and BBB-. Standard & Poor's rating on ACA Aquarius 2006-1 is a "D" on classes A1S, A3, B2, B3 and Class 1 subordinated notes.

The average intended life of CDOs issued was 3-7 years for most assets types, except commercial mortgage-backed securities where it was 5-10 years.

Important features of and variations on CDOs were the following:

Absence of Independent Management

CDOs may be managed in the sense of buying securities to replace maturing ones, but otherwise did not typically have anyone responsible for strategic matters. Corporations have extensive provisions governing important events such as a sale of all or part of the business, a merger, or unsolicited proposals, which management and directors take very seriously. In a CDO, by contrast, there is no one to interface with regarding a sale of part of the portfolio or a restructuring of a debt. They have winding up provisions in case of default and will accept cash in case of early redemptions. But there are only few instances of CDOs actively participating in a debt restructuring for example

Sparse Affiliation Information

Most CDOs do not readily reveal their affiliations. For example, Galena is a series of CDOs sponsored by BlackRock; although this was well known in the investment community, this information is not readily available from Galena documentation. Few sponsors advertised their affiliation with CDOs. Ares Management, Oppenheimer, Cerberus, and PIMCO tended to be exceptions in disclosing their sponsorship of Ares, HarbourView, Ableco and Crystal Cove series of CDOs, respectively.

Sparse Information on Holdings and Investment Prospectus Information

Most CDOs were registered in the Cayman Islands and divulged no information unless required to do so in jurisdictions where CDO notes were sold. As a result most of the information on CDOs consists of a) pre-sale notes from the rating agencies announcing preliminary ratings for proposed CDO programs, b) rating change announcements and c) prospectuses on CDOs sold in certain markets, Ireland and Australia in particular. Trustees provide reports on the CDOs and their holdings; however, the level of detail rapidly diminishes if the holdings consist of asset-backed securities or other CDOs. In order to determine which U.S. investors acquired CDO notes, a text search by CDO name must be conducted. [40]

Default; Acceleration

CDOs have varying events of default (EOD) provisions. Typical EDO triggers were minimum overcollateralization levels, default par value coverage ratios, and ratings maintenance. Many CDOs have incurred EODs as a result of ratings changes.

[40] The text search can be conducted at www.sec.gov and will provide a list of forms N C and 13F

An EOD, unless waived, causes the CDO to accelerate. Acceleration will typically cause an immediate stop in all interest and principal payments to classes that are subordinate to the super-senior swap or the senior-most class in the structure. A true sequential waterfall pattern then takes over. In some CDOs, the senior holders would then decide whether to unwind or restructure. In other CDOs, acceleration automatically resulted in the winding up of the CDO.

Super Senior Tranche

The most senior tranche of a cashflow CDO is the AAA-rated tranche. So-called super senior tranches are not a supplemental tranche but rather a credit default swap (see below) referencing the AAA-rated tranche. The swap can be a standalone swap or be part of a synthetic CDO. Super senior tranches, particularly leveraged super senior credit default swaps, which are discussed below, generated substantial losses for banks.

Synthetic CDOs

Synthetic CDOs are CDOs backed not by physical assets but by CDSs. This can happen in two ways: the CDO can be a portfolio of CDSs or the CDO can itself act as a large CDS. Synthetic CDOs were attractive to certain investors because they offered high yields on AAA-rated bonds.

Credit Default Swaps

CDSs are contracts between two parties in which one agrees to make periodic payments to the other in exchange for receiving credit "protection." The credit events against which protection is sought can be a default, a bankruptcy, or simply the decline in value of a security or index. When such events occur, the contract will call for the "protection seller" to make compensatory payments to the "protection buyer." The party in which the default, bankruptcy or decline in value triggers the payments is called the reference entity – that entity can be a borrower, a bond, a portfolio or a third-party unrelated to either the protection buyer or the protection seller. The payments are in turn calculated relative to a notional amount, in which the range of possible variation – upward or downward – defines the amount of the exposure to which the protection applies.

In the simplest of structures, for example, a bank might enter into a $100 million CDS with another institution referencing a portfolio of bonds for a period of five years. If during the five-year period the bonds decline by a given percentage, that percentage as applied to the $100 million will determine the payment to be made. The payment can either be for the difference in cash between par and the current (reduced) value of the bonds (cash settlement) or through the delivery of the bonds – or equivalent paper – in exchange for payment of the (original) par value (physical settlement). When the payments are for shortfalls in the interest or principal amounts owed as and when these shortfalls occur, the CDS is referred to as a pay-as-you-go CDS.

Although CDSs were similar to insurance, because "protection" buyers did not necessarily have an economic exposure to the reference entity, they were not governed by insurance laws. Because they were recognized as derivatives by the International Swap

Dealers Association (which provides the CDSs forms used by participants), CDSs were not considered a form a gambling covered by state laws. Finally, CDSs, along with over-the-counter and electronic trades in energy and commodities (under a provision known as the "Enron loophole"), were exempt from regulation by the Commodity Futures Modernization Act of 2000

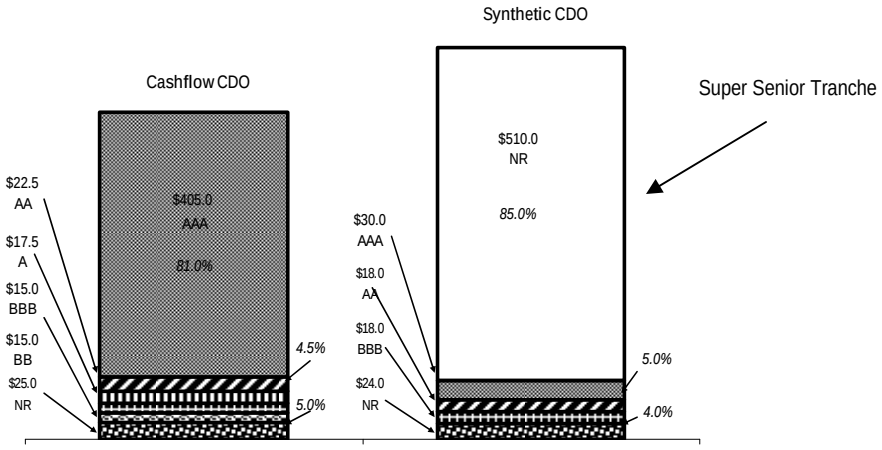
Synthetic CDOs have two important features which at times may have been misunderstood, if not by the direct market participants, most certainly by the trustees or overseers of some these participants. The first is the fact that *the source of funds for repaying any securities issued by synthetic CDOs do not come from payments (scheduled or unscheduled) on assets in an underlying portfolio.* Rather the source was in the proceeds of the securities themselves, but only to the extent those proceeds had not been reduced by credit events.

The second feature was that synthetic CDOs were devices that created leveraged credit exposures to the investors. As a result, relatively modest changes in the reference asset could produce magnified losses through the CDS mechanism. This is what banks discovered with leveraged super senior swaps in particular. See p. 62. Synthetic CDOs were particularly popular in Europe.

From a risk profile standpoint, the riskiest structures were sold mostly overseas in Europe but also in the Pacific Rim and Asia. To the extent that synthetic CDOs contributed to the credit crisis, they have thus contributed to a disparity in the type of issues that issuers and investors face overseas as compared to the U.S.

Synthetic CDOs can be entirely unfunded or partially unfunded. In unfunded structures, the investors did not pay a purchase price. Rather, they received periodic payments for the protection and stood ready to pay the CDO issuer if a loss was incurred in the reference portfolio – itself made up of CDSs – for the portion of losses attributable to their tranche.

In a partially funded synthetic CDO notes are issued against the Class A, B and C tranches and the equity is retained by the sponsor or a hedge fund. A super senior tranche is present in the form of a CDS wrapped around the AAA-rated tranche. The super senior is effectively a protection contract on the portfolio of CDSs below it. This is illustrated below by comparing a partially funded synthetic CDO to a cashflow CDO.



Let us now briefly look at examples of synthetic CDOs.

Alpha Financial Products Ltd Series 1

Alpha Financial Products Ltd Series 1was a A$50 million CDO issued in April 2005 in Australia.

Event/Party	Description
Scheduled Maturity Date	March 20, 2012
Issuer Manager	ABN Amro Australia Ltd
Issuer (Protection Seller)	Alpha Financial Products Ltd Series 1
CDS counterparty (Protection Buyer)	ABN Amro NV
Reference Portfolio	130 corporates with notional amount of A$4.333 billion
Portfolio Manager	Monte de Paschi
Deposit Bank	ABN Amro NV

The proceeds from the CDO issuance were deposited with ABN Amro and invested. The interest from these investments contributed part of the coupon on the bonds. The rest of the coupon came from the periodic payments received from ABN Amro, as protection buyer, under the CDS arrangement. The CDS called for Alpha Financial Products Ltd to absorb credit losses in the principal portfolio in excess of 9.615%. What this meant was that if the reference portfolio incurred credit losses in excess of 9.615%, Alpha Financial would withdraw that excess amount from the deposit bank and remit it to ABN Amro as CDS counterparty. The principal amount of the CDO notes issued to investors would then be correspondingly reduced.

S&P issued a AA rating on the principal of the notes to reflect a) its estimate of the probability of credit losses in excess of 9.615% and b) ABN Amro's credit rating (AA- long/A-1+ short). If ABN Amro's short-term rating, it could cash-collateralize its obligations under the CDS, substitute another CDS counterparty, find a guarantor or obtain credit enhancement. The interest was not rated. On February 19, 2009, the rating on the principal was adjusted to B+, which is a below investment-grade rating.

Aria CDO 1

An entirely different type of synthetic CDO was Aria CDO 1. This was a €1 billion issue that closed in July 2004.

Event/Party	Description
Scheduled Maturity Date	2009/2011
Issuer Manager	ABN Amro Australia Ltd
Issuers (Protection Sellers)	Aria CDO (Jersey No. 1-7) Ltd Aria CDO (Delaware No. 1-7) Corp.
CDS counterparty (Protection Buyer)	JP Morgan Chase
Reference Portfolio	CDSs on 140 corporate names (investment and speculative grade
Portfolio Manager	AXA Investment Managers
Management Style	Active with limits on size of trading bucket
Deposit Bank	JP Morgan Chase

Here the proceeds were deposited with JP Morgan Chase and invested in AAA collateral. The coupon on the notes came from interest on the collateral, from the performance of the portfolio and from the trading gains. The CDS payments from JP Morgan Chase, the protection buyer,

were made to AXA to pay for part of the management fee The reference portfolio was composed of CDSs, with Aria absorbing losses on this portfolio in excess of certain credit loss thresholds. These were different depending on the class and tranche. Investors could therefore lose principal if the portfolio behaved adversely or if trading losses were incurred by AXA.

In May 2005, Standard & Poor's downgraded both Ford and General Motors to below-investment-grade on the same day. Less than a week later, Kirk Kerkorian offered to take General Motors over sending is stock on a sharp climb. These developments severely affected the bond markets and led to extreme dislocations in spread structures.

CDOs and synthetic CDOs had been issuing notes to investors based on preliminary ratings and ahead of securing the assets in their portfolios. In fact, the investing criteria set forth in trust documents or indentures were typically the basis for the preliminary ratings. The CDOs would then go out into the market and acquire assets that based on the agencies' models would deliver the promised ratings.

This feature led to extensions in synthetic CDO structures designed to address market situations where "the relationship between prices of certain assets … change in an unexpected way." [41]

Constant Proportion Debt Obligation (CPDO)

CPDOs were introduced in late 2006 and almost immediately garnered favorable reviews.[42] CPDOs issued one class of notes which were typically rated AAA as to principal as well as coupon. The majority of the proceeds from the notes would be deposited in a reserve account where they would be invested in very liquid AAA bonds. This would produce a first income steam for investors although a modes one given the high-grade nature of the paper held. The CPDO would then write credit protection on the GDX and iTraxx indexes, or on custom-made portfolios of names (bespoke portfolios) for notional amounts calibrated to equate to a leverage of up to 15 x the notes proceeds. This was done to leverage the returns on the premiums received for providing protection. This was the second income stream which, together with the first (from the AAA bonds), would pay Libor + 200 basis points.

Every six months as the indexes were adjusted, the CPDO would recalibrate by buying or selling additional protection or through an exit and reentry on the new index configuration. The CPDOs were rated AAA because they were considered to be exposed to only minimal risk of a default by a corporate name in the index before the six months were over. Additional protection came from the fact that there were clear rules that if 10% in losses were reached, the CPDO would unwind. The CPDO would also disinvest once it had earned sufficient funds to make principal and coupon payments over the remainder of its life.

One particularity of CPDOs is that the leverage would be adjusted depending on the net asset value (NAV) of the CPDO: when NAV went down leverage was increased and when NAV went up leverage decreased. The notes sold to investors could lose value and have a significant impact on mark-to-market results if NAV went down as leverage magnified the paper losses.

[41] BIS Quarterly Review, June 2005
[42] CPDOs, The Next Best Seller? Citigroup, 10 November 2006

Leveraged Super Senior Credit Default Swaps

Leveraged super senior swaps were the other major development that gained momentum after the May 2005 default risk shocks. These swaps were to become the source of significant losses for AIG, Citigroup and other financial institutions.

In a leveraged super senior (LSS) credit default swap, a financial institution writes a CDS on a synthetic CDO as described earlier to create a super senior tranche. Because of the deemed low probability of default, however, these CDSs would typically generate relatively low protection payments. To palliate this, the CDS would thus be leveraged by increasing the amount of notional it bore on. Leverage of 10 x or more was common. The protection that a writer of LSS was providing in the CDO could thus significantly exceed the actual exposure amount of the CDO. Depending on the triggers, relatively modest losses or deviations would require payments ten times larger in a 10 x LSS. LSS swaps were initially written to provide protection against portfolio losses; in time variations were introduced, with LSS swaps on portfolio weighted average spread (WAS) and tranche market value. In a WAS, payments are triggered by deviations in the weighted average spread of a portfolio (as measured against Libor or another reference rate) in excess of a pre-agreed grid.

Market Value CDO

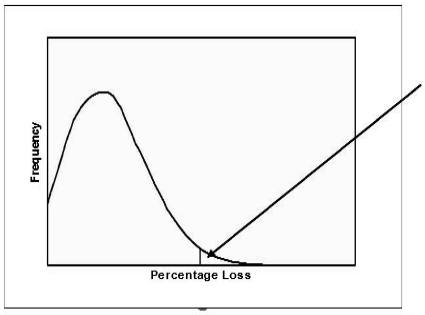
Synthetic CDOs constituted a means for investors to gain exposure to instrument classes – for example high-yield (junk) bonds – in which they could not invest directly because of ratings restrictions in their investment mandate – typically requiring them to invest only in investment-grade paper. With synthetic CDOs, by contrast, they could place wagers on the performance of junk bonds while holding AAA-rated paper.

Market value CDOs were less prevalent than either cashflow CDOs or synthetic CDOs. Their attraction was that they referenced a pool of diverse instruments on which "protection" payments were triggered not by credit deterioration but by whether periodic mark-to-markets measurements exceed or fell short of targeted performance criteria. If the market value of the reference portfolio dropped below a certain level, periodic payments were suspended. If it fell even further, the "protection" payment was made. The appeal of market value CDO was that they offered investors the ability to gain exposure to portfolios that could be calibrated to any mix of asset classes that was desired – for example traditional corporate bonds, loans, or instruments such as private equity or shares of hedge funds.

Ratings and Pricing

In the structuring and pricing of mortgage-backed securities and their derivatives, default probabilities and protection from losses through subordination are key considerations. Banks, rating agencies and other private organizations maintained historical statistics of defaults, recovery rates, ratings changes, price changes, returns, and other parameters, as well as sophisticated models designed to assess the impact of alternative market conditions on default likelihoods.

❑ "First Dollar of Loss" concept. For example, if AAA subordination is 8%, then there are $8 out of $100 of more lowly rated risks underneath. It is "AAA" unlikely that the entirely $8 will be lost and eat into the AAA investor's principal return



For CDO tranche to be rated AAA:

The stressed 5 yr AAA default probability is 0.284%. For the area under the curve to be 0.284%, the x – co-ordinate has to be 8%. This is the same as saying it is AAA-unlikely that losses will exceed 8%. 8% is the gross subordination before recovery is considered

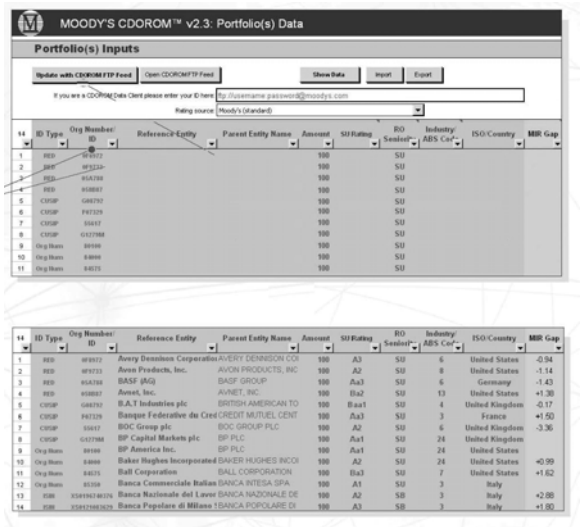
Source: Moody's

Mortgage-backed securities were originally priced using prepayment formulas and assessing the impact of randomized changes in interest rates, housing prices and other parameters. Once the ABX index was introduced, however, market practice increasingly turned to this index, its subindexes or even its constituent tranches to price an issue.

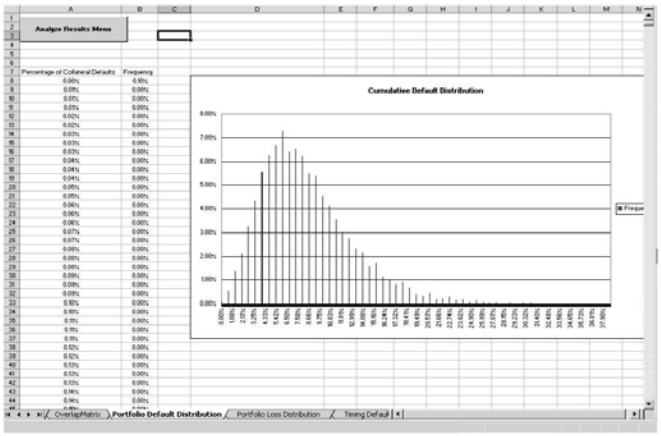
CDSs and CDOs were different because they are highly illiquid instruments which almost never trade. Banks used them to manage their risk exposures. Today there are indexes for CDSs – the iTraxx for CDSs on investment grade European corporates and the CDX, its U.S. equivalent. These indexes are different than the ABX, however, and there have been even more questions about the quality of the pricing information they provide than the ABX. The indexes are derived through periodic surveys of member banks. While this is how Libor is also derived, there is a crucial difference: Libor is a quote or offer while the prices on individual CDSs are indications – there is no assurance that a contract would actually be struck at that price.

Pricing revolved around determining the anticipated revenues from the coupon or protection payments (premium leg) and ensuring that they exceeded the potential for losses from defaults (default leg). This meant creating dynamic models and running simulations based on changes in default rates, recovery rates, correlations, and other parameters.

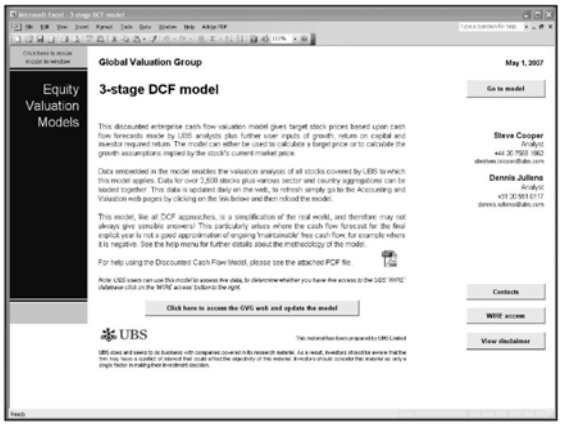
Standard & Poor's offered the Evaluator, Moody's the CDOROM package and Fitch the default Vector.



Moody's CDOROM



Moody's CDOROM



UBS Discounted Cash Flow Analysis Portal

Bloomberg Credit Default Swap Pricing Screen

Modeling For A Living

More than any other activity on Wall Street, mortgage-backed securities and CDOs are a world of financial models.

Discounted Cash Flow Analysis

Despite some short-comings, the discounted cash flow (DCF) analysis is a building block of financial valuations. The DCF approach is often made to look more complicated than it really is. What a DCF does is value an enterprise based on the cash flows it is expected to throw off after all operating requirements and costs have been met. These cash flows are then discounted back to the present to give the total value they represent in the aggregate today.[43] An example of a DCF for manufacturing business is shown below.

Discounted Cash Flow Analysis	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues	$1,000.0	$1,100.0	$1,200.0	$1,300.0	$1,400.0
Operating costs	(880.0)	(968.0)	(1,056.0)	(1,144.0)	(1,232.0)
Operating income	120.0	132.0	144.0	156.0	168.0
Income taxes (40%)	(48.0)	(52.8)	(57.6)	(62.4)	(67.2)
- Change in working capital (20% of Rev)	(20.0)	(20.0)	(20.0)	(20.0)	(20.0)
- Capital expenditures (3% of Rev)	(30.0)	(33.0)	(36.0)	(39.0)	(42.0)
+ Depreciation & amortization	35.0	37.0	39.0	41.0	42.0
Free Cash Flow (FCF)	$57.0	$63.2	$69.4	$75.6	$80.8
Discount factor	0.87	0.76	0.66	0.57	0.50
Present Value of FCF on day 1 of Year 1	$49.6	$47.8	$45.6	$43.2	$40.2

Valuation Result					
Cumulative present value of FCF in period	$49.6	$97.4	$143.0	$186.2	$226.4
Terminal Value calculated as described below					$1,252.9
		Value of the Enterprise	=		$1,479.3

Assumptions
Cost of Capital (k) = 15.0%
Terminal Value calculation method: multiple of Year 5 EBITDA
Terminal Value: EBITDA of $210 x 12 = $2,520.0
Terminal Value discounted to present = $1,252.9

Sensitiviy to Different Assumptions

Cost of Capital	*Terminal Value Multiple* 10.0x	12.0x	14.0x
13%	1,378.1	1,606.0	1,834.0
15%	1,270.5	1,479.3	1,688.1
17%	1,173.2	1,364.8	1,556.4

The DCF is composed of two distinct parts – a current period consisting of the anticipated cash flows from operations for a period of time (typically 5-7 years), and a so-called terminal value. This is similar to an investor holding stock: the value of a stock to that investor is the sum total of distributions (dividends) and the stock's appreciation during the period, plus the value of the stock at the end of the period. The resulting total is the value of the enterprise – financial debt and equity. For example, if the company had $400 of debt, then the value of the equity would be $1,479.3 - $400= $1,079.3. See discussion pp. 46-47

[43] Compounding $100 at 15% for 3 years is $100 x 1.15 = $115 x 1.15 = $132.25 x 1.15 = $152.09. Discounting is simply the reverse process, but since division is more difficult than multiplication, we begin by dividing $\frac{1}{1.15} = 0.8696$ and proceed as before: $100 x 0.8696 = $86.96 x 0.8696 = $75.62 and so on.

Monte Carlo Analysis

In some situations, the static inputs of the traditional DCF are not sufficient. One will want to calculate the various ways in which cash flows can fluctuate depending on interest rate changes, prepayments, defaults, etc. The most popular approach for this type of analysis is the Monte Carlo simulation. Monte Carlo is a set of techniques replicating ,and tabulating the results of, chance events (such the tossing of a coin) where the outcome of one event is unrelated to the outcome of the previous or next event (such events are then said to be stochastic).

In mortgage-backed securities and CDOs, the analysis began with the determination of the variables (interest rates, prepayments, defaults) that have an impact on the outcome (the cash flows) of a portfolio of securities. These variables are a combination of hypotheses about possible forward rates and volatilities, and historical statistics. Possible dependencies among variables (see Gaussian copula below) are also posited.

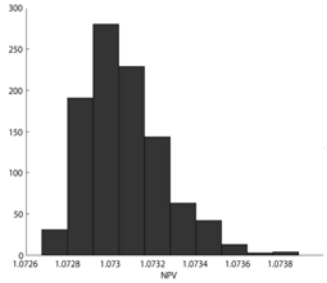
Monte Carlo will then "simulate" future scenarios by associating a stochastic term (a random probability number between 0% and 100%) to the variables and their sequences, thus generating a large number of paths (interest rate paths, prepayment paths, default paths, etc.). The cash flows for all these paths are then discounted and the results tabulated. The results of these calculations form a distribution, with the value of the security based on the mean of this distribution.

$$V_0 = \frac{PV[Path(1)] + PV[Path(2)] + \ldots + PV[Path(N)]}{N}$$

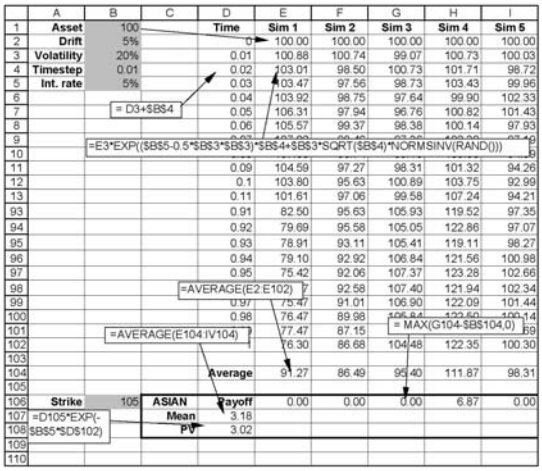
$$V_1 = \frac{PV[Path(1)] + PV[Path(2)] + \ldots + PV[Path(N)]}{N}$$

$$V_2 = \frac{PV[Path(1)] + PV[Path(2)] + \ldots + PV[Path(N)]}{N}$$

$$\vdots$$



While the Monte Carlo method is extremely useful in random physical phenomena, models are inevitably simplifications of the real world; as such their results are only approximately correct and can be biased by subjective assumptions about the interdependence (or rather lack thereof) among variables. Above all, in Monte Carlo simulations the user must also specify the type distribution to be assumed for the variable sample and that distribution's attributes (standard deviation, etc.). The user must therefore decide what distribution is appropriate for interest rates, prepayments and defaults. The user must also make a determination



whether a different distribution or different dependencies should be used if the environment changes.

Copulas

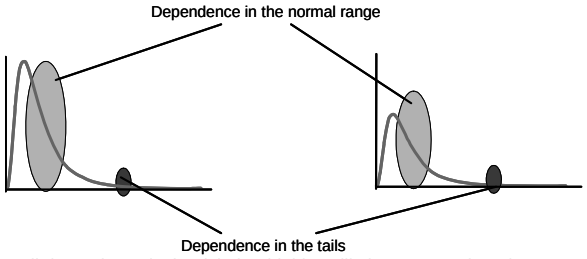
Copulas have become widely used in the study of associations and dependencies among multiple random variables. Pairwise dependence – by repeated regression one response variable at a time – or empirical factors [44] – by using an observed proportion or percentage for estimating joint occurrences – provide inherently incomplete information on associations and dependencies. Markovitz matrices, which are also used to study the dependence between assets, were considered less well suited in cases other than low risk.

Because times to default tend to be clustered, understanding the nature of this dependency was key to estimating what proportion of the portfolio might be affected by a default shock. Different approaches have been explored, but the one that has gained the most popularity is the copula approach.

A copula provides a method for expressing the probability of joint defaults among random variables by linking (coupling) their individual *marginal* (Bayesian [45]) default distributions through a formula. With a copula, times-to-default dependency in a portfolio can thus be established by first specifying the marginal time-to-default for each variable (for example, based on credit curves), and then defining the formula for the dependency *between* times-to-default. The advantage is that dependency and marginals can thus be modeled independently.

An unlimited number of copulas can be derived. However, the one that has gained the most popularity is the normal (or Gaussian) copula.

The Gaussian copula has two main drawbacks: market spreads are not consistent with the model's predictions (so-called correlation smile) and it exhibits no tail dependence, that is, pattern of dependence in extreme stress conditions.



Tail dependence is the risk that highly unlikely events. When they happen, will be cataclysmic because they reinforce one another

[44] An example of an empirical factor was encountered in GSAMP Trust 2006-NC2, bottom of p. 55
[45] This is the probability of an event affecting a variable occurring given that an event affecting another variable has occurred. See p. 105.

> "Tail dependence is a very important property for a copula, especially when this copula is to be used in modeling default correlation. The essence of tail dependence is the interdependence when extreme events occur, say, defaults of corporate bonds. The lack of tail dependence has been for years a major criticism on standard Gaussian copula."[46]

For this reason, other copulas have been proposed (Clayton, Student-t) as well as variations on the Gaussian, although most have shortcomings. (The low level of the tails should not be misconstrued: what the tails denote are probabilities; these are very low probabilities but the losses can be very large – the question with tail dependency is how they are related). As it were, the main problem that has arisen with copulas had less to do with methodology than with the fact that dependencies tend to deviate from the norm when unusual circumstances prevail. To wit:

> "Correlation levels can change over time for a number of reasons. For example, the correlation coefficient for the S&P 500 index and the 10-year Treasury note moved from a positive .24 in 1965 to -.53 in 1997 and back to a positive .39 in 2007. This indicates that including *both these securities within the same portfolio may provide very different diversification benefits depending on the timing* (emphasis added)" [47]

Oops…

A number of cashflow and synthetic CDOs were rated investment grade at issuance – that is with the senior tranche rated AAA and the junior-most BBB – and yet collapsed spectacularly, some within a year of launch. The $1.56 billion Carina CDO, sponsored by State Street, liquidated in November 2007 suffering a downgrade from AAA to CCC in one fell swoop. Tricadia's $1.5 billion TABS 2006-5 and $2.3 billion TABS 2007-7 both collapsed in late 2007 and early 2008, the latter barely a year after coming to market. And Vertical Capital saw an estimated 92% of the assets in its CDOs default, triggering the collapse of the CDOs in late 2007.

In CPDOs, within months of awarding AAA ratings to several issues in 2007, some of the issues had incurred losses and could be not traded for more than 70¢ on the dollar. Standard & Poor's and Moody's defended their ratings by saying that they address risk of default not price Eventually, Moody's disclosed that the entry of erroneous computer codes had resulted in issues being awarded with ratings up to 4 notches higher than should have been. Then in late 2007, a CPDO structured by UBS against debt of financial institutions lost 90% of its value and was downgraded nine notches by Moody's.

As a Dominion Bond Rating Service analyst summed it:

> "Small tweaks in the model can make a huge difference in a product that's this leveraged. They are complex, there's a significant amount of model risk, a presumption of market liquidity and leverage." [48]

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[46] "Perturbed Gaussian Copula," Jean-Pierre Fouque, Xianwen Zhou, August 2006, p. 13
[47] "Correlation Analysis: A Key Practice In Achieving Portfolio Diversification, " Direxionfunds Brochure, August 30, 2007
[48] Dominion Bond Rating Service, Huston Loke

4. The Players

"Man can believe the impossible, but can never believe the improbable."

The Decay of Lying, Oscar Wilde

Discussion Templates: AIG and Citigroup

Financial firms in distress are much like unhappy families[49]: each has its specific vulnerability, exposure concentration and pattern of hardship. The undoing of a Washington Mutual or a Wachovia was vastly different from that of Lehman Brothers or a Bear Stearns. As we will see later (pp. 111-113), the hallmark of the crisis for financial institutions had been the sudden drying up of liquidity. Almost overnight for some, within weeks for others, short-term funding became very difficult to obtain. Without this it is impossible to understand how the crisis became so severe. How the various players were affected by this is where the differences come in.

Commercial banks tend to be best insulated because of the customer deposits they hold and the access they have to the Fed's discount window. For investment banks, the greatest vulnerability lies in the fact that they are predominantly reliant on the bank lines of credit and the repo markets for short-term financing. The inability to access overnight funding markets was at the heart of both the Bear Stearns and the Lehman failures.

With insurance companies, whose business revolves around the probability of infrequent events (hurricanes Katrina and Andrew cost the industry $45 billion and $23 billion, respectively), reserves are built up conservatively over the years. As a result they do not have significant liquid assets that they can convert to cash in case of a non-insurance related contingency. Financial missteps can represent an unacceptable abridgement of their insurance loss-absorption capabilities and mark the beginning of a rapid winding up of their business.

Due to the size of their balance sheets, it is sometimes wrongly believed that financial firms can suffer sizeable losses without faltering. In reality, as with any other company, what matters is capital and the only true capital is cash. Any requirements beyond cash requires a conversion of assets into cash. This is not always feasible in a timely fashion or at non-distressed prices.

Many firms will maintain credit lines to supplement their cash holdings. However, estimating how much of a reserve cushion one needs is not simple or necessarily sufficient. Diverting cash from the regular cycle of receipts from customers and payments of wages, inventory, supplies, and other current needs is expensive. When faced with liquidity pressures, a company can rapidly find itself needing to prioritize cash disbursements and extend payment cycles. In turn, vendors, depositors and other creditors will react by requiring higher deposits, more collateral or swifter remittances. One can see that relatively little is required to create a liquidity crisis.

In order to avoid repetitions, let us thus look at AIG and Citigroup first and make some observations that will apply to other players as well. As with all financial institutions, there are five types of losses:

- *Credit losses*: a) defaulted loans and b) provisions for expected losses
- *Investment losses*: securities that are sold at a loss
- *Liquidity losses*: losses that stem from funding or take-back commitments
- *Trading losses*: losses from bad trades, typically short-term trading
- *Ineffective hedges*: hedging losses due to default by third-parties

[49] "All happy families are like one another; each unhappy family is unhappy in its own way." Anna Karenina, Leo Tolstoy, Chapter 1, p. 5, Penguin Putnam Inc.

American International Group (AIG)

AIG was once the largest and most profitable U.S. insurer. In property and casualty, its business was conducted under some of the most prestigious names in the industry. It was also one of the most prominent international insurance companies, with operations in Europe and Asia, and a presence in China dating back to the turn of the 20th century.

On February 12, 2008, AIG issued the following statement:

> "AIG continues to believe that the mark-to-market unrealized losses on the super senior credit default swap portfolio of AIG Financial Products Corp. (AIGFP) are not indicative of the losses AIGFP may realize over time. Based upon its most current analyses, AIG believes that any losses AIGFP may realize over time as a result of meeting its obligations under these derivatives will not be material to AIG."

As we will see, the losses that were eventually realized in that portfolio turned out to be very significant. Super senior credit default swaps, in fact, were the root cause of AIG's misfortunes. They were aggravated by trading losses and impairments in securities values. The swaps, however, were the most problematic because of the significant net cash outlays they required. By contrast trading losses generated cash inflows, albeit in the form of reduced principal, while securities revaluations were (for a time) non-cash items.

Let us look at the financial statements. Several comments should first be made.

- AIG entered the crisis with a relatively **thin capital base**. Today that figure is $52.7 billion figure, comprised of $63 billion of investments from the government and $7.3 billion of stock issuances prior to the September 2008 events, offset by losses incurred. Of the capital the firm had at the beginning of the crisis, relatively little was in liquid form – cash or readily convertible owned securities.
- This issue is amplified by the fact that much of the company's balance sheet is tied to **insurance** activities. The assets side classifies financial instruments by category rather than by the activity they relate to. But the liabilities side gives a clear idea of insurance-related holdings: 62% of liabilities are insurance liabilities; in fact, if we exclude AIG debt, insurance represents 82% of *operating* liabilities.
- Seven months after the above statement, AIG had built up its cash position to $18 billion. In the third quarter, however, fresh **collateral postings** on swap commitments were coming due. AIG had just disbursed $3.3 billion to catch up on mandatory regulatory deposits. Further a ratings downgrade by Standard & Poor's triggered a requirement to **return collateral against borrowed AIG shares** which trading counterparts were starting to return. The table below shows AIG's collateral postings in 2008.

$ billions	Dec-07	Mar-08	Jun-08	Sep-08	Dec-08
Cash collateral posted	$2.9	$8.2	$13.8	$32.8	$8.8

These cash outlays – collateral posted and collateral needing to be returned – were the principal cause of AIG's downfall down and led to the $85 billion September 2008 borrowing from the Federal Reserve (in exchange for 79.9% equity).

- Concurrently, AIG lost access to short-term financing through the **repo market**. This precipitated a liquidity crisis as AIG instantly lost the ability to renew $20 billion in financing. This was because no one was willing to trade with it despite the fact that these are *secured* lending transactions. Its vast holdings of securities did not provide liquidity.
- Another aggravating factor was that AIG leasing and finance subsidiaries lost access the **commercial paper** market when the parent company was placed on negative watch by Standard & Poor's.
- Finally, in its **credit default swaps**, AIG's commitments were much smaller than those undertaken by other writers of protection, including Citigroup, Bank of America, and others. However, it did not "hedge" itself in the sense of entering into purchases of protection of comparable magnitude.

In fiscal year 2008, AIG had a pre-tax loss of $108.8 billion. The losses stemmed from $28.6 billion in "unrealized" super senior credit default swaps [50], $55.5 billion in realized capital losses on securities sold and $17 billion in interest included in operating expenses.

AIG

$ millions	2008	2007	2006	2005	2004	2003
Net premiums earned	$83,505	$79,302	$74,123	$70,209	$66,625	$54,802
Net investment income	$12,222	$28,619	$26,070	$22,165	$18,465	$15,508
Realized capital gains (losses)	(55,484)	(3,592)	106	341	4	(442)
Losses on super senior CDS	(28,602)	(11,472)	-	-	-	-
Other income	(537)	17,207	12,998	16,190	12,532	9,553
Net Revenues	$11,104	$110,064	$113,297	$108,905	$97,626	$79,421
Reserve for loss expenses	(63,299)	(66,115)	(60,287)	(63,711)	(58,360)	(46,034)
Operating expenses	(56,566)	(35,006)	(31,413)	(29,981)	(24,461)	(21,480)
Income before taxes	($108,761)	$8,943	$21,597	$15,213	$14,805	$11,907
Cash & deposits	$8,642	$2,284	$1,590	$1,897	$2,009	$922
Receivables	23,329	24,982	23,880	21,060	21,178	17,801
Bonds	400,290	428,935	419,142	385,680	365,677	309,254
Stocks	21,143	75,373	59,068	23,588	17,706	9,584
Mortgage, loans receivable	34,687	33,727	28,418	14,300	13,146	12,328
Financial services, oth. assets	180,792	313,926	286,246	255,477	241,752	187,620
Other Assets	191,535	181,278	161,066	151,368	139,677	136,644
Total Assets	$860,418	$1,060,505	$979,410	$853,370	$801,145	$674,153
Unearned premiums	2,575	28,022	26,271	24,243	23,400	20,910
Loss expense reserves	89,258	85,500	79,999	77,169	61,878	52,381
Other policyholders's funds	382,274	407,126	380,254	346,704	331,494	273,953
Unrealized loss - swaps, options	6,238	20,613	11,401	12,740	18,132	14,658
Trading liabilities	15,332	28,491	35,176	45,256	52,508	46,388
Total debt	193,203	176,049	148,679	146,247	77,707	63,190
Other	18,828	218,803	195,762	114,508	156,154	132,451
Shareholders' equity	$52,710	$95,801	$101,677	$86,317	$79,673	$70,030

Super senior swaps

Realized securities losses

Incl. interest on new debt

See note p. 81 (bottom right)

While, the earning release suggested that AIG's insurance operations were performing well, segment information confirms what the finance and leasing subsidiaries' financing woes presaged a year earlier: that all activities were in fact affected.

[50] As we will see that accounting loss was turned into a cash (i.e. realized) loss within short order

Revenues - $ millions	2008	2007	2006	2005	2004	2003
General Insurnace	44,676	51,708	49,206	45,174	41,961	33,833
Life Insurance	3,054	53,570	51,878	47,316	43,400	36,678
Financial Services	(31,095)	(1,309)	7,777	10,525	7,495	6,242
Asset Management	(4,526)	5,625	4,543	5,325	4,714	3,651
Other	(81)	457	483	565	96	(983)
Operating earnings						
General Insurnace	(5,746)	10,526	10,412	2,315	3,177	4,502
Life Insurance	(37,446)	8,186	10,121	8,965	7,923	6,807
Financial Services	(40,821)	(9,515)	383	4,424	2,180	1,182
Asset Management	(9,187)	1,164	1,538	1,963	2,125	1,316
Other	(15,055)	(2,140)	(1,435)	(2,765)	(560)	(1,900)

Super senior CDSs

The losses on super senior credit default swaps are shown on the face of the statements as consisting of $28.6 billion in valuation adjustments (i.e. unrealized losses). This valuation adjustment was an estimate of additional costs likely to be incurred in repurchasing multi-sector CDOs on which AIG had written super senior swaps. As it turned out, most of this amount was realized when AIG went out and purchased the CDOs in order to close out the swaps.

This was a government-assisted transaction designated as Maiden Lane III. It was in connection with this transaction that the November 2009 term loan of $38 billion – which raised the AIG bailout to around $120 billion – was granted. In total, $68.1 billion in consideration was paid for the CDOs: $21.1 billion in cash from the just created $28.6 billion reserve, an additional $8.5 billion, also in cash, on puts that had ill-advisedly been written in the spring of 2008 against the CDSs, and the surrender of $32.5 billion in posted cash collateral.

Through this transaction, AIG realized a loss that was more or less as large as the notional of the CDSs. We now know that AIG and the government paid 100¢ on the dollar for the CDOs, in contrast to the 22¢ paid in the Merrill Lynch CDO transactions (see p. 88). This demonstrated how it is not a given that losses on derivative instruments would necessarily represent a fraction of the notional amount.

Super Senior CDSs - $ m	Net Notionals 2007	Terminations/ Maturities	Amortiz/ Reclass.	Currency Impact	Repurchase of CDOs	Net Notionals 2008	2008 Unreal'd Loss	2008 Fari Value
Regulatory capital								
Corporate loans	$229.3	($75.5)	($24.7)	($3.6)	-	$125.6	-	-
Subprime residential mortgages	149.4	(24.2)	(11.4)	(6.5)	-	107.2	-	-
Other	0.0		1.8	(0.2)	-	1.6	0.4	0.4
	$378.7	($99.7)	($34.3)	($10.3)	-	$234.4	$0.4	$0.4
Arbitrage								
Multi-sector CDOs	78.2	(2.1)	(1.1)	(0.2)	(62.1)	12.6	25.7	5.9
Corporate debt/CLOs	70.4	(17.1)	(1.8)	(0.9)	-	50.5	2.3	2.6
Mezzanine tranches	5.8	(0.4)	(0.2)	(0.5)	-	4.7	0.2	0.2
	$154.4	($19.7)	($3.2)	($1.7)	($62.1)	$67.8	$28.2	$8.7
	$533.1	($119.4)	($37.5)	($12.0)	($62.1)	$302.2	$28.6	$9.0

luded in $6.2 billion
realized loss - swaps,
ions entry in B / S

Cash outlay	(21.1)
Payment 2a-7 puts	(8.5)
Collateral surrende	(32.5)
	($62.1)

The credit default swaps on regulatory capital were protection that AIG sold to enable European banks to demonstrate temporary compliance with new capital requirements known as Basel II. This volume of business was written at approximately the same time as AIG entered into reinsurance with General Re enabling it to boost its insurance reserves for its own capital compliance purposes. The regulatory capital swaps were never activated and as can be seen above $100 billion of them terminated in 2008. The likelihood of these swaps requiring disbursements of cash is remote due to the government rescues of European banks. All the losses of any significance were the arbitrage swaps.

Realized Securities Losses

The other main source of losses in 2008 consisted off capital losses on securities totaling $55.5 billion. The primary components were what the company calls "other-than-temporary" valuation adjustments of $50.8 billion, trading losses on bonds of $5.3 billion and losses on derivatives of $3.7 billion.

$ billions	2008	2007	2006
Sale of fixed maturity securities	(5.3)	(0.5)	(0.4)
Sale of equities	(0.1)	1.1	0.8
Sales of real estate and other	1.2	0.6	0.3
Other than temporary impairments			
Severity	(29.1)	(1.6)	-
Lack of intent to hold to recovery	(12.1)	(1.1)	(0.6)
Foreign currency declines	(1.9)	(0.5)	-
Credit events	(6.0)	(0.5)	(0.3)
Adverse projectted cash flows	(1.7)	(0.4)	(0.0)
Other tha temporary total	(50.8)	(4.1)	(0.9)
Foreign exchange transactions	3.1	(0.6)	(0.4)
Derivative instruments	(3.7)	(0.1)	0.7
Total Realiz. Cap Gains (Losses)	(55.5)	(3.6)	0.1

$ billions	2008	2007	2006
General Insurance	(4.5)	(0.3)	(0.1)
Life Insurance & Retirement Serv	(38.7)	(2.8)	(0.6)
Financial Services	(0.1)	(0.7)	-
Asset Management	(7.3)	(0.8)	(0.2)
Other	(0.1)	(0.2)	-
	(50.8)	(4.7)	(0.9)

It is noteworthy that these losses are not only significant but were especially concentrated *outside* of the financial services subsidiary – the subsidiary that is widely viewed as the main culprit in AIG's downfall. This was because general insurance, life insurance and asset management were all large holders of mortgage-backed securities and to a lesser extent CDOs.

In fact, the impairments include $19.5 billion of losses that were incurred when mortgage-backed securities were sold in a government sponsored transaction similar to that bearing on CDSs. That is, a special entity called Maiden Lane II was created to effect this transaction whereby $39.3 billion of paper was sold for $19.8 billion in proceeds. At year-end, AIG held $59.6 billion in mortgage-backed securities and CDOs, down from $134.5 billion in 2007.

If we look at the detail of the severity losses, what is remarkable is that the most significant losses were on high-rated paper.

$ billions	2008	2007	2006
AAA	(13.1)	(0.8)	-
AA	(5.2)	(0.9)	-
A	(5.1)	(0.2)	-
BBB and less	(3.3)	(0.1)	-
Non-rated	(0.2)	(0.2)	-
Equities	(2.3)	-	-
	(29.1)	(2.2)	-

What is the potential for further losses at AIG? As reviewed above, the Maiden Lane III transaction "eliminated the vast majority of the super senior multi-sector CDO CDS exposure" which was the primary source of CDS losses. Where do we stand then?

- AIG has **special-purpose entities**, called variable interest entities(VIEs), which are not consolidated. These VIEs had assets of $175.5 billion in 2008 and AIG estimated that its maximum exposure to losses in these VIEs was $20.3 billion.
- AIG asserts that the $234.4 billion of CDSs written for **regulatory capital relief** purposes has had performance characteristics and benefits from subordination levels such that "AIGFP does not expect that it will be required to make payments pursuant to the contractual terms of these transactions."
- AIG has CDS commitments outstanding which are tied to its **credit ratings**. In particular, if AIG's credit ratings fell below BBB and Baa2, these counterparties would be entitled to compensation. The notional amount of these contracts was $38.6 billion at year-end. Additionally, in its **corporate arbitrage portfolio**, AIG has CDS tied to CLOs, single-name risk and other commitments with a net notional of $22.6 billion. Regarding both the ratings-related CDSs and the corporate portfolio contracts tied to other triggers, AIG commented that "[it] is unable to make reasonable estimates of the periods during which any payments would be made. However, the net notional amount represents the maximum exposure to loss on the super senior credit default swap portfolio."
- In its **investment portfolio**, AIG had $25 billion in unrealized losses at year-end compared to $13.6 billion at the end of 2007 on $636.9 billion carrying value of investments (bonds, equities, loans, leases, futures, etc.). Of that $636.9 billion, $408 billion was classified Level 2 and $38.3 billion Level 3. These amounts are striking when one thinks that AIG remains to this day primarily an insurance company.

So we can see that in addition to further possible impairments in its securities portfolio, AIG could still incur losses several times its depleted equity. It is possible that liquidity constraints have already damaged its insurance operations beyond the point of recovery.

Citigroup

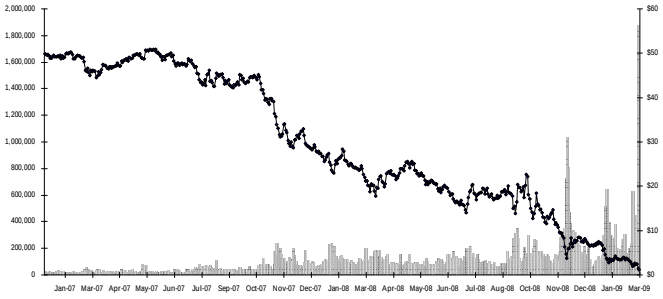
Citigroup as it exists today is the result of several mergers engineered under Sanford Weill: Citibank, Salomon Brothers, Smith Barney. In 2007, ABN Amro Mortgage Group was acquired.

Citigroup is the largest U.S. bank in terms of assets. Altogether, it raised in excess of $85 billion in capital since November 2007: $40 billion from private investors (including sovereign funds) and $45 billion from the Treasury. In January 2009, it also entered into a backstop arrangement with the government covering $301 billion of loans and investments. In February 2009, the Treasury's preferred stock converted into 34% of Citigroup's equity.

For the year ended December 30, 2008, Citigroup had a pre-tax loss of $43 billion (excluding $9.6 billion in goodwill writeoff). In addition, it had $12 billion in losses on securities held-for-sale and cash flow hedges taken directly to the other-comprehensive-income (OCI) section of its equity accounts. [51] Assuming a 37.5% tax rate, this meant that the pre-tax comprehensive loss for 2008 was thus in excess of $60 billion.

Citigroup, Inc

$ millions	2008	2007	2006	2005	2004	2003
Net Interest Income	$53,692	$45,378	$37,928	$39,246	$41,679	$37,330
Commissions and fees	11,227	20,706	18,850	16,930	15,981	15,657
Principal transactions	(22,188)	(12,086)	7,990	6,656	3,716	4,885
Gains (losses) sale of investm	(2,061)	1,168	1,791	1,962	833	529
Admin, investments and other	12,123	23,329	19,768	18,848	17,426	13,193
Net Revenues	$52,793	$78,495	$86,327	$83,642	$79,635	$71,594
Reserve for credit losses	(34,714)	(17,917)	(7,537)	(9,046)	(7,117)	(8,924)
Operating expenses	(61,192)	(58,274)	(50,301)	(45,163)	(49,782)	(37,500)
Income before taxes	($43,113)	$2,304	$28,489	$29,433	$22,736	$25,170
Cash & deposits	$199,584	$107,572	$69,036	$55,277	$47,445	$40,926
Reverse repos	184,133	274,066	282,817	217,464	200,739	172,174
Brokerage receivables	44,278	57,359	44,445	42,823	39,273	26,476
Securities and investments	633,655	753,989	667,516	476,417	493,410	418,211
Loans	664,600	761,876	670,252	573,721	537,560	465,363
Other Assets	212,220	232,766	150,252	128,335	165,674	140,882
Total Assets	1,938,470	2,187,628	1,884,318	1,494,037	1,484,101	1,264,032
Deposits	774,185	826,230	712,041	592,595	562,081	474,015
Repurchase agreemens	205,293	304,243	349,235	242,392	209,555	181,156
Brokerage and trading liabs	238,394	267,033	231,006	192,102	185,695	159,199
Total debt	486,284	573,600	389,327	284,429	264,677	198,889
Preferred stock	70,664	-	-	-	-	-
Shareholders' equity	$70,966	$113,598	$119,783	$112,537	$109,291	$98,014



Looking at the face of the statements summarized above, we readily see several things:

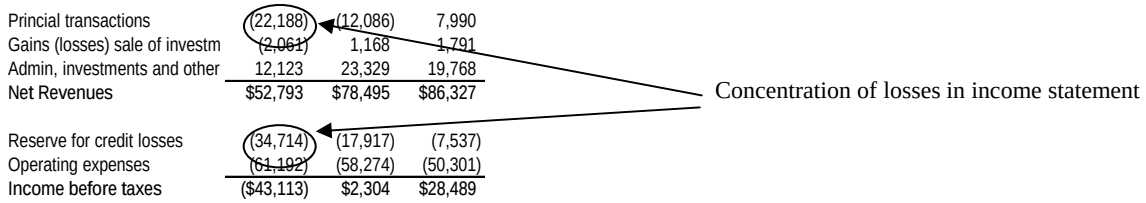
- It had **high leverage** (total assets divided by shareholders equity): 16 x and 19.5 x in 2006 and 2007, respectively. In 2008 thanks to the government's investment, this came back down to the 13 x -14 x that had prevailed historically.
- It had very **strong net interest income** in the last two years. In 2008, at $53.7 billion, interest income was actually a record, up more than 14% after having already risen by almost 19% in 2007. This reflects the high margins on loans and bonds in the current market conditions while interest rates are at record lows. If Citigroup were not involved in supbprimes and CDOs, it would be doing very well.
- **Cash was up sharply**. This is something which also occurred at other firms facing potential liquidity issues. In fact, Citigroup says that its "cash box" totaled $66.8 billion in 2008, up from $24.2 billion in 2007. Of course, part of that cash comes from the government's support of the firm (some might say the latter's "hoarding" of it).
- **Reduced short-term funding** through the repo market is also apparent, which is confirmed in the cash flow statement. In fact, the bank is reliant on much of the government's support: a large amount of its commercial paper is guaranteed under the FDIC's Temporary Liquidity Guarantee Program; over $20 billion of notes issued to

[51] Gains or losses on assets held-for-sale are taken directly to the equity accounts rather than the profit and loss statement. The $12 billion excludes foreign currency and pension liability items totaling ($8.4) billion.

the public were under this program, $13.8 billion and $12.3 billion under the Fed's Primary Dealer Credit Facility and Commercial Paper Funding Facility. Citigroup also accesses the Term Securities Lending Facility, under which collateral other than Treasuries can be posted for borrowings.

- We can also see that **loans are small proportion** of Citigroup's activities, at about 34% of the total assets.

Principal transactions and reserves for loan losses are where the biggest declines were registered: this is where the bank's charges are concentrated.



Loan Reserves

Let us look at the loans first. In 2008, Citigroup increased its loan loss reserves by $34.7 billion and had $19 billion in credit losses. Below is the detail of increases in reserves for the past three years:

Reserve Additions - $ m	2008	2007	2006
Global Cards	(9,556)	(5,517)	(3,152)
Consumer Banking	(19,622)	(10,761)	(3,825)
ICG	(5,234)	(1,540)	(532)
Wealth Management	(302)	(99)	(28)
Total	(34,714)	(17,917)	(7,537)

We can see that the bulk of the writedowns were on consumer loans (global cards and consumer banking). The writedowns in ICG were mostly "highly leveraged finance" – debt underwritings and loans of $4.9 billion of the $5.2billion in 2008 and $1.5 billion in 2007.

The year-to-year increase in reserves was much smaller (~$14 billion), due to $19 billion in credit losses in 2008. This compared to $9.9 billion in 2007 and $6.9 billion in 2006 – at 66.5% compound growth in two years; this is a sizeable increase. 90% of these bad loans were consumer loans. Citigroup also had $22.3 billion in non-performing loans in 2008, up from $9 billion in 2007 and $5.1 billion the year before – essentially a doubling every year. If we add loan losses and non-performing, 6% of Citigroup's loan portfolio in 2008 was delinquent. This compares to 2.4% in 2007.

Where do these losses come from? Turning to the loan portfolio, we can see from the table below that mortgages and real estate loans made up over a third of total loans and over half of U.S. loans. Of this total, about $134 billion and $59 billion represent first and second residential mortgages, respectively (another $19 billion of residential loans were in wealth management).

$ millions	2008	2007	2006	2005	2004
U.S. - Consumer Loans					
Mortgage and real estate	229.6	251.9	225.9	192.0	161.8
Installment, revolving credit, etc	130.8	140.8	131.0	127.4	134.1
Leases	0.0	3.2	4.7	5.1	6.0
Total Consumer Loans	360.4	395.9	361.7	324.6	301.9
U.S. - Corporate Loans	51.7	42.7	29.7	24.1	16.4
Total U.S.	412.1	438.6	391.4	348.7	318.3
Overseas – Consumer Loans	158.5	195.6	150.8	130.0	133.9
Overseas – Corporate Loans	127.5	143.5	136.9	105.2	97.5
Reserves and unearned income	(33.5)	(15.9)	(8.8)	(10.1)	(12.1)
Grand Total	664.6	761.8	670.3	573.8	537.6

At year-end 2008, 26% of first mortgages or almost $35 billion had FICO scores below 620 (compared to 17% at origination). While FICO scores are higher in the second mortgage category, there 43% or over $25 billion have loan-to-value ratios of more than 90% (i.e. less than 10% equity).

$154.1 billion of mortgages are covered by the $301 billion government backstop. This coverage becomes effective after Citigroup has incurred the first $30 billion in losses.

Principal Losses

Looking now at principal transactions, here is the breakdown for the P&L entry:

Trading and derivative losses - $ m	2008	2007
Fixed income	(6,455)	4,053
Credit products	(21,614)	(21,805)
Equities	(394)	682
Foreign exchange	2,316	1,222
Commodities	667	686
Institutional Clients Gr	(25,480)	(15,162)
Consumer banking	1,616	1,364
Global wealth	836	1,315
Corporate/other	840	397
Principal Transactions	(22,188)	(12,086)

This table shows that in 2008, aggregate losses of $28.1 billion were incurred in trading ($6.5 billion fixed income plus $21.6 billion credit derivatives). The composition of this $28.1 billion loss was as follows:

- $14.9 billion in subprime direct exposure ($12 billion of which was super senior),
- $5.7 billion in losses from monoline hedges that were not be fulfilled and
- $7.5 billion in losses from Alt-A, SIVs, and other securities.

As a result of the $14.9 writedown, Citigroup stated that its subprime exposure declined from $37.3 billion to $14.1 billion; this writedown and the $5.7 billion losses on the monoclines are shown in the table below. These items were Level 3 items (Level 3 is described on p. 24). Of the

$7.5 billion in other securities losses, it is not possible to determine which resulted from trading vs. mark-to-market.

$ billions	Dec-07	Writedowns	Sales	Dec-08
Super senior exposure	29.3	(13.1)	(4.2)	12.0
CDO warehouse	0.2	(0.1)	-	0.1
Subprime for securitization	4.0	(1.3)	(1.4)	1.2
Loans secured by subprime	3.8	(0.4)	(2.6)	0.8
Total	37.3	(14.9)	(8.3)	14.1
Monoline hedge default		(5.7)		
		(20.6)		

The impact of these items on the balance sheet is shown below. The table also show the $64.5 billion in securities reclassified to held-to-maturity securities; as previously stated, $12 billion in losses (unrealized since they are still held) were taken directly to the equity.

Securities & Invest. - $ m	2008	2007
Mortgage-backed securities	82,436	119,815
US Treasuries/agencies	68,334	51,604
Derivatives	115,289	76,881
Other fixed income	345,361	480,031
Equities (incl non-marketable)	22,235	25,660
	633,655	753,991

$20.6 subprime, derivatives
$7.5 fixed income

Where do all these adjustments leave Citigroup? Fifteen months into the credit crisis, what is the remaining exposure of the bank to subprime and other troubled assets? What other aspects are particularly salient in its reported results? The following comments can be offered.

- We do not know what Citigroup's **credit default swaps** triggers are. We also do not know if the valuation on some of the swaps could change or rapidly. As it were, interest rates and the general trading environment have produced a dramatic change in exposure levels for Citigroup and others, as reflected by the changes in fair values even as the notionals have declined. While the contention of financial firms is that they maintain offsetting trades, the margin for error has clearly narrowed.

Derivatives Notionals - $ millions	2008	2007
Interest rate	$23,746,968	$25,362,862
Interest rate/FX and other derivative contracts	5,333,400	6,670,932
Credit derivatives:		
Citigroup as the Guarantor	1,443,280	1,767,838
Citigroup as the Beneficiary	1,590,213	1,906,956

Derivatives Fair Values - $ millions	2008		2007	
	Receivable	Payable	Receivable	Payable
Interest rate/FX and other derivative contracts	880,435	894,571	351,569	385,686
Credit derivatives:				
Citigroup as the Guarantor	5,890	198,233	4,967	73,103
Citigroup as the Beneficiary	222,461	5,476	78,426	11,191
Cash collateral paid/received	63,866	65,010	32,247	19,437
Total	1,172,652	1,163,290	467,209	489,417
Netting agreements & market value adjustments	(1,057,363)	(1,046,505)	(390,328)	(385,876)
Net receivables/payables	115,289	116,785	76,881	103,541

To balance sheet

91% Level 2 and 6% Level 3

83% Level 2 and 8% Level 3

- In any further losses in its mortgage loan portfolio, Citigroup must absorb the first $30 billion in losses before the government's backstop arrangement becomes effective;

- Citigroup still retains $14.1 billion in exposure to subprime CDOs on which futehr losses cannot be ruled out.

- Citigroup has **VIEs** which are not consolidated. These VIEs include asset-backed commercial paper conduits with assets of $59.6 billion, CDOs and CLOs totaling $37.7 billion in assets, and VIEs with municipal tender option bonds totaling $30.1 billion in assets. Citigroup's estimate of its risk exposure on VIEs is $106.8 billion.

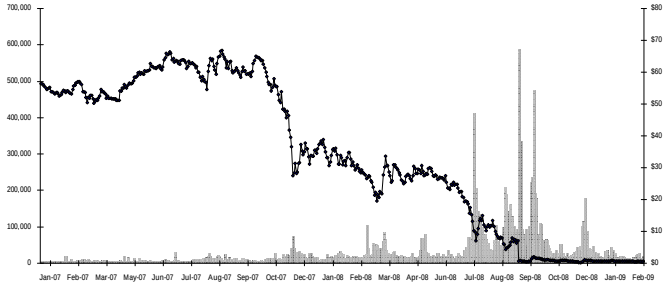
- Citigroup is a different entity as it enters 2009: it will be operating without its German network (German deposits are excluded from the presentation of total deposits above) and its Smith Barney wealth management operations will part of a joint venture with Morgan Stanley.

- Many of Citigroup's assets and liabilities are **market exposures** created by commitments and countercommitments rather than physically- and directly-owned assets. As a result it is possible for the exposure to increase due to counterparty default or any other external events. It should be considered for example, that Citigroup was forced to recognize non-negligible losses on positions that were guaranteed by monocline insurers. But most importantly, unlike a physical item these liabilities cannot be readily sold off. As the song says: "*You can check out any time you like but you can never leave*."

Government-Sponsored Enterprises

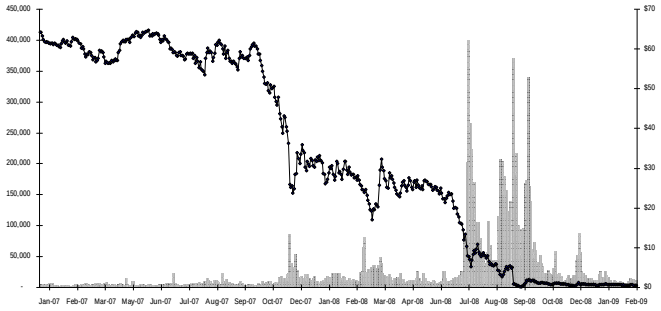
On September 6, 2008,Fannie Mae and Freddie Mac were placed under the conservatorship of the Treasury's Federal Housing Finance Authority. Two months earlier, the Treasury had begun purchasing GSE debt in the open market. This was expanded to mortgage-backed securities and now to the securities guarantees they issued.

Fannie Mae $ millions	TTM 3Q08	2007	2006	2005	2004	2003
Net Interest Income	$7,238	$4,581	$6,752	$11,505	$18,081	$13,569
Guarantee Fees	6,456	5,071	4,250	4,006	3,604	2,411
Trust Management Fees	375	588	111	-	-	-
Other Fees	616	751	672	1,445	404	437
Net Revenues	$14,685	$10,991	$11,785	$16,956	$22,089	$16,417
Gains/(losses) investments, etc	(17,717)	(8,436)	(3,713)	(6,842)	(14,071)	(4,441)
Operating expenses	(2,076)	(2,669)	(3,076)	(2,115)	(1,656)	(1,463)
Reserve for credit losses	(19,715)	(4,564)	(589)	(441)	(352)	(100)
Foreclosure expense	(1,091)	(448)	(194)	13	(11)	0
Income before taxes	($25,914)	($5,126)	$4,213	$7,571	$5,999	$10,413
Net cash flow	$66,133	$42,949	$31,669	$78,141	$41,556	$58,223
Total Assets	$896,615	$882,547	$843,936	$834,168	$1,020,934	$1,009,569
Repurchase Agreements	1,357	869	700	705	2,400	0
Other indebtedness	831,310	796,299	767,046	764,010	953,111	861,732
Shareholders' equity	$9,276	$44,011	$41,506	$39,302	$38,902	$22,373



The decline of the GSEs has been striking because on their concentration on traditional mortgages. For this reason, their travails have been viewed as a reflection of a general economic contraction going well beyond subprime.

Freddie Mac $ millions	TTM 3Q08	2007	2006	2005	2004	2003
Net Interest Income	$4,945	$3,099	$3,412	$4,627	$8,313	$8,598
Guarantee Fees	3,249	1,905	1,519	1,428	NA	NA
Trust Management Fees	3,076	2,635	2,393	2,076	NA	NA
Other Fees	239	246	236	126	NA	NA
Net Revenues	$11,509	$7,885	$7,560	$8,257	$8,313	$8,598
Gains/(losses) investments, etc	(22,630)	(9,128)	(3,281)	(3,845)	NA	NA
Operating expenses	(1,510)	(1,674)	(1,641)	(1,535)	NA	NA
Reserve for credit losses	(10,266)	(2,854)	(296)	(307)	NA	NA
Foreclosure expense	(931)	(206)	(60)	(40)	NA	NA
Income before taxes	($22,318)	($5,977)	$2,282	$2,530	$8,313	$8,598
Net cash flow	($14,262)	($7,350)	$8,737	$6,142	NA	NA
Total Assets	$804,390	$794,368	$804,910	$798,619	$779,572	$787,952
Interest payable	6,207	7,864	8,307	NA	NA	NA
Other indebtedness	783,950	738,557	744,341	734,391	709,796	717,918
Shareholders' equity	($13,795)	$26,724	$26,914	$25,691	$29,925	$30,408



A closer look tempers this view substantially. As with Citigroup, we can first note that net interest income also rose here due to low interest rates and high credit spreads. Perhaps most notable, however, is the very significant leverage at ~20 x in the case of Fannie Mae and almost 30 x in that of Freddie Mac. These are astonishing levels, holding the potential for devastating losses on relatively small portfolio variations.

As it turned out, the losses incurred by the GSEs were substantial. They consisted of credit losses on traditional mortgages, losses on guarantees and investment losses. Losses on mortgages and guarantees were all incurred on agency-grade loans. They increased as the economy slowed, but would not have had the impact they had if the GSEs had been more traditionally capitalized.

Investments, on the other hand, were an entirely different story. There, the GSEs incurred substantial losses on subprime mortgage-backed securities. Although they stayed away from investing in CDOs, the GSEs had accumulated significant amounts of subprime assets.

The Banks

We looked at Citigroup's earnings release as the template. Here we show Citigroup's main rivals, including two which failed – Wachovia and Washington Mutual.

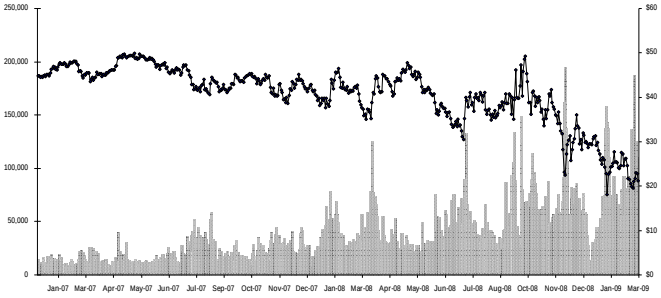
JP Morgan Chase: The Survivor?

JP Morgan Chase and Wells Fargo have both been considered the financial institutions that are th best protected against mortgage-backed securities writeoffs and losses from CDSs and CDOs. This is despite the fact that both were significant players in the mortgage securitization process and maintain large derivatives books.

JPMorgan Chase Co

$ millions	2008	2007	2006	2005	2004	2003
Net Interest Income	$38,779	$26,406	$21,242	$19,555	$41,679	$37,330
Commissions and fees	10,614	10,573	8,988	7,477	15,981	15,657
Principal transactions	(10,699)	9,015	10,778	8,072	3,716	4,885
Admin, investments and other	28,558	25,378	20,991	19,144	18,259	13,722
Net Revenues	$67,252	$71,372	$61,999	$54,248	$79,635	$71,594
Reserve for credit losses	(20,979)	(6,864)	(3,270)	(3,483)	(7,117)	(8,924)
Operating expenses	(43,500)	(41,703)	(38,843)	(38,926)	(49,782)	(37,500)
Income before taxes	$2,773	$22,805	$19,886	$11,839	$22,736	$25,170
Cash & deposits	$165,034	$51,610	$53,959	$58,331	$56,848	$30,443
Reverse repos	203,115	170,897	140,524	133,981	101,354	76,868
Brokerage receivables	124,000	84,184	73,688	74,604	47,428	41,834
Securities and investments	715,926	576,859	457,713	375,717	415,048	317,867
Loans	721,734	510,140	475,848	412,058	394,794	210,243
Other Assets	245,243	168,457	149,788	144,251	141,776	93,657
Total Assets	2,175,052	1,562,147	1,351,520	1,198,942	1,157,248	770,912
Deposits	1,009,277	740,728	638,788	554,991	521,456	326,492
Repurchase agreemens	192,546	154,398	162,173	125,925	127,787	113,466
Brokerage and trading liabs	166,878	157,867	147,957	145,930	151,207	149,448
Total debt	214,038	248,606	164,479	144,228	127,362	69,066
Shareholders' equity	$166,884	$123,221	$115,790	$107,211	$105,653	$98,014

* Legacy JP Morgan only



Like its peers, it has experienced significant growth in its interest income. Unlike its peers, it is said to have put most of the subprime related issues behind it.

JP Morgan Chase has also consistently portrayed itself as an institution that did not need a capital infusion from the government but agreed to one in order to support the Treasury's "goal of obtaining the participation of all major banks." The bank has also presented itself as a model that others might emulate and the only institution to be increasing its lending activities to promote economic recovery and growth.

Whether this image can be preserved going forward will perhaps depend largely on whether surprises spring out of its multi-trillion dollar notional exposures in credit default swaps and other derivatives.

Bank of America: Commercial Banking and Retail Brokerage

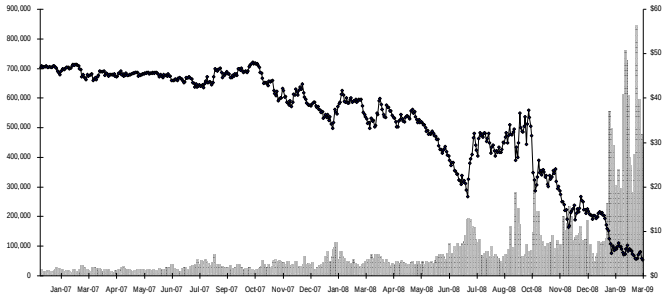
Until recently Bank of America was perceived as almost as well positioned as JP Morgan due to its strong presence in credit card lending and its extensive branch network. It has pursued two ambitious acquisitions in rapid succession: that of Countrywide Financial for its mortgage servicing rights portfolio and Merrill Lynch for its retail brokerage.

Questions about possible overextension, particularly in light of large losses at Merrill Lynch have since pushed its stock into the single digits.

As with others, Bank of America's fortunes may also hinge to some extent on whether exposures to CDOs and super senior commitments could lead to complications, particularly given notionals in Level 2 and Level 3 assets (Level 2 and 3 are described on p. 24) while lower than JP Morgan's are comparable to Citigroup's. See p. 122.

Bank of America NA

$ millions	2008	2007	2006	2005	2004	2003
Net Interest Income	$45,360	$34,441	$34,591	$30,737	$27,960	$20,505
Card income and fees	$23,630	$22,985	$22,514	$13,457	$11,581	$8,670
Commissions and fees	7,235	7,492	6,773	6,040	5,500	4,107
Principal transactions	(5,911)	(4,889)	3,166	1,763	869	408
Admin, investments and other	2,468	6,804	5,536	5,178	3,055	4,144
Net Revenues	$72,782	$66,833	$72,580	$57,175	$48,965	$37,834
Reserve for credit losses	(26,825)	(8,385)	(5,010)	(4,014)	(2,769)	(2,839)
Operating expenses	(41,529)	(37,524)	(3,597)	(28,681)	(37,012)	(20,155)
Income before taxes	$4,428	$20,924	$63,973	$24,480	$9,184	$14,840
Cash & deposits	$42,427	$54,304	$50,381	$49,799	$41,297	$35,135
Reverse repos	82,478	129,552	135,478	149,785	91,360	76,492
Securities and investments	499,363	410,782	369,337	377,022	318,895	164,185
Loans	908,375	864,756	697,474	565,746	513,187	365,300
Other Assets	285,300	256,352	206,967	149,451	145,693	78,371
Total Assets	1,817,943	1,715,746	1,459,637	1,291,803	1,110,432	719,483
Deposits	882,997	805,177	693,497	634,670	618,570	414,113
Repurchase agreemens	206,598	221,435	217,527	240,655	119,741	78,046
Brokerage and trading liabs	87,996	99,765	84,009	65,890	54,582	41,906
Total debt	426,348	391,597	287,300	217,117	175,714	110,323
Shareholders' equity	$177,052	$146,803	$135,272	$101,533	$100,235	$47,980



While both JP Morgan and Bank of America have indicated that their performance had stabilized and their CDO and subprime exposures been reduced, market volatility has remained high. In addition, as mentioned in connection with Citigroup (p. 82) and further discussed in pp. 118-119, credit spreads have significantly increased loss exposures across all derivatives from interest rate swaps to CDSs. Any miscalculation or bet on the wrong direction has the potential of producing debilitating losses.

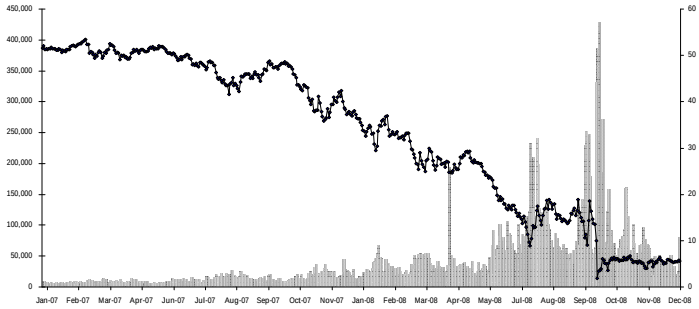
Wachovia: Acquisition Gone Sour

The downfall of Wachovia marked the end of a firm that had grown rapidly through acquisitions. In November 2006, it had completed one of its most ambitious transactions yet – the purchase of Golden West for $25 billion. Wachovia's own equity at the time was valued at $90 billion.

In mid-July 2008, when the bank reported a $2.8 billion loss, it was clear that the Golden West transaction was notable mostly for the subpar loan portfolio it had been brought on board. Now it was revealed that this included $122 billion of distressed interest-option ARMs.

Reports of merger talks began circulating soon thereafter and at the end of September, Citigroup announced that it would acquire the deposit-taking unit of Wachovia for $1 per share and that it would absorb the first $42 billion of losses on Wachovia loans, with the FDIC assuming responsibility for losses beyond that. The FDIC was also slated to invest $12 billion in Citigroup to assist in completing the transaction.

Wachovia Corp $ millions	2008	2007	2006	2005	2004	2003
Net Interest Income	$18,663	$18,130	$15,249	$13,681	$11,961	$10,607
Service charges and fees	$4,820	$4,483	$4,236	$3,642	$3,204	$2,748
Commissions and fees	$10,147	8,814	7,119	6,567	6,284	5,450
Principal transactions	($5,395)	(375)	1,178	776	286	16
Admin, investments and other	($507)	375	2,132	1,338	1,005	1,268
Net Revenues	$27,728	$31,427	$29,914	$26,004	$22,740	$20,089
Reserve for credit losses	($16,524)	(2,261)	(434)	(249)	(257)	(586)
Operating expenses	($24,710)	(19,822)	(17,596)	(15,951)	(14,666)	(13,280)
Income before taxes	($13,506)	$9,344	$11,884	$9,804	$7,817	$6,223
Cash & deposits	$24,520	$18,181	$17,993	$17,710	$16,155	$13,787
Reverse repos	9,900	15,449	16,923	19,915	22,436	24,725
Securities and investments	163,693	170,919	153,360	157,593	156,529	135,159
Loans	467,022	457,447	416,798	256,291	221,083	163,223
Other Assets	99,243	120,900	102,047	69,246	77,121	64,294
Total Assets	764,378	782,896	707,121	520,755	493,324	401,188
Deposits	418,840	449,129	407,458	324,894	295,053	221,225
Repurchase agreemens	0	0	0	0	0	0
Trading liabilities	18,388	21,585	18,228	17,598	21,709	16,945
Total debt	251,217	211,400	187,751	110,924	110,165	108,020
Shareholders' equity	$50,003	$76,872	$69,716	$47,561	$47,317	$32,428

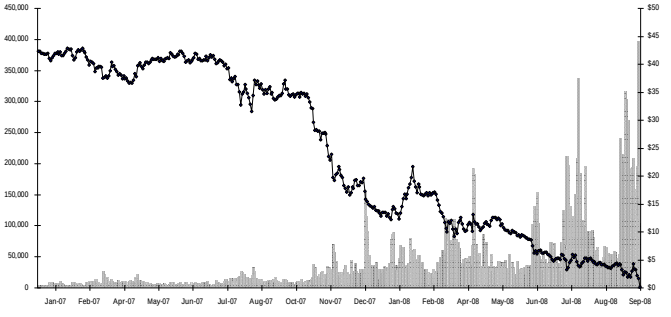


Within days, Wells Fargo counterbid $7 a share, eventually entering into a merger agreement on October 3, 2008. A lawsuit ensured but Wells Fargo prevailed.

Washington Mutual: Run On Deposits

Technically, **Washington Mutual** was a thrift institution, like Indymac. It had grown rapidly through acquisitions, purchasing Great Western in 1997 and entering the New York/New Jersey market through its 2002 purchase of Dime Savings.

Washington Mutual $ millions	TTM 2Q08	2007	2006	2005	2004	2003
Net Interest Income	$8,533	$8,177	$8,121	$7,886	$7,116	$7,629
Loan sales & servicing	2,021	2,583	2,295	2,443	1,391	1,977
Retail and credit card fees	3,759	3,671	3,204	2,332	1,999	1,818
Other Fees	657	780	1,041	1,303	1,320	1,392
Net Revenues	$14,970	$15,211	$14,661	$13,964	$11,826	$12,816
Gains/(losses) investments, etc	(1,565)	(992)	(163)	(341)	(98)	663
Operating expenses	(8,550)	(8,516)	(8,690)	(7,794)	(7,505)	(7,400)
Reserve for credit losses	(11,924)	(3,107)	(816)	(316)	(209)	(42)
Foreclosure expense	(586)	(309)	(117)	(75)	(30)	(8)
Income before taxes	($7,655)	$2,287	$4,875	$5,438	$3,984	$6,029
Cash & equivalents	$7,235	$9,560	$6,948	$6,214	$4,455	$7,018
Investment in securities	24,375	27,540	24,978	24,659	19,219	36,707
Loans	231,171	241,815	223,330	227,937	205,770	173,900
Mortgage servicing rights	6,175	6,278	6,193	8,041	5,906	6,354
Total Assets	$309,731	$327,913	$346,288	$343,839	$307,918	$275,178
Deposits	181,923	181,926	213,956	193,167	173,658	153,181
Total debt	89,242	108,961	93,880	115,161	108,561	94,157
Shareholders' equity	$26,086	$24,584	$26,969	$27,616	$21,226	$19,742



As one of the leading players in mortgages and mortgage-backed securities, Washington Mutual had already recorded sharply lower earnings in 2007. Its stock, which had traded in the mid-$40s in the first half of the year, dipped below $15 at year-end. When earnings came out, there was another worrisome sign: deposits had declined had continued declining – by 6% since the third quarter and 15% for the entire year.

Rumors of rising losses surfaced intermittently throughout 2008. Nevertheless, in April 208, TPG, David Bonderman and James Coulter, feeling that the firm represented a significantly undervalued opportunity with strong upside potential, invested $7 billion in Washington Mutual. In late August and early September 2008, reports on a run by depositors became particularly pronounced. A look at the firm's cash flow statement clearly shows that beyond credit losses, Washington Mutual was suffering from a dramatic slowdown in business activity.

Selected Cash Flow Items	2Q08	2Q07	2007	2006	2005
Net income	(4,466)	1,614	(67)	3,558	3,432
Depreciation and amortization	150	306	504	827	2,656
Provision for loan losses	9,423	606	3,107	816	316
Origination of loans	(16,467)	(48,111)	(86,866)	(137,469)	(175,831)
Sale of originated loans	20,290	80,620	101,478	131,478	167,937
Sale of foreclosed assets	545	354	744	489	413
Securities & trading assets	3,175	(4,209)	194	8,614	(5,902)
Decrease in deposits	(3)	(12,576)	(32,030)	18,005	10,911
Short-term borrowings	(5,512)	14,961	13,689	27,374	17,626
Long-term borrowings	(14,318)	(33,008)	2,162	(50,416)	(11,696)
Stock sales net of repurchases	6,996	(2,646)	874	(98)	(921)
Dividends	(276)	(976)	(1,960)	(1,986)	(1,709)

In a mid-September 8-K report, the firm provided an update on expected third quarter performance in which it said that its capital was "significantly above 'well-capitalized' levels" and that its "long-term credit outlook [was] unchanged." It also mentioned that "retail deposit balances at the end of August of $143 billion were essentially unchanged from year-end 2007" even though that level was actually almost $40 billion (21%) lower.

On September 28 2008, Washington Mutual filed for Chapter 11 protection and sold its deposit-taking subsidiary to JP Morgan Chase.

The Monoline Insurance Companies

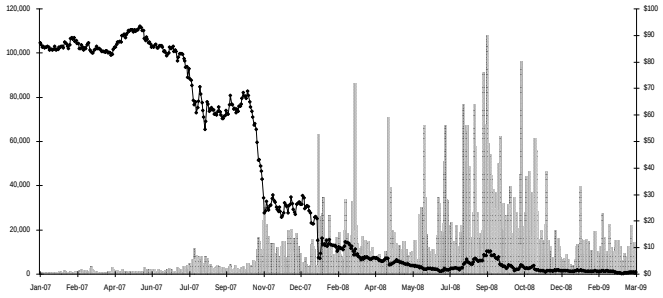
Firms such as Ambac, MBIA, FGIC and others are often called monocline insurers because for a long time, they were focused on municipal bond insurance. The early stages of their involvement began with mortgage-backed securities, which they would insure.

What would bring these insurance companies down, however, were the CDSs they entered into and CDOs that they both issued and insured.

Monolines were all relatively small companies whose inability to make good on "protection" commitments led to several losses at banks such as Citigroup. We present below the financials of the larger of these monolines, Ambac Financial.

Ambac Financial Group

$ millions	2008	2007	2006	2005	2004	2003
Net premiums earned	1,023	841	811	816	717	620
Investment income - insurance	503	475	431	384	385	361
Credit derivative losses	(4,031)	(5,928)	69	64	65	47
Investment income - financial	256	445	392	270	199	212
Financial service losses	(516)	(65)	77	64	38	19
Other income	12	16	52	16	(2)	12
Net Revenues	(2,753)	(4,215)	1,832	1,614	1,402	1,272
Reserve for loss expenses	(2,228)	(256)	(20)	(150)	(70)	(53)
Interest expenses	(363)	(510)	(435)	(295)	(223)	(251)
Operating expenses	(275)	(166)	(167)	(146)	(132)	(119)
Income before taxes	(5,618)	(5,147)	1,210	1,023	977	850
Cash & deposits	108	124	32	28	20	25
Receivables	132	214	206	173	164	164
Loans	799	868	625	685	1,406	838
Securities and investments	10,293	18,396	17,707	16,011	14,768	13,965
Derivative assets	1,867	991	1,019	981	1,298	1,146
Other Assets	3,753	2,973	679	668	929	609
Total Assets	16,951	23,565	20,268	18,546	18,585	16,747
Unearned premiums	2,397	3,124	3,038	2,941	2,779	2,545
Loss expense reserves	2,266	484	220	304	254	189
Repos	3,244	8,571	8,203	7,056	6,814	6,546
Derivative liabilities	9,770	6,686	667	808	1,049	946
Total debt	1,869	1,670	992	1,192	1,866	981
Other	1,188	751	959	862	799	1,285
Shareholders' equity	(3,782)	2,280	6,190	5,383	5,024	4,255



The Investment Banks

Investment banks are no stranger to market dislocations. For example in the 1970s, when the industry was much smaller, the failure of Penn Central led to a commercial paper crisis had severely affected firms like Goldman Sachs and almost bankrupted Lehman Brothers. Spectacular firm failures – such as Kidder Peabody and Drexel Burnham – were also first hand experiences such as were unimaginable for commercial banks.

In the current credit crisis, losses incurred by investment banks were also triggered by exigencies that are more reminiscent of insurance companies than the commercial banks: soured trades or investments, collateral calls, short sellers and difficulties in obtaining financing through the repo market.

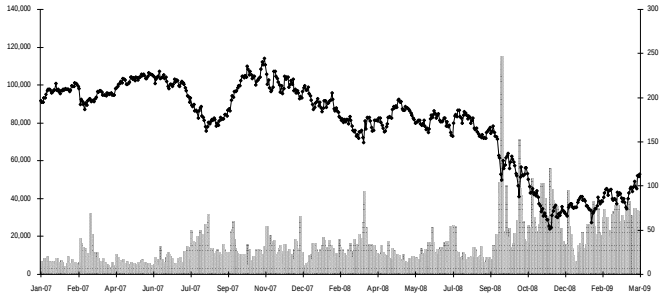
Goldman Sachs: Timely Exit After Prolific Period Of Underwriting

Goldman Sachs's results have been strongly impacted by the decline of principal trading activity. However, the firm has been considered almost prescient in the timing of its exit from subprime mortgage-related activities after having been one of the largest sponsors of both mortgage-backed securities and CDOs.

Today, of course, along with Morgan Stanley it will be seeking to access retail deposits to diversify its funding.

Goldman Sachs Group

$ millions	2008	2007	2006	2005	2004	2003
Net Interest Income	$4,276	$3,987	$3,498	$3,097	$3,026	$3,151
Investment banking	$5,179	7,555	5,613	3,599	3,286	2,400
Principal transactions	$8,095	29,714	24,027	15,452	11,984	8,555
Admin, investments and other	$4,672	4,731	4,527	3,090	2,655	1,917
Net Revenues	$22,222	$45,987	$37,665	$25,238	$20,951	$16,023
Operating expenses	($19,886)	(28,383)	(23,105)	(16,965)	(14,275)	(11,578)
Income before taxes	$2,336	$17,604	$14,560	$8,273	$6,676	$4,445
Cash & deposits	$15,740	$10,282	$6,293	$10,261	$4,365	$7,087
Reverse repos	122,021	87,317	82,126	83,619	44,257	26,856
Brokerage receivables	90,564	148,183	93,013	75,381	52,545	36,377
Securities and investments	444,989	572,534	415,551	328,431	259,983	190,434
Collateral, securities borrowed	180,795	277,413	219,342	191,800	155,086	129,118
Other Assets	30,438	24,067	21,876	17,312	15,143	13,927
Total Assets	884,547	1,119,796	838,201	706,804	531,379	403,799
Deposits	27,643	15,370	10,697	13,830	10,360	8,144
Investment sold not yet purch	175,972	215,023	155,805	149,071	132,097	102,699
Repurchase agreemens	62,883	159,178	147,492	149,026	47,573	43,084
Other secured borrowings	55,743	94,334	72,632	23,331	19,394	17,528
Payables brokers & customers	253,843	318,453	213,177	188,318	161,221	109,028
Total debt	220,878	235,731	170,746	155,226	135,655	101,684
Preferred stock	16,471	3,100	3,100	1,750		
Shareholders' equity	$47,898	$39,700	$32,686	$26,252	$25,079	$21,632

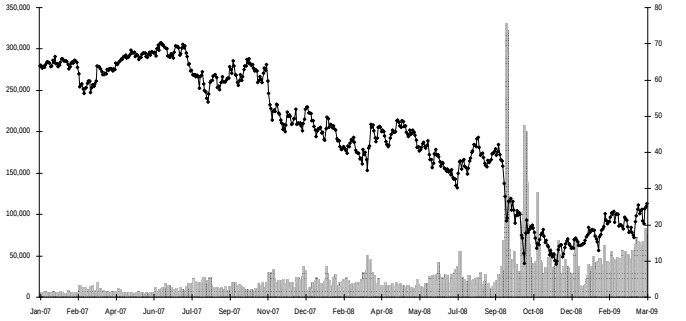


Morgan Stanley: From Investment Bank to Bank Holding Company

Morgan Stanley's survival was at best uncertain in the fall of 2008 as the magnitude of its exposure to subprime investments and credit default swaps became apparent. It appears that a critical element in its return from the brink has been the alliance it struck with Mitsubishi UFJ, which included a $9 billion equity injection.

Morgan Stanley

$ millions	2008	2007	2006	2005	2004	2003
Net Interest Income	$3,202	$2,781	$3,279	$3,750	$3,877	$2,888
Investment banking	$4,092	6,368	4,755	3,843	3,341	2,440
Principal transactions	$1,260	6,468	13,407	8,346	6,117	6,278
Admin, investments and other	$16,185	12,362	13,173	11,717	11,299	10,518
Net Revenues	$24,739	$27,979	$34,614	$27,656	$24,634	$22,124
Operating expenses	($22,452)	(24,585)	(22,858)	(19,417)	(16,890)	(15,052)
Income before taxes	$2,287	$3,394	$11,000	$7,361	$6,818	$5,805
Cash & deposits	$78,654	$25,598	$20,606	$29,414	$32,811	$29,692
Reverse repos	72,777	126,887	175,787	174,330	123,041	78,205
Brokerage receivables	52,115	112,312	134,316	85,062	96,575	66,615
Securities and investments	337,413	436,571	404,343	300,744	259,534	230,348
Collateral, securities borrowed	91,002	322,223	364,219	287,798	246,197	181,091
Other Assets	26,851	21,818	21,921	21,174	17,252	16,892
Total Assets	658,812	1,045,409	1,121,192	898,522	775,410	602,843
Deposits	42,755	31,179	28,343	18,663	13,777	12,839
Investment sold not yet purch	118,945	134,341	183,119	147,000	123,595	111,448
Repurchase agreemens	102,401	162,840	267,566	237,274	188,645	147,618
Other secured borrowings	32,565	220,424	260,401	187,545	134,994	91,653
Payables brokers & customers	120,950	215,631	147,288	120,373	140,888	104,638
Total debt	173,920	225,119	174,070	141,585	131,589	93,986
Preferred stock	19,155	1,100	1,100	0		2,810
Shareholders' equity	$31,676	$30,169	$34,264	$29,182	$28,206	$22,057



Today, it is the only remaining investment along with Goldman although it too is now a bank holding company and actively targeting retail deposits as a source of funding.

Merrill Lynch: From Wachovia to Bank of America

Soon after the first write-offs related to subprime securities were announced in August 2007, Merrill's chief executive at the time, Stanley O'Neil, was dismissed for holding unauthorized discussions about a merger with Wachovia. The board appeared to believe that such talks were both premature and an overreaction to perhaps temporary problems.

Merrill Lynch & Co $ millions	2008	2007	2006	2005	2004	2003
Net Interest Income	$4,034	$5,549	$4,219	$4,797	$4,429	$3,633
Investment banking	$3,733	5,582	4,648	3,594	3,268	2,643
Principal transactions	($37,290)	(14,257)	10,131	5,778	3,702	4,557
Admin, investments and other	$16,930	14,376	12,814	11,840	10,660	9,067
Net Revenues	($12,593)	$11,250	$31,812	$26,009	$22,059	$19,900
Operating expenses	($23,952)	(24,081)	(23,971)	(18,778)	(16,223)	(14,680)
Income before taxes	($36,545)	($12,831)	$7,841	$7,231	$5,836	$5,220
Cash & deposits	$68,403	$41,346	$32,108	$14,586	$20,790	$10,150
Reverse repos	93,247	221,617	178,368	163,021	78,853	61,006
Brokerage receivables	89,872	116,849	89,381	68,197	64,287	55,488
Securities and investments	265,535	340,200	300,707	229,932	270,821	224,210
Collateral, securities borrowed	46,735	178,385	143,539	109,292	106,401	65,228
Other Assets	103,751	121,653	97,195	95,988	86,946	80,061
Total Assets	667,543	1,020,050	841,298	681,016	628,098	496,143
Deposits	96,107	103,987	84,124	80,016	79,746	79,457
Investment sold not yet purch	89,471	123,588	98,862	88,933	99,593	89,315
Repurchase agreemens	92,654	235,725	222,624	198,152	153,843	96,006
Other secured borrowings	36,084	101,151	68,421	36,143	34,139	20,237
Payables brokers & customers	90,395	132,626	112,593	83,648	81,024	70,355
Total debt	237,573	285,887	199,510	139,403	126,584	91,502
Preferred stock	8,605	4,383	3,145	2,673	630	425
Shareholders' equity	$11,398	$27,549	$35,893	$32,927	$30,740	$28,459

Under its new CEO, John Thain, Merrill embarked on several rounds of equity raises even as its fortunes continued sagging. In late July 2008, in a striking demonstration of the dramatic decline in value of subprime instruments, it sold CDOs that it had once carried at $30.6 billion on its books, and subsequently marked down to $11.1 billion, for $6.7 billion or 21.9¢ of par. In order to facilitate the sale, it financed 75% of the transaction.

Almost exactly a year after O'Neill's dismissal for holding unauthorized talks with Wachovia and after numerous capital raises and repeated predictions that it would survive, Merrill Lynch struck an agreement to be acquired by Bank of America after a weekend's due diligence.

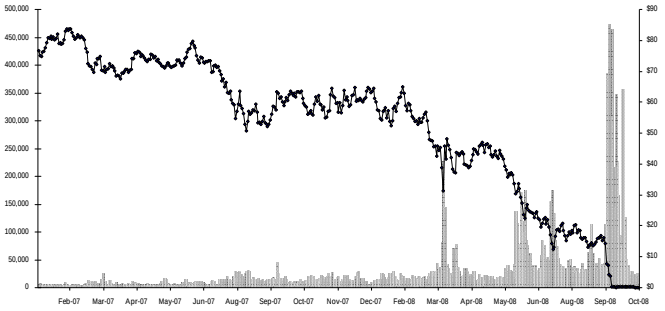
By the time the deal closed at year-end, Merrill had suffered a dramatic deterioration. Rumors of high-risk trades to recoup prior losses made the rounds ahead of the earnings release, only to be denied by its CEO and former Goldman Sachs president, John Thain. Questions remain whether Bank of America might find itself seriously weakened at a time when the end of the crisis remains uncertain.

Lehman Brothers: Complacency or Short Sellers' Victim?

Lehman Brothers is no doubt the most striking demonstration of how quickly trading counterparties' diffidence – if not predatory actions – and liquidity pressures can bring a firm down. Lehman Brothers vied with Bear Stearns, Merrill Lynch and Goldman Sachs for the top spot in mortgage-backed securities underwritings. It was not only one of the most active sponsors, but also a leading originator trough the acquisitions of Aurora Mortgage and BNC Mortgage.

Beginning in the spring of 2008, the firm had become one of the favorite targets of short-sellers. It had about $60 billion in subprime investments and short-sellers were keenly aware that as with other securities firms, Lehman was highly dependent on its ability to finance itself through repos and access to bank credit lines. As had become apparent with Bear Stearns, securities firms were easier to bring down than banks. Greenlight Capital was particularly vocal among these short-sellers, actively promoting its views that Lehman would be recognizing continued losses and that its accounting did not reflect the true level of impairment that it claimed the market was indicating.

Lehman Brothers Hdgs	LTM					
$ millions	8/31/2008	2007	2006	2005	2004	2003
Net Interest Income	$3,027	$1,947	$1,158	$1,253	$1,358	$1,302
Commissions and fees	$5,723	6,374	5,210	4,622	3,725	2,932
Principal transactions	($6,167)	9,197	9,802	7,811	5,699	4,272
Admin, investments and other	$1,743	1,739	1,413	944	794	141
Net Revenues	$4,326	$19,257	$17,583	$14,630	$11,576	$8,647
Operating expenses	($12,344)	(13,244)	(11,678)	(9,801)	(8,058)	(6,111)
Income before taxes	($8,018)	$6,013	$5,905	$4,829	$3,518	$2,536
Cash & deposits	$22,696	$20,029	$12,078	$10,644	$9,525	$11,022
Reverse repos	26,888	162,635	117,490	106,209	95,535	87,416
Brokerage receivables	53,332	43,277	27,971	21,643	18,763	15,310
Securities and investments	141,104	313,129	226,596	177,438	144,468	133,634
Collateral, securities borrowed	102,514	138,599	107,666	83,430	79,043	54,802
Other Assets	52,461	13,394	11,744	10,699	9,834	9,877
Total Assets	398,995	691,063	503,545	410,063	357,168	312,061
Instruments sold not yet purch	15,371	149,617	125,960	110,577	96,281	72,476
Repurchase agreemens	98,272	181,732	133,547	116,155	105,956	107,304
Other secured borrowings		76,299	73,010	36,270	25,779	28,532
Brokerage and trading liabs	149,671	64,307	43,912	49,080	39,529	39,999
Total debt	80,291	151,216	101,816	65,250	59,343	45,860
Shareholders' equity	$11,896	$22,490	$19,191	$16,794	$14,920	$13,174



Throughout the summer of 2008, Lehman is said to have explored a merger with a number of firms, domestically and internationally, including Barclays, Blackstone Group, Toronto Dominion and Korea Development Bank. Principal trading, however, was decline rapidly while contrarian trades, negative market chatter and bouts of short selling continued. was declining rapidly that potential suitors withdrew from consideration one after another.

Then on the eve of weekend meetings to discuss the Lehman situation scheduled at the New York Federal Reserve among its president, the secretary of the Treasury, and the heads of Goldman Sachs and Morgan Stanley, rumors surfaced that JP Morgan, Lehman's clearing bank, had frozen $17 billion of cash and securities deposited in is prime brokerage unit. That weekend, Lehman was to conduct frantic negotiations with Bank of America and Barclays about a takeover.

Learning of these discussions, Merrill Lynch reached out to Bank of America and beat Lehman to the finish line, agreeing to a $50 billion deal that was announced on the following Monday. Lehman was bankrupt..

Bear Stearns: From Trading Powerhouse To JP Morgan Subsidiary

Between 2004 and 2006, rumors would periodically surface about a merger involving Bear Stearns, only to be dashed by reports that its chief executive officer, James Cayne, would not consider a sale at less than three times book value.

When Bear Stearns was eventually acquired by JP Morgan Chase, it would be a fire-sale price of $2 a share, or less than $250 million, and with a government guarantee backstopping much of the firm's securities portfolio. In a premonitory demonstration of how elusive valuations of financial firms were about to become, Joseph Lewis, the famed Bahamas-based currency speculator, had invested $1 billion in the firm for a 6% share of its capital only a few months earlier. The same weekend during which JP Morgan was conducting its due diligence review of Bear Stearns, a buyout group composed of Royal Bank of Scotland and JC Flowers were said to have offered $3 billion for 90% of the firm.

Bear Stearns Cos	LTM					
$ millions	2/28/2008	2007	2006	2005	2004	2003
Net Interest Income	$1,259	$1,350	$1,212	$966	$708	$554
Commissions and fees	2,578	2,649	2,497	2,237	2,209	1,931
Principal transactions	496	1,323	4,995	3,836	3,596	3,308
Admin, investments and other	609	623	523	372	300	201
Net Revenues	$4,942	$5,945	$9,227	$7,411	$6,813	$5,994
Operating expenses	(5,204)	(5,525)	(6,080)	(5,204)	(4,791)	(4,222)
Income before taxes	($262)	$420	$3,147	$2,207	$2,022	$1,772
Cash & deposits	$35,696	$34,296	$13,399	$11,129	$8,596	$12,495
Reverse repos	26,888	27,878	38,838	42,648	45,395	33,823
Brokerage receivables	53,332	53,522	36,346	37,233	35,364	23,645
Securities and investments	141,104	138,242	125,168	106,244	78,387	59,232
Collateral, securities borrowed	102,514	97,844	89,327	75,341	78,616	78,815
Other Assets	39,461	43,580	47,355	20,040	9,591	4,158
Total Assets	398,995	395,362	350,433	292,635	255,950	212,168
Collateral held	15,371	15,599	19,648	12,426	8,823	5,497
Repurchase agreemens	98,272	102,373	69,750	66,132	58,604	47,464
Brokerage and trading liabs	149,671	132,413	119,766	111,690	111,773	99,020
Total debt	80,291	80,181	80,357	63,505	49,054	42,818
Shareholders' equity	$11,896	$11,793	$12,129	$10,791	$8,991	$7,470

As the company's statements for the period ended a few weeks before its downfall show, there were no clear signs that the situation has significantly deteriorated from the prior year. As it were, the fall of Bear Stearns resulted from the combination of several of its banks withdrawing overnight lines of credit while its prime brokers (the divisions of large banks and investment peers) began requiring higher grade collateral, forcing existing collateral be replaced with cash or Treasuries. Eventually, large customers began withdrawing assets from Bear Stearns' prime brokerage division. This required the firm to unwind borrowings it had made against some of these assets. When Within days, it was drained of cash and its non-trading businesses paralyzed.

The Rating Agencies

The rating agencies played a critical role not only in rating subprime securities, but also in helping structure them so that they qualified for investment grade ratings. They provided sponsors and investors alike access to databases of statistics, valuation and default analysis models, and other services on a fee- or subscription-basis. As can be seen from the data below, ratings activities are a highly profitable business.

Standard & Poor's Corporation is a division McGraw-Hill. Segment information for S&P was as follows:

	2008	2007	2006	2005	2004	2003
Revenues	2,654.3	3,046.2	2,746.4	2,400.8	2,055.3	14,769.1
Operating Income	1,055.4	1,359.5	1,202.3	1,019.2	839.4	667.6
Margin	*39.8%*	*44.6%*	*43.8%*	*42.5%*	*40.8%*	*4.5%*

Moody's Corporation is a publicly-traded corporation. Its highlights were as follows:

	2008	2007	2006	2005	2004	2003
Revenues	1,755.4	2,529.0	2,037.1	1,731.6	1,438.2	1,246.6
Operating Income	475.7	1181	1098.9	939.6	786.4	663.1
Margin	*27.1%*	*46.7%*	*53.9%*	*54.3%*	*54.7%*	*53.2%*

Fitch Ratings is a subsidiary of Fimalac, a French company. Fitch ratings had revenues of €484 million in 2008 and a operating profit of €178.2 million, for an operating margin of 36.8%. The year before Fitch had revenues of €605 million and operating margins of 31.9%.

The Other Players

The other players have ranged from mutual funds, some publicly-traded like T Rowe Price, Franklin and Brookfield Asset Management, and pension funds to hedge funds. Many mutual funds, pension funds and endowments were large buyers of mortgage-backed securities and CDOs.

These included the State of Montana (Galena CDO); Schwab also bought Galena (see N-Q report for 11/30/05); UNC Management Co, Calpers (purchases from Citigroup), New Mexico State Investment Council, General Retirement System of Detroit, Teachers Retirement System of Texas (purchases from Goldman Sachs, Credit Suisse, RBS Greenwich, and Merrill Lynch), Missouri State Employees' Retirement System (purchases from Black Rock), City of Springfield, MA, the State of Maine (Mainsail II CDO), to name a few.

T Rowe Price Group

$ millions	2008	2007	2006
Investment advisory fees	$1,761	$1,879	$1,509
Administrative fees	354	348	305
Investment income- net	1	1	1
Other	0	0	0
Net Revenues	$2,116	$2,228	$1,815
Reserve for credit losses	0	0	0
Operating expenses	(1,268)	(1,232)	(1,028)
Income before taxes	$849	$996	$787
Cash & deposits	$619	$785	$773
Accounts receivables	177	265	224
Investment in sponsored funds	514	771	554
Other investments	208	231	208
Other Assets	1,302	1,125	1,006
Total Assets	2,819	3,177	2,765
Total debt	0	0	0
Other liabilities	331	400	338
Shareholders' equity	$2,489	$2,777	$2,427

$ billions	2008	2007	2006
Mutual Funds			
Equity funds	$117.9	$200.6	$168.5
Bond funds	46.5	45.4	38.0
	$164.4	$246.0	$206.5
Managed portfolios			
US Stocks	62.4	94.7	80.4
Int'l stocks	16.6	26.3	18.1
Stable value	15.7	13.6	12.6
Other	17.2	19.4	17.1
	$111.9	$154.0	$128.2
Net inflows			
Funds	3.9	20.2	12.9
Managed portfolios	13.2	13.6	14.9
Market gains	(140.3)	32.4	37.9
Distributions	(0.5)	(0.9)	(0.5)
Increase in assets	(123.7)	65.3	65.2
Assets under mgt	276.3	400.0	334.7

On the issuer side, active participants other than the banks and investment banks we just reviewed included firms such as Ameriquest, GMAC/RFC and Option One in the U.S. and heretofore staid players like Abbey National, HBOS and Northern Rock in the U.K.

Hedge funds were also active issuers of CDOs, including: Aladdin Capital Management, Cohen & Co., Trust Company of the West (a subsidiary of Societe Generale), Duke Funding Management, Maxim Group, Golden Tree, Black Rock (Galena CDO II, Tourmaline CDO III), Fortress Management and Gramercy Capital Management.

Finally, the list would not be complete without the short sellers who correctly bet that the mortgage-backed market would contract or that individual firms would fail. Short sellers included: Paulson & Co., Prudential Investment Management, MKP Capital Management, Zais Group, Brigadier Capital Management, Kynikos Associates, David W Tice & Associates, Hayman Capital, Pershing Square Capital Management, Balestra Management, Hennessee Group and Greelight Capital.

5. Whither the Crisis?

“What is a cynic? A man who knows the price of everything and the value of nothing.”

Lady Windemere’s Fan, Oscar Wilde

"When I use a word," Humpty Dumpty said in a rather a scornful tone, "it means just what I choose it to mean --- neither more nor less."

"The question is," said Alice, "whether you can make words mean so many different things."

"The question is," said Humpty Dumpty, "which is to be master--- that's all."

Through the Looking Glass - Lewis Carroll

“Do not use dishonest standards when measuring length, weight or quantity. Use honest scales and honest weights, an honest ephah and an honest hin. I am the Lord your God, who brought you out of Egypt.”

Leviticus 19:35

Are We At The End Of The Crisis?

So much money has been spent to overcome the crisis and such large writedowns have been taken that one might first want to ask whether we are not approaching the end of the crisis. After all, how many more losses can possibly be in store, whether in the stock market, on banks' balance sheets or in the real economy? Is not much of the problem out in the open and factored into securities prices and the market ("priced-in" as financial commentators say) by now?

While sporadic, there have actually been some signs of improvement. After practically shutting down in October 2008, bond issues have come back. In January, AT&T, ConocoPhillips, Duke Energy, General Mills, Hess Corp, Lubrizol and others all successfully completed new bond issues ranging from $500 million to $6 billion and with maturities of 5 to 10 years, and even 30 years in the case of AT&T and ConocoPhillips. The high-yield market also reopened, notably with a $2 billion Chesapeake Energy issue. In early February, this was followed with Cisco's two $2 billion, one for ten years, the other for 30. What was soon called the "January Effect" carried on, albeit hesitantly, to the rest of the first quarter, with $60 billion in high-grade issues coming to market in the first two weeks of March. On the transactions front, in early March, Merck and Schering Plough announced that they were merging in a $41 billion transaction while Roche upped its offer for $13 billion (revenues) Genentech, agreeing to acquire the 44% it did not own for $44 billion.

Whether improvement bespeaks of a recovery, however, is not certain, and throwing caution to the wind is probably ill advised. There are as many signs that things could get worse as there are that we have turned the corner. One particular area of vulnerability is the automotive industry. North American plants are estimated to have the capacity to produce approximately 21 million cars and light trucks while annualized automobile sales have dropped to below 10 million units a year. Automakers are thus facing the prospect of operating with debilitating cost structures in an atmosphere of heightened international competition. Saddled with expensive union contracts and frayed supplier relationships – the result of years of pricing pressures and broken promises – U.S. automakers will need to find a creative solution while having to not only change their ways but do so quickly and under pressure. Any misstep or miscalculation of any magnitude has the potential of destabilizing fragile markets.

Meanwhile mixed signals also abound in the financial industry. Banks, despite unprecedented spreads that have produced record interest income, have been giving only timid signs of improvement. While January and February appear to have been months of positive performance for most, March is said to have posed greater challenges. The inter-bank lending market has recovered ground and banks are now talking about returning TARP money in order to free themselves of what they view as unreasonable government constraints. But the former would collapse if the Federal Reserve attempted to return to pre-crisis funding practices, while the latter merely points to a troubling perception gap as to what sustained the banks. Meanwhile, caution on the part of businesses continues to be high – the flip side of the light financing backlog story.

Finally, economists' forecasts mostly point to continued losses in the financial system. Nouriel Roubini in a January 2009 paper written with Elisa Parisi-Capone predicts that having written off or lost $570 billion since the beginning of the credit crisis, U.S. banks and brokerage firms face up to $1.8 trillion in exposure losses. In total, they estimate global losses from securities issued

in the U.S. at $3.8 trillion. Goldman Sachs, for its part, forecast $2 trillion in additional losses to be reckoned with in 2009, and sized the likely cost of a repurchase of bad assets in the system at $4 trillion. IMF economists, finally, in a January 2009 predicted that $2.2 trillion in remaining losses are likely.

In the pages that follow, we argue that regardless whether signs of a turnaround emerge or future losses turn out to be smaller than the dire forecasts above, the nature of the problem is such that for an effective and comprehensive solution to be had, certain ingredients should be present. Without them, only a partial solution will obtain; the economy may recover but neither it nor the financial system will regain the vibrancy that goes with global leadership. We argue that neither changing mark-to-market rules nor engaging in a voluntary process to remove impaired assets will suffice in accomplishing this.

Proportions

The ancient Greeks used the word "cosmos" to denote both the notion of proportion and that of harmony. The latter sense is how we get the word cosmetic. The Greeks called the universe cosmos because they believed it to have proportions that were not only harmonious but, most importantly, which could be measured, thus making it knowable. The opposite of cosmos, is chaos which does not mean disorder but rather unpredictability. Chaos is feared because it is about the unknown.

What is particularly remarkable about the current crisis is the extent to which things seem to shift, fade, reappear, disperse again, all as in a Greek chaos; it is never clear whether the image jumps because the light is shimmering or because the object actually contracts and expands. This is how we end up with bonds that can lose their entire value more rapidly than an option or Alt-A structures and super senior tranches specifically designed to be the safest layers in subprime investments exploding into massive losses. The literature itself is replete with expositions and assertions that obfuscate more than they explain, making actuarial studies look like riveting adventure stories by comparison.

One study on risk premiums in credit derivatives, for instance, contains the following statement:

> "Swap rates [from the Bloomberg system] are widely regarded as more reliable than Treasury yields as a source of riskless interest rates. Treasury securities often contain a convenience yield, because they can be posted as collateral and may allow to borrow at special repo rates. See for example Duffie (1996), Jordan and Jordan (1997) and Feldhutter and Lando (2004)." [52]

The assertion – that Treasury securities are not the most "reliable" indicators of riskless rates because they contain a convenience, that is, a liquidity, yield – is truly astonishing. It is precisely because they are liquid, as good as cash and yet postable – so that one can temporarily have cash without having to enter into an outright sale transaction – that they are considered riskless.

[52] "Risk Premia in Structured Credit Derivatives," Andreas Eckner, September 2007. In this article, this statement also appears: "we adopt the common industry practice of assuming … recovery rates equal to 40%," compared to recoveries of 10% and 0% for Bear Stearns' Structured Credit and Enhanced Leverage funds

"In general, there are two main advantages to securitization. First, it can turn ordinarily illiquid assets into reasonably liquid instruments. Second, it can create instruments of high credit quality out of debt of low credit quality." [53] This statement, which appears in a paper about consumer loan- and subprime mortgage-backed securities, involves quite a bit of legerdemain. The first part describes a feature of securitization – liquidity – which no one would deny is central to agency-backed paper and CMOs and makes it sound as though it applies to subprime paper because of a similar mechanism.

In reality, the suggestion that subprime securitization creates liquidity is only partly true, and when true it is not in the straightforward fashion suggested here. That is, liquidity in subprime is dependent on whether the securities pay down in an average of 2 years or 30 years; if the latter, not only will the securities not be liquid, but their quality could deteriorate due to the underlying credit profiles. Where the part-truth comes in is that even when the securities pay down in just a few years, they are still not very liquid.

The second part of the statement then goes on to describe a hoped-for feature of subprime – that low quality could be bundled to yield high quality – by making it appear as though the same thing happens with agency-backed paper and CMOs. As it were, this is not what is at work in agency and CMO paper and it creates a largely misleading impression when applied to subprime. What is being left out is that it is only *if* the securities pay down within a few years *and* the underlying credit does not deteriorate, that paper may *then* retain the same credit profile as at issuance, and usually only for the senior-most tranches at that. Otherwise, they could not only get downgraded quickly, but by categories several at a time.

The reason these matters are important is that, as all engineers will tell you, in order to devise a solution, the problem needs to be first couched in unambiguous terms. In this respect, it is certainly not a given that relying on the same jargon as used by derivatives professionals will be helpful or that indulging in this sector's proclivity for complexity will prove a wise course. In the world of subprime, in fact, it is more than a question of jargon; everyday words are also used in ways that have the effect of distracting from the true operating principle. The words "protection buyer" and "protection seller" in credit default swaps have precisely such effect: most of the time compensatory payment is *not* being made to someone who has suffered a loss, let alone has a stake in the reference asset, and yet by characterizing that party as protection buyer this fact is subtly masked. This is significant because the pre-sale notes or prospectuses describing these bonds invariably touted the overall experience and capabilities of the sponsors. This conveyed the impression that exposures being insured were real ones which these astute risk managers had determined were good enough for their balance sheets. This is not what was happening, however.

The same thing is at work with the discussion of valuation models and probability statistics. Because the mathematics conveys a sense of straightforward and objective analysis, simulations and DCFs appealed to executives' sense of rigorous decision-making. Banks have since found out the shortcomings of their mortgage-backed securities models. The question, however, is not whether they were letting themselves be enthralled by mad scientists who got carried away and concocted deeply flawed products. [54] It is more that the use of arcane terms and convoluted syntax replaced efforts to understand and monitor. A fatal assumption subtly set in: that just as netted trading positions seemed unassailable, the presence on all sides of scientists using similar

[53] "Securitisation in Asia and the Pacific: implications for liquidity and credit risks," Jacob Gyntelberg Eli M Remolona, BIS Quarterly Review, June 2006, Bank for International Settlements

[54] Felix Salmon for example wrote an article for Wired magazine in which he states:

models and speaking the same language lulled everyone into thinking that self-policing was taking place.

In fact, because this is an area where fairly straightforward concepts can quickly be made to look complicated, the importance of clear exposition and using familiar concepts that promote clear thinking is all the greater. We saw earlier that Bayesian statistics are at the heart of portfolio default analyses. Bayesian probabilities are simply about conditional events: the probability of one event occurring given that another has occurred. The literature is replete with references to modeling conditional probabilities using credit curves. Yet, casual conversations with investment bankers promoting CDOs and CDSs revealed as much confusion about Bayesian probabilities as the hospital department head in the following example. The question is from Gerd Gigerenzer's book Calculated Risks.

In the experiment on professionals' ability to simplify and explain, he asked the department head of a university hospital a question which an industry text worded as follows:

> *The probability that one these women has breast cancer if 0.8 percent. If a woman has breast cancer, the probability is 90 percent that she will have a positive mammogram. If a woman does not have breast cancer, the probability is 7 percent that she will still have a positive mammogram. Imagine a woman who has a positive mammogram. What is the probability that she actually has breast cancer?*

The department head became frustrated and finally gave an answer (90%) he knew to be wrong. He then suggested that the question might be better tackled by a specialist. He was not able to simplify as follows:

- 8 out of 1,000 women have breast cancer;
- of the 8 women, 7 [8 x 90% ~ 7] will have a positive mammogram;
- of the 992 without breast cancer, 70 [992 x 7% ~ 70] will have a positive mammogram;
- if women has a positive mammogram, how likely is it she actually has breast cancer?

Expressed in these terms, it is readily apparent that the probability is 7 out of 77, or 9.1%.

So, if we pursue this objective of simplification and summarizing, what are some central facts we can state about the subprime paper and derivates, about the nature of the crisis we confront, and about the ingredients that will be need to be present for the solution to be effective?

Subprime, CDOs, CDSs – Select Facts

One thing that can be unambiguously stated about mortgage-backed securities and CDOs is that terms such as overcollateralization, excess spread and first loss tranche are merely another way of saying that we are dealing with very highly leveraged structures. In fact, no bank would lend to a company with these levels of indebtedness. Banks and insurance companies have high degrees of leverage themselves; however, they also hold significant amounts of Treasuries and investment-grade securities for the very reason that they could not safely have the same levels of concentration as mortgage-backed securities and CDOs in any one class of riskier assets (be they consumer loans, asset-backed credits or other investments).

With respect to the subprime securitization process, although in practice they involved multiple layers and almost infinite variations in structures, at heart there are only three basic building blocks so to speak: mortgage-backed securities, CDOs and CDSs. As we have seen, some of the most popular CDOs – particularly in Europe – were synthetic, that is, portfolios of CDSs, with leveraged super senior default swaps providing the ultimate layer on the CDOs or their constituent CDSs.

Whenever a CDO holds subprime paper or CDS references it, a default in that paper – because of delinquencies, for example – will cause an unwind of the CDO or CDS, that is, a sale of the remaining assets in the case of a CDO, and a protection payment in the case of a CDS. So we can see that so long as there is a link – directly or indirectly – to subprime paper, CDOs, whether cash flow or synthetic, CDSs, whether standalone, within a synthetic CDO, or in the form of leveraged super senior swap, and any other protection swap down the line (however many steps removed), all these contracts will be caused to unwind by a loss event in the paper.

Events of default and unwinds, however, will not affect all investors equally. What investors were buying were tranches of mortgage-backed securities and CDOs. This meant that they were entitled to a priority on streams of cash flows but did not have actual ownership in or legal rights over the underlying asset. The tranches could be compared in some sense to time shares: full legal rights do not come with the investment; when times are good, this may be overlooked; when times are bad, this becomes more critical. With the tranching, there is something else that happens as well: because a default does not affect all tranches in the same way (at least not until the cash flow is affected), they will also be valued differently on financial institutions' balance sheets. A bank may very well hold a tranche in paper that has defaulted (in the sense of violating its triggers) and yet only write it marginally down because the tranche's cash flows are only minimally affected at the time of assessment.

There are only three other events that can cause a CDO to unwind: expiry, a mutual abrogation of the contract or a counterparty failing (as in the case of monocline insurers).

CDOs and CDSs referencing corporate loans, spreads, or the market value of a portfolio, are clearly in a separate category: mortgage-related defaults do not directly trigger a loss. So, in effect, we have two main families of products: subprime-related securities, CDOs and CDSs; and CDOs and CDSs referencing other portfolios or indexes.

Nature of the Crisis – Part 1

We began this paper with the observation that attempting to understand a crisis by tracing back to its root causes tended to be fraught with controversy. We observed that this often leads to bitter disagreements as diagnoses are viewed as disguised finger-pointing. For this reason an emphasis on energetic action even if it means foregoing situation analysis in an effort to develop consensus is often preferred.

Tracing things to their causes or origins is appealing primarily because of the scientific character of this approach. Darwin was the first to search for explanations this way. His central insight was to posit that we carried all the information about our origins and genetic antecedents in what we are today – presaging Mendel and Sturtevant. However, this is not the only approach that has

been used to understanding the world around us. Another, much older in fact, uses a best-fit approach to theories, selecting the one that provides the most comprehensive explanation. This is an approach that has been used from the ancient Greeks to Brahe and Copernicus, from Locke and Smith to Keynes and Hawking.

What is the theory that can be advanced as best explaining the government's actions in the crisis? If we parse through the various initiatives and, working backwards, try to piece together an interpretation of the crisis that would motivate the type of decisions that were made, what is the image that emerges?

We would contend that the various governmental instrumentalities have ultimately been strikingly consistent in their actions. On the surface, it seems as though diverse initiatives have been pursued and that the goals are highly disparate. Ben Bernanke, for example, pointed to three policy tools used by the Federal Reserve: liquidity provision to banks to encourage them to "lend and make markets", "the provision of liquidity directly to borrowers and investors in key credit markets" and the "purchase of longer-term securities for the Fed's portfolio." But this diversity of initiatives is only at the micro level. At the macro level, all the government's actions have one thing in common: they all have the effect of propping up asset prices. The objective has not been articulated as being such, but that is the fundamental effect of the actions taken.

In describing the first policy tool, for example, the Fed chairman provided this explanation:

> "Liquidity provision by the central bank reduces systemic risk by assuring market participants that, should short-term investors begin to lose confidence, financial institutions will be able to meet the resulting demands for cash without resorting to potentially destabilizing fire sales of assets."

Clearly there is an emphasis on liquidity and the Fed's desire to "reduce systemic risk" and this indeed has been the general takeaway and the manner in which it was reported in the news. A closer read, however, reveals how this is achieved: by assuring investors that financial institutions can meet demands for cash (that is, without applying the anticipated discount that "loss of confidence" reflects) and do so without resorting to sales of assets below, even well below, face value. But this is nothing other than a propping of asset prices.

When TARP was first negotiated, the envisaged tool for repurchasing impaired assets was a reverse auction. Such auctions have the effect of pushing prices up, not down (as in a Dutch auction): the highest quote that clears the market is the one that prevails for all. Government guarantees such as were provided in the Bear Stearns transaction or to backstop Citigroup's mortgage-backed securities portfolio also have the effect of boosting asset prices. What they do is convince an otherwise skeptical buyer that the assets have a minimum value that is higher than the buyer is assigning to them: the guarantee delivers that higher value by promising that if the buyer cannot realize that value in the market, the guarantor will make up the difference.

Repurchases of mortgage-backed securities issued or guaranteed by the GSEs are another price boosting mechanism. Prices for these securities are pushed up by reducing the available supply of these securities, making them scarcer and thus more valuable. When TARP was redirected to become equity investments in financial institutions, the upward impact on prices remained no less real; it is only that it would now operate indirectly. That is, by strengthening the equity of these firms, the government was reducing their need to monetize assets for liquidity purposes. Strengthening someone's bargaining position in this fashion is the same thing as saying that the bid is too low and the trade should be left to another day.

The explanation that has been repeatedly given for these price-propping actions is that the objective is to encourage the banks to start lending again – and that the urgency is all the greater given the severity of the credit crisis. But this dual emphasis on monetary support and support for lending unmistakably reflect the view that this is at heart a conventional recession, a much more serious one than the last two because of deflationary pressures and a stalled banking system, but not a fundamentally different one. What has perhaps been unusual is the size of the fiscal expenditures and the fact that they have principally gone to buying securities – although this is changing now with the Obama administration's infrastructure stimulus package. However, government spending on securities does not conflict with the view of the crisis as an extremely severe recession but a classic recession nonetheless. Quite to the contrary, those steps and their magnitude merely reflect a determination to avoid the mistakes of the past.

Ben Bernanke has asserted that the current economic situation bears no comparison to the crisis that led to the Great Depression. With a scholar of the Great Depression as chairman of the Federal Reserve, ensuring this remains so is an overriding objective. While the Great Depression long spawned different views of the nature of financial crises and the role of government, since the 1980s a consensus has more or less emerged that three conditions led from a deep recession to a depression in the 1930s: a misguided tightening of the monetary supply which drained the system of liquidity (the Fed allowed money supply to fall 30% between 1929 and 1933) and sparked a severe deflation (prices and wages dropped 40% and GDP was cut in half); the Treasury's failure to protect the banking system (one third of all banks were allowed to fail); and prolonged adherence to the gold standard which led currencies to collapse (causing world trade to contract by two-thirds).

It is therefore no wonder that two themes undergird the Fed's actions. The first is monetary support in order to keep interest rates low and forestall deflation (price declines). As with Alan Greenspan in 2001-02, there is a concern that deflationary pressures may be mounting. The danger of deflationary pressures leading to a collapse of consumer demand is especially real today. These tendencies became apparent when commodity prices took off in late 2007 and throughout 2008 without having any impact on CPI inflation. Now that commodity prices have fallen back, the threat of deflation having a compounding effect on already weak demand is greatly enhanced.

The second theme underpinning the Fed's actions has been to bolster the financial system. Because of the large sums that are being spent, supporting the banks has been balanced with an imperative to also protect the taxpayer. But the pervasive sense that the banking system must be protected at all cost has been echoed by other branches of government – notably the Treasury and Congress.

Why do we emphasize the significance of this view of the crisis as a bona fide recession? Because it has two important corollaries: that the crisis must be fought with the traditional tools used to fight recessions and that, once the crisis is overcome, *we will be back where we were* and be able to resume on a growth path. This is entirely consistent with the focus on buttressing prices – as prices eventually begin firming, as home prices eventually begin rising again, the value of subprime paper will come back and CDOs will be restored, if not to par, at least to a much smaller discount from par than the 22¢ on the dollar which characterized the Merrill Lyunch transactions. See p. 96.

The recently announced initiative for Public-Private Investment Partnerships that would have the government provide financing and a share investment profits so that investors could buy "toxic

assets" from banks is very much in line with this. The aim is to attempt to bridge the gap between investors who in the past have valued these assets at more or less the levels of the Merrill Lynch transactions and the banks who have held out for double of more those amounts.

Nature of the Crisis – Part 2

Is there an alternative theory that might better explain the crisis and suggest different tools to combat it? That such an alternative may be worthwhile exploring is evidenced by the number of items which remain unexplained:

- The dramatic declines in valuation that have affected all sectors of the financial markets indiscriminately;
- The international almost uniform nature of the crisis a mere months after pundits had been talking about de-coupling;
- The significant stock market downdrafts in response to many of the policy announcements beginning in October 2008;
- Finally, the fact that guarantees and/or backstops almost as large as the problems at an AIG or a Citigroup have not dissipated counterparties' concerns.

What would an alternative theory say about the crisis? It would say that this is a crisis of the financial system first and foremost, with the economic contraction being a consequence rather than a cause or aggravating factor; that it was brought about by the creation of an oversupply condition in a particular type of paper; and that the characteristics of that paper have led to a pricing system breakdown.

The primarily financial nature of the crisis is often obscured by the fact that its proximate cause was a decline in housing prices. In reality, such a decline would not have been sufficient on its own had it not been for the massive demand for what might be called hybrid paper that had built up in the preceding four years and which suddenly collapsed. This was paper which was rated investment grade and yet promised yields well in excess of normal investment grade instruments. What this produced was a crossing of investment categories by players who traditionally had tended to specialize. Indeed, with subprime mortgage-backed securities and CDOs conservative funds which normally would have stayed away from high-yielding instruments instead became investors. A similar situation had occurred a few years earlier when conservatively managed funds had acquired bonds, albeit on a much smaller scale, in industrial companies such as Bucyrus, Joy Global and others which suddenly turned into junk bonds. Columbia, Wellington, T Rowe Price and the like sold down these bonds while distressed funds bought in.

When housing prices plateaued and then declined, such adjustment through a repricing of subprime paper and CDOs did not and could not occur. Ratings downgrades caused a supply imbalance between subprime issues and the pools of capital that traditionally hew to lower quality paper like it. Too many holders were trying to exit from positions that had become large parts of their portfolios. There simply was not enough room in the traditional high-yield market or similar segments to absorb the paper produced.

Subprime Overhang

It is estimated that $1.7 trillion of subprime mortgages were outstanding when the housing market turned. Let us assume that 80% of these, or $1.4 trillion, were securitized. We know that some mortgage-backed issues were mainly composed of subprime while others mixed in jumbo and a variety of other mortgages, some agency-grade, some not. Let us assume that subprime ranged from 35% to 75% of the composition of all non-agency paper. That would mean that anywhere from $1.8 trillion to $3.9 trillion of paper containing subprime was issued. Ignoring the CDOs and taking at face value banks' valuation of the paper at 60¢ on average, this means $1 trillion to $2.3 trillion in total outstanding.

Overall, high-yield funds are a $1 trillion market today. According to UBS' latest estimates, hedge funds represent another $1.0 trillion (down from $2 trillion at the end of 2007). Regardless of what we assume their cash holdings to be, and regardless of how much of the $1 - $2.3 trillion is available for sale, it is clear that there is not enough of a market for the paper.

This is the predicament of trying to redirect paper that was originally intended for a $25 trillion market (the straight and asset-backed bond market). Many investors had come in because it was AA or better paper. Now they were holding BB or lower rated paper. This is a very different situation than had occurred earlier, when funds knew they were buying BB+ paper and therefore bought smaller amounts – just enough to spruce up overall returns but not so much as to exceed their risk guidelines. [55] Essentially what occurred with subprime paper is similar to a pension fund mistaking a particular private equity investment as being high-grade, loading up on it and then finding the underlying company has run into difficulties.

The unavailability of a natural adjustment mechanism through simple re-pricing is the signal characteristic of this crisis. A sudden and wholesale flight to safety created overpowering disincentives to letting prices adjust in the face of a sudden demand shortage. Weaker players could only be further weakened by valuation adjustments at a time when counterparties wanted to shore up their own balance sheets and insulate themselves from risk. This led to increased pricing opacity on troubled assets and a dislocation of the payments system that prevented the normal to-and-fro by which adjustments work themselves through.

Ordinarily, what happens is that when a loss is incurred or a loan called in, the investor who took the loss or the borrower who makes a repayment ends up with lower balances; the bank or broker where the deposit is maintained must replenish its reserves so calls in a loan or increases its margin requirements. This creates a cycle which is the reverse of the money creation cycle described on pp. 41-42. Eventually this will spread to the economy at large as people start wanting to hold a little bit more cash reserves and beginning to reduce borrowings and stretch outgoing payments, causing others, knowing that they will be paid more slowly and that credit terms may become less generous, to also want to build reserves. Liquidity is reduced little by little – a painful process, but one that allows the process to ramp down rather than seize up.

The problem is that this time – and this is another aspect where the crisis revealed itself to be more financial than economic – instead of the step-by-step reduction described above a liquidity crisis materialized and locked everything up: financial institutions were suddenly confronted with large and unexpected liquidity distortions in the form of collateral calls and the inability to obtain

[55] In addition to the smaller amounts involved, the earlier paper consisted of high-yield bonds where default probability declines as the bond ages; the opposite was known to be predominantly the case in subprime, which is why prepayment at reset was important.

credit (even on an overnight basis) without high-grade security postings. As we have seen, credit default swaps had become a veritable lattice of contracts going back and forth, promising payments on everything from defaults, spreads, downgrades, indexes, and other references. It was as though besides the players at the roulette table, there were participants betting on the players, and then in turn others betting on the participants' bets on the players, and so on. When subprime defaults increased, references moved above or below the agreed protection band, triggering collateral calls back up the chain. The scramble to monetize assets fed price declines which in turn triggered more collateral calls.

When reading the statements of financial institutions, this is not readily apparent. It is because banks and insurance companies reflect their derivatives exposures net of cash collateral posted. Similarly, they state "protection" they acquired net of the collateral they hold. If instead they provided greater information on total exposures and the collateral amounts and their movements, we would better see the deterioration that has occurred in their derivative assets and the large amounts of cash that have been exchanged as settlement insurance. The degree to which financial institutions' cash has been diverted from the normal M1-like forms of money to lock-box type money and the efforts expended to generating unrestricted cash is revealing.

This crisscrossing of cash collateral deposits, together with the predatory or opportunistic behavior that has emerged, as counterparts resort to collateral calls as a funding mechanism or to weaken a competitor, and the migration of collateral requirements to high-grade instruments (such that the repo market is largely unavailable unless Treasuries are posted), have created considerable stickiness in the payments system. In the alternative theory of the crisis, it is this stickiness of the payment system that is real culprit and the trigger that induced the economic recession.

Liquidity Disappears

In an article titled "Monetary Theory and the Great Capitol Hill Baby Sitting Co-op Crisis," [56] economists Richard and Joan Sweeney illustrated how rising demand for money in an environment of insufficient liquidity can lead to an economic contraction. In the co-op, parent baby-sat for co-op members and in turn could ask other co-op members to baby-sit for them. When the co-op started, each member was given an equal amount of scrip, each unit of which was worth one hour of baby-sitting time. This scrip served as the medium of exchange for baby-sitting services, thus playing the role of money in this baby-sitting economy. The co-op was highly successful and grew rapidly. Then it began experiencing a paradoxical decline in baby-sitting activity. This was not because members were unwilling to baby-sit. On the contrary, members were eager to baby-sit in order to obtain scrip that they could in turn use to buy baby-sitting services from other members. But because demand for scrip was so strong, members began hoarding the scrip for emergency baby-sitting needs. There was not enough scrip left in circulation for members to use to buy normal baby-sitting services.

Everyone wanted to baby-sit to earn scrip, but no one could collect any scrip because everyone else was also trying to accumulate scrip by not buying. The coop had entered into a recession. The reason is that it had been so successful that it had outgrown the supply of scrip. Insufficient scrip had caused it to fall into a recession.

[56] Monetary Theory and the Great Capitol Hill Baby Sitting Co-op Crisis, Joan Sweeney, James Sweeney, Journal of Money, Credit and Banking, Vol. 9, No. 1, Part 1. Ohio State University Press, February 1977.

In the financial crisis, the same thing happened: excess demand for money materialized and set off a round of hoarding. The only thing is that the excess demand was not a result of the growth of the economy. Rather, it was caused by the sudden run to cash by financial institutions. To understand the implications of this within the context of a flight to safety, we need to first consider how banking transactions typically take place. Let's take the example of a customer who needs $100 but does not want to sell securities to generate the cash. He goes to his bank and offers to put up the securities as collateral in exchange for a loan. The bank and the customer enter into a credit agreement whereby the bank agrees to lend $100 and the customer agrees to repay the loan at a given point in time; the securities he owns are pledged as collateral. Once the contract is signed, the bank credits the customer's account with $100. As explained earlier (see p. 38), the money supply has now grown by $100. The customer now writes a check for $100 to settle his transaction. He could have withdrawn the $100 in cash but he prefers the safety of the banking payment system. If he had, this would have been a problem because the bank only has $10 on hand. The bank would have had to borrow in the interbank market.

So now, a check has been written on the bank for $100. The counterparty with whom the customer is transacting deposits the check in his bank. However, the customer's bank does not have to credit $100 to the counterparty's bank when the check is presented because there is an unrelated transaction that has led to an $80 check going in the opposite direction, thus creating an offset. So the customer's bank only has to make a credit of $20 in this particular case of two transactions. Now, suppose there are not just two checks written but three, bringing a third bank into the picture; suppose further that the customer's bank does not maintain an account with the third bank and that their only common correspondent bank is the counterpart's bank (the second bank). What happens then is the customer's bank (the first bank) will credit the counterpart's bank (the second bank) with the net amount it owes the third bank; however the third bank does not "see" the first bank; it only sees the second bank – that is, the second bank will send a message saying "by order of the customer's bank (the first bank), I credit your account with us – known as a vostro account – with $xx." Now let us suppose the customer's bank does not have sufficient balances to cover the entire amount. What will happen then is that the counterpart's bank (the second bank) will "lend" money to the customer's bank (the first bank) by letting it go overdrawn and placing a credit in the third bank.

This whole system where the various financial institutions experience increases and decreases in deposit balances as checks clear is the inter-bank system and when one bank goes overdrawn with another, it is resorting to the inter-bank lending system. There are, in fact, several ways this lending can take place. One bank can go overdrawn as just described. This form of unsecured interbank lending is what interest reference rates such as Libor (London Interbank Offered Rate) are about. Alternatively, it can purchase Fed Funds, that is, reserves at the Fed from a bank that has excess reserves. Finally, it can access the repo market, where it obtains funds by posting securities as collateral.

So what happens when something like the subprime crisis takes place? Let's assume that in addition to checks going back and forth as described above, the customer's bank (the first bank) has also made a promise to someone. That promise works as follows: if the value of a hypothetical portfolio falls below $100, it (the first bank) will make up the difference. Now the portfolio has dropped in value to $80. It is not maturity yet, though, so what happens is the beneficiary asks for some collateral, say $15 in cash. Now the bank has to either borrow $15 or sell enough securities to generate that cash. The other banks are a little spooked by the magnitude of the loss, however; they considered the customer's bank (the first bank) to be sterling solid and very capable – surely, they think, it would have hedged itself; so this loss means that either the hedge did not work or some other miscalculation occurred. The banks have just convinced

themselves that they would much prefer that the customer's bank (the first bank) go ahead and sell securities; not only that, but next time it needs to borrow funds overnight they would also prefer to do a repo against good quality securities – say, Treasuries rather than something of lesser quality such as the bonds that the first bank is trying to sell at a loss to raise the $15.

The first bank is in the worst of situations: it cannot borrow that easily any more and it has just had to monetize some assets to get cash; in addition, it will now show a loss on the sale transaction, something which will worry customers and bank counterparts. From the perspective of the economy, what has happened is that an asset has been converted into cash; before the asset would have served as security for a credit. So, although it is happening in the financial industry rather than in the economy of real products, the result is a slight contraction of the economy. Eventually, an inter-bank loan will be called in and the contraction will begin in earnest. As banks become warier of dealing with one another, the interbank lending market begins shrinking. This is exactly what happened in late 2008 – in fact the unsecured overnight interbank market did not merely shrink, it came to a complete standstill.

From the perspective of the money supply, nothing for now seems to have changed – cash has merely changed hands in the securities transaction. If we think about our babysitting coop, scrip has become more plentiful relative to the economy. In reality, a vicious circle has set in: money in the form of cash is increasingly desired in case additional collateral needs to be posted; securities are sold to generate this cash since the interbank market is unavailable. The cash is immediately hoarded for possible collateral or to cover losses. Securities start losing value because of the volume of sales transactions. The resulting price declines and increasing diffidence about the creditworthiness of the bank close off all forms of secured borrowings through the repo market other than against Treasuries.

In the event, the manner in which the Federal Reserve provides liquidity to the financial system – by purchasing Treasury securities (until this crisis, the only securities the Fed would buy) – has had an unintended consequence. These purchases put more cash in the system. They do something else, quite obviously: they withdraw Treasuries from the system – precisely the financial instruments financial institutions need to raise overnight funds. In fact, Treasuries are today the safest form of money – safer than the credits held in banks.

These repurchases have led to a veritable scramble for Treasuries that can be borrowed for repos. Treasuries lending has become a large business. This is one of the reasons the Fed has expanded its purchases to include agency securities. By diversifying its purchases to include Fannie Mae and Freddie Mac mortgage-backed securities or third-party mortgage-backed securities guaranteed by them, the Federal Reserve is achieving the same objective of injecting liquidity although at some cost to its balance sheet since it now holds slightly inferior paper in addition to the Treasuries it has traditionally limited itself to.

The stimulus package will alleviate this situation by increasing the supply of Treasuries, although increasing the federal debt by the same token.

Pricing System Breakdown

Astute investors are the ones who are able to determine what is sometimes called the intrinsic value of a company. They then invest when they see the price of the shares drop too far below that value, selling when conversely the stock has performed so well that it exceeds intrinsic value. That information is derived from the forward prospects of the company and the relative

movement of prices of related and unrelated items. That is, one needs to develop a view of the company's prospects – do they have a good product, do they have committed employees, are they a reliable vendor, how strong is their competitive advantage – and then look at the prices and price movements of other things, some similar some not, in order to quantify those prospects. Sometimes a markup will be added for certain undefinable qualities like image, brand recognition, design, even aura. However, if prices act erratically, fluctuating in ways that exceed normal market volatility and understandable patterns, uncertainty will thwart our endeavor and gradual sap any sense of what prices reflect and where fundamental value lies.

This shows that prices are much more than merely as a market clearing mechanism. At times, prices do move very rapidly in one direction or another because of changes in the supply-demand equation, tending then to hold a level temporarily until some market clearing takes place. However, the reason prices provide information in normal circumstances, that is, when they are not entirely consumed in such equilibrium finding, is because of their relationships with the prices of other assets and the way in which those relationships change as the economy evolves. These relative movements enable us to develop a view of what is gaining in value, where needs are emerging and excesses accumulating. It is because of this value imparting aspect of prices that people will react angrily to inexplicable movements over prolonged enough periods of time – as was the case as recently as 2008 when oil prices continued climbing.

This value and information imparting aspect of prices was summarized by Hyman Minsky, an economist with unique insights into the financial systems, as follows:

> "In the neoclassical view... the only function of the price mechanism is to ration output and allocate resources… *However, the economy we live our lives in is a capitalist economy that invests. In such an economy, the financing of investment and of ownership of the stock of capital assets leads to commitments to make money payments, that is, to contractual cash flows*. As a result, if the economy is to be coherent, prices must accomplish not only the resource allocation and output-rationing functions but also assure that (1) a surplus is generated, (2) incomes are imputed to capital assets… (3) the market prices of capital assets are consistent with …current production … and (4) the obligations on business debts can be fulfilled … [and] the carrots that induce the production of the physical resources needed for future production… Unless the past is being validated and the future is expected to validate present investment and financing decisions, none put pathological optimists will invest (emphasis added)." [57]

Particularly deleterious in this credit crisis has been the loss of clear reference points due to the run to cash, indiscriminate securities sales and payments system that is functioning only because of massive government support. Much has been made of the difficulty of valuing CDOs and CDSs, most of which are Level 3 assets. However, the valuation difficulty is sometimes a valuation subterfuge which has spread to other assets. The knowledge that slight methodology adjustments can completely change the status of an investment has profoundly destabilizing effects. We are slipped into an environment where "which is the master" has become the determinant.

The criticality of the government's role as a provider of liquidity has been discounted in some quarters because of the false sense of normalcy that has come to prevail. In reality, the financing system would not be able to operate unaided. There are significant dangers with financial

[57] Stabilizing An Unstable Economy, pp. 157-158, Hyman P. Minsky, McGraw-Hill, 2008

institutions compounding the breakdown in the pricing system with bargaining brinksmanship with a counterparty like the government. The government is known to be acting only secondarily with a profit-motive in mind. Bureaucratic and political constraints under which government officials operate aggravate third-parties' perception that assets can be priced arbitrarily and that they can get the better trade. Using the government as a "stalking horse" in AIG-type transactions, by exploiting the disparity of in bargaining leverage, has the potential of creating significant distortions through artificial (i.e. non-market or off-market) pricing, that could have far-reaching consequences.

The Recession: Cause or Consequence?

The Fed and the Treasury have devoted substantial efforts to strengthening financial institution's balance sheets and enhance liquidity. The various initiatives they have pursued were described in pp. 27-28. In addition to propping up prices, the Federal Reserve's focus has been on supplying as much reserves as possible to the banking system. This is a classical tool to combat recessions. By increasing the banks' reserves, it is increasing the money supply and providing banks with the resources to make new loans. It is this fresh lending that the Fed is hoping for since it is through loans that the increased money supply leads to economic growth.

This suggests that the official view is that the financial sector ran into problems but that what broke the camel's back was the compounding effect of a recession in the real economy. But there is little clear evidence that this is really what happened. While it is undeniable that the housing markets in California, Arizona and Florida were deeply affected when growth stalled in 2007, true signs of deterioration picked up pace only as the succession of failures, bailouts and distressed mergers shook the financial industry beginning in October 2008. Until then and throughout 2007, the Californian economy and the automotive industry were the only real trouble spots. The Californian economy had had the most overheated housing market of the nation and began showing signs of a slowdown as early as 2006. The automotive industry, meanwhile, had started on a rapid decline in 2005. This is when DaimlerChrysler's U.S. unit began faltering and rumors of a possible sale of Chrysler surfaced. Both General Motors and Ford suffered their first loss that year after almost a decade of record profits from light trucks, vans and utility vehicles. The automotive industry's travails had been long coming and produced the first layoffs in Michigan and Ohio.

The alternative theory of the crisis instead attributes the beginning of the recession solely to the problems in the financial system. Certainly, scarcity of credit and the inability to obtain financing for acquisitions has had a dampening effect, but this alone would likely not trigger a recession. American companies have built up record amounts of cash and, aside from firms owned by private equity groups, currently have historically low levels of debt. While exercising caution, they did until recently maintain some level of spending and hiring, acting on the understanding that if everyone stops spending completely and freezes hiring, then a recession will definitely be the result. However, as prices broke down and showed no sign of returning to a normal state, the contention is that businesses suddenly opted for vigilance, reducing discretionary expenses, conserving cash, and postponing all long-term initiatives.

In particular, businesses are not immune to stock market gyrations. In presentations to their boards, managements routinely include charts of their company's stock performance as a proxy for external validation of their strategies. Business managers devote not insubstantial efforts communicating their company's prospects to institutional investors; they value having pension funds and other guardians of retirement or endowment wealth as their shareholders; they are

proud when their companies perform well in the stock market. When as in the current crisis, the stock market – and its volatility – reflects a general breakdown in the pricing mechanism and the disappearance of points of reference, it is not only natural but imperative for firms to hold back and adopt a wait-and-see posture.

As regards the slowdown in consumer spending, it is clear that there has been a sea-change in attitudes and purchasing habits. Consumer spending is strongly affected by the job security and as such we should not be surprised that it has slowed in light of business caution and expense reduction. But this does not mean that the contraction of the consumer segment is due to traditional recessionary factors. In fact, the premise that increased lending to consumers would revive spending is uncertain at best. Rather, it seems that as with businesses, consumers have been affected by the same uncertain about prices and where value lies, only indirectly so.

Where Do We Go From Here?

The events of 2007 and 2008 marked the end of a phenomenal quarter century when everything financial was the rage. The only question is whether the interruption will be temporary or long-lived. We described the explosion of financial activity that began in the early 1980s on pp. 43-44. Going forward is a Japan-style drift in store? Will we just snap back and return to where we were? Or is U.S. leadership in financial services a thing of the past? Much seems to depend on whether we can overcome the costs incurred so far or whether we will find ourselves overwhelmed with significantly greater ones instead.

Analyzing the Costs: Private-Sector Approach

The same sense of the elusiveness of facts – a recurring characteristic of this crisis – surfaces when one looks at actual vs. estimated costs and the successive revisions in the latter.

Overall, financial institutions worldwide have incurred $1 trillion in losses as of year-end 2008. U.S. firms had $678 billion in losses and European banks $300 billion. These results are all the more staggering when one thinks that in July 2007, the Federal Reserve forecast that *overall* losses on subprime mortgages would total $50-$100 billion. By the end of 2007, estimates had been raised to $250 billion (Lehman Brothers) - $495 billion (Goldman Sachs).

At that time (May 2008), financial institutions had recorded $165 billion in losses and Fitch commented:

> "As a significant proportion of the losses have been disclosed, further ratings action arising from ABS-CDO [asset-backed securities CDO] and subprime RMBS [residential mortgage-backed securities] exposures is likely to be minimal."

More ratings downgrades on CDOs and mortgage-backed securities were to pile up before the year was over than had occurred between the beginning of the crisis and then. By the end of 2008, the IMF increased its estimate of the total cost of the crisis to $1.4 trillion, Bridgewater Associates opined that it would be $1.6 trillion and Goldman Sachs forecast $2 trillion

How large could remaining losses be? Will it be another $400 billion as per the IMF or $1 trillion as Goldman Sachs believes? Nouriel Roubini and Elisa Parisi-Capone, who had predicted as early as February 2008 that the total cost would reach at least $1 trillion and might top out at $2 trillion when all was said and done, updated their analysis in January 2009 and now predict an *additional* $1.6 trillion in losses for U.S. financial institutions and $3.6 billion globally.

How are these figures arrived at and why do they change so much?

All private-sector approaches share a common top-down approach. For **loan losses**, the analysis starts with the aggregate mortgages outstanding, estimates default rates based on past trends, and then adjusts these estimates taking into account a) the fact that 2006 and 2007 vintages have deteriorated more rapidly than pre-2006 mortgages, and b) the fact that housing price drops have been more severe than previous recessions. Once these adjustments made, the analysts then back into loan loss estimates.

For **writedowns**, the methodology is similar: it starts with total subprime mortgage-backed securities outstanding – the estimates range from $1 trillion to $1.1trillion –, assumes a uniform distribution of the paper across ratings categories – 80% of AAA, 6% of AA, 5% of BBB and 5% of BB – and then applies the indicated prices from the relevant ABX subindex. The same is done with CDOS and commercial mortgage-backed paper, to arrive at a grand total of likely writedowns.

So for example, in an article titled "Leveraged Losses: Lessons from the Mortgage Market Meltdown," David Greenlaw of Morgan Stanley, Jan Hatzius of Goldman Sachs, Anil K Kashyap (University of Chicago) and Hyun Song Shin (Princeton) explain how their 2007 estimate of $500 billion in losses was derived. Essentially, they added the 2005, 2006 and 2007 subprime mortgage originations to arrive at total subprime mortgages outstanding of $1.4 trillion. Their reasoning is that since subprimes refinance mostly after two years, vintages earlier than 2005 can be excluded. (Of note is that the calculation here is strictly on subprime, that is, excludes Alt-A even though Alt-A paper has not behaved differently than subprime). Then they assume that 80% of these mortgages were adjustable rate. Then assuming some negative-equity dynamics leading to subprime mortgage defaults and adding non-subprime losses (assumed to reach half their historical peak rate), they arrive at their estimate.

Similarly in Roubini and Parisi-Capone's January 2009 update, the loss estimates begin with total loans and securities outstanding as provided by the IMF. Then assuming a further 20% fall in house prices and unemployment peaking at 9%, they conclude that about half of 2006/2007 subprime mortgage originations are set to default and that a quarter of Alt-A loans would do the same – the two get them to $300 billion. Then they assume 7% defaults in prime mortgages, 17% in commercial real estate, and a similar rate on consumer loans – adding another $912 billion. Finally, leveraged loans and commercial and industrial defaults add another $421 billion. Total: $1.6 trillion.

Then, taking the $10.8 trillion in U.S. originated securities outstanding and applying current ABX and CMBX prices, Roubini and Parisi-Capone arrive at $550 billion in subprime mortgage-backed securities losses not yet recognized, $380 billion in CDOs, $114 billion in prime mortgage-backed paper, $282 billion in commercial mortgage-backed paper. Securitized consumer debt, high-yield bonds and high-grade losses round out the calculus to $1.675 trillion.

Aside from the top-down aspect, private-sector estimates make two critical assumptions: that a contraction of GDP is solely related to a reduction in debt provision by banks and that the equity that has been destroyed provides a measure of the rescue costs that will be incurred – that is, they implicitly exclude that GDP could contract for reasons unrelated to debt availability and they posit that financial institutions' balance sheets after the crisis will not look much different than before the crisis. Thus Roubini and Parisi-Capone point out that since the total losses they estimate will wipe out $1.4 trillion in bank equity, this is the amount that will need to be injected into the financial system. But this shows that *they too make the implicit assumption that overcoming the crisis will mean getting back to where we were when it all started*

Assessing Costs from a Micro Perspective

A look at the micro picture sheds light differently on what happened in the crisis and what the future appears to hold. In particular, the most notable area where change is noticeable has to do with the environment in which financial institutions currently operate.

First – this is something private sector analysts are silent on – we note that banks continue to rely heavily on borrowings from the Federal Reserve. In effect, without the liquidity support provided by the Fed, the inter-bank market would still be frozen. The table below shows the volume of these borrowings – we must remember that these are emergency borrowings. Today they stand at slightly more than $600 billion. These borrowings provide the true gauge of how the banking system is performing. Focusing on credit spreads, housing prices, changes in the ABX and other aggregates only provides a partial picture of what is at work. Specifically, without the liquidity that the Fed is providing, banks would be responding very differently to those aggregates than they have.

$ billions	Borrowings at Fed Window
Jan-07	$0.2
Feb-07	$0.0
Mar-07	$0.1
Apr-07	$0.1
May-07	$0.1
Jun-07	$0.2
Jul-07	$0.3
Aug-07	$1.0
Sep-07	$1.6
Oct-07	$0.3
Nov-07	$0.4
Dec-07	$15.4
Jan-08	$45.7
Feb-08	$60.2
Mar-08	$64.5
Apr-08	$135.4
May-08	$155.8
Jun-08	$171.3
Jul-08	$165.7
Aug-08	$168.1
Sep-08	$290.1
Oct-08	$648.3
Nov-08	$698.8
Dec-08	$653.6
Jan-09	$563.5
Feb-09	$582.5
Mar-09	$604.8

Source: Board of Governors of the Federal Reserve System

Secondly, we note that financial institutions continue to operate with significant backstop support from various government instrumentalities. Citigroup and Bank of America have, respectively, 301 billion and $118 billion in loan guarantees in place from the Treasury. JP Morgan Chase has a loss-sharing agreement with the Federal Reserve on $30 billion of Bear Stearns securities. The FDIC, for its part, continues to provide bank deposit insurance up to $250,000 at each depositary institution; this means that, on a client-basis, banks such as Citigroup, Bank of America and the Chase unit of JP Morgan are effectively in a position to offer their clients insurance that is a multiple of the 250,000 since each have them actually has multiple depositary entities where clients can maintain accounts.

Thus, when executives tell journalists that their institutions were misguided in accepting TARP money, they no doubt are *not* proposing that they should operate entirely on their own, that is, not only without TARP but also without the guarantees and liquidity support that TARP complemented.

A third observation is that banks' financial statements do not corroborate the assertion that lending has contracted. From the table below, we can see the significant level of concentration of the banking system. Just four institutions account for $3.2 trillion in bank loans, or over 41% of total domestic loans outstanding (adding "loans and advances" and "consumer credit" owed by the non-financial sector, p. 37, and "loans and advances" owed by the financial sector, p. 39 produces a slight overstatement due to the inclusion of loans by non-banks, but is close enough). Merrill Lynch is shown separately because it is not consolidated onto Bank of America's balance sheet as of December 30, 2008, but will be a unit of the latter going forward.

At year-end 2007, by contrast, total loans outstanding were $3.3 trillion, adjusting for the depositary unit of Washington Mutual (now part of JP Morgan Chase) and for Wachovia (which merged with Wells Fargo) for comparability. So, at least with this group, credit contraction has been modest at 2.5%. What has significantly contracted by comparison are securities issuances, as we saw in section 2 (p. 43).

($ billions)	Bank of America		Citigroup		JP Morgan Chase		Merrill Lynch		Wells Fargo		Totals	
Loans	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007
Total loans	908.4	864.8	664.6	761.9	721.7	510.1	69.2	95.0	843.8	376.9	$3,207.7	$3,289.4
Residential Mortgage	248.0	274.9	277.8	307.1	96.6	55.5	42.6	38.4	358.1	147.0		
Home Equity	152.5	114.8	NA	NA	114.3	94.8	NA	NA	0.0	0.0		
Commercial RE Loans	64.8	61.3	14.0	6.4	83.8	38.3	12.8	21.2	356.1	152.8		
Real Estate Loans	465.3	451.1	291.9	313.5	294.7	188.6	55.4	59.6	714.1	299.8		
Deposits	883.0	805.2	774.2	826.2	1,009.3	740.7	-	-	781.4	344.5		
Total Assets	1,817.9	1,715.7	1,227.0	1,251.7	2,175.1	1,562.1	-	-	1,309.6	575.4		
*Funding ratio **	*97.2%*	*93.1%*	*116.5%*	*108.4%*	*139.8%*	*145.2%*	-	-	*92.6%*	*91.4%*		
Loans as a % of assets	*50.0%*	*50.4%*	*54.2%*	*60.9%*	*33.2%*	*32.7%*	-	-	*64.4%*	*65.5%*		

* deposits as a $% of loans

In terms of the areas where the losses were incurred, an examination of the various institutions' financial statements also paints a more complex picture than suggested by many private-sector analyses. For example, it is difficult to fit the credit crisis impact entirely into the two categories of loan losses and securities writedowns. Within the first category, there are really two types of loan losses: actual delinquencies, where borrowers have defaulted and not made a payment in

over 90 days, leading to a complete writeoff is one type loan loss; another type are the provisions (reserves) that the banks set aside as a "cushion" in anticipation of future defaults.

Beyond loan defaults, loan provisions and securities writedowns, then, where else have losses come from? There have there have been four other main types of events with have triggered losses for financial institutions:

- **Liquidity puts**. As we discussed in connection with SIVs and VIEs, banks routinely wrote liquidity puts on these vehicles as a form of funding guarantee – that in the event the commercial paper market became inaccessible, the SIVs could be put back the sponsoring banks. Bank of America incurred over $10 billion in losses on such liquidity puts.
- **Hedge defaults**. Several financial institutions incurred severe losses ($6.5 in the case of Citigroup, $10.4 billion in that of Merrill Lynch) from monoline insurance companies not making good on their hedge commitments.
- **Super senior credit default swaps**.
- **Trading losses**. Not all losses were from writedowns or loans losses. As we saw earlier, for example, Citigroup incurred $7.5 billion in trading losses in 2008, and approximately $10 billion of Merrill Lynch's $41.8 billion pre-tax loss appears to be trading-related.

Going forward, where are future losses likely to come from and how large could they be? Certainly, it would seem that the bulk of the "toxic" subprime exposures – CDOs, CDO^2s, credit default swaps – should have been worked down to more benign levels by now. Let us look at subprime super senior exposures, where financial institutions incurred large losses and for which they have provided etailed data, as summarized below:

Exposures $ billions	Bank America	Citigroup	Merrill Lynch	Morgan Stanley
Sep-07	15.6	54.6	45.0	NA
Sales		(0.1)		
Losses	(4.0)	(17.2)	(14.6)	
Terminations				
Other				
Dec-07	11.6	37.3	30.4	11.1
Sales	(1.6)	(8.3)	(27.8)	
Losses	(4.7)	(14.9)		
Terminations				
Other			(0.9)	0.1
Dec-08	5.3	14.1	1.8	11.2

Unfortunately, not all financial institutions present their subprime information in quite the same way. There are several ways these exposures can be presented: at one extreme, super senior exposures can be identified by the notional amounts on which they bear; at the other extreme, exposures can be expressed in terms of what the financial institutions believe are the true amounts for which they are at risk, after insurance, offsetting trades, and other factors are taken into account. The above figures are in between these two extremes – they mostly represent the tranche amount to which the financial institution has exposed, but before insurance and other factors are

netted out. (The reason we did not include AIG figures here is that AIG provides data both in term of notionals and fair values, but not in the intermediate form used by the other firms)

As this table shows, Bank of America, Citigroup and Morgan Stanley could all still register substantial losses, albeit not as large as in 2008 and the fourth quarter of 2007.

Is the information in the table above indicative of the maximum losses that could be incurred? That is not clear since they have tended to change their presentations when events took over and it only when new information is provided that the previously made assumptions become apparent. For example, Merrill Lynch showed its exposure at year-end 2007 as being $6.8 billion after losses of $14 billion. It is only subsequently, when it incurred additional losses in excess of the exposure amount, that it became apparent that the exposure had been originally stated on a "fair value" basis, that is, assuming that hedges and offsets would be effective.

Could the figures change? Since we do not know how closely the information presented reflects notional amounts or incorporate estimates about interest rates, counterparty creditworthiness, and other parameter, we do not know. This has in fact been part of the problem leading to banks not trusting one another.

We note that AIG has the following caveat:

> "The valuation of the super senior credit derivatives continues to be challenging given ... market conditions .. Further, disparities in the valuation methodologies employed by market participants and the varying judgments reached by such participants when assessing volatile markets have *increased the likelihood that the various parties to these instruments may arrive at significantly different estimates* as to their fair values (emphasis added0." [58]

Citigroup, for is part, lists the following item in its "risk factors" section:

> "Subsequent valuations, in light of factors then prevailing, may result in significant changes in the values of these assets in future periods. In addition, at the time of any sales of these assets, the price Citigroup ultimately realizes will depend on the demand and liquidity in the market at that time and may be materially lower than their current fair value." [59]

Where are the other areas where losses could be incurred? We review below the four areas in question: mortgage loans, mortgage-backed securities, credit derivatives exposures and VIEs.

($ billions)	Bank of America		Citigroup		Goldman Sachs		JP Morgan Chase		Merrill Lynch		Morgan Stanley		Wells Fargo	
Areas of Vulnerability	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007
Real Estate Loans	465.3	451.1	291.9	313.5	NA	NA	294.7	188.6	55.4	59.6	NA	NA	714.1	299.8
Mortgage-backed	229.6	163.7	82.4	119.8	16.1	34.6	74.9	67.3	11.1	30.4	34.3	54.1	99.7	55.0
Derivatives	62.3	34.7	115.3	76.9	130.3	105.6	162.6	77.1	89.5	72.7	99.8	77.0	34.4	3.6
VIEs	70.0	91.6	106.8	152.0	16.1	25.9	34.1	58.7	13.8	34.9	7.1	16.0	105.0	16.0
Cash & equivalents	32.9	42.5	29.3	38.2	15.7	10.3	26.9	40.1	nmf	nmf	78.7	25.6	23.8	14.8
Book Equity	177.1	146.8	141.6	113.4	64.4	42.8	166.9	123.2	nmf	nmf	50.8	31.3	99.1	47.6
Tangible Equity	86.6	59.0	100.3	58.1	59.2	37.7	103.9	80.5	nmf	nmf	47.7	27.2	76.5	34.5

[58] American International Group, 10-K for the year ended Dec 31 2008
[59] Citigroup Inc., 10-K for the year ended Dec 31, 2008

We list three balance sheet items to help in the analysis: cash on hand, shareholders equity as stated (book equity) and shareholders equity adjusted for goodwill and other intangible assets. Shareholders equity as stated is a measure of the assets of the firm that are not spoken for in the fulfillment of the firm's various commitments to creditors, vendors, customers, employees and others. Cash is the most concrete part of that equity; it can of course be supplemented with other sources of quasi-cash such as assets that can be quickly sold.

The above table shows that if a Bank of America, for example, had a 3% loan loss (on its loans and those of Merrill Lynch) and had to make good on 1/5th of its VIE exposure (its own and Merrill Lynch's), its cash would be depleted and its tangible equity would decline more than 35%. Similarly if Wells Fargo, which acquired Wachovia and its $200 billion in troubled loans, incurred a loss of 3% in its loan portfolio, it would have no cash; if the loss were 10% of the loans its tangible equity would disappear. These are extreme scenarios, but banks *are* required to maintain minimum capital levels, so a fraction of such losses would render them insolvent.

If we look more closely at credit derivatives, we find that there seems to be a potential for substantially enhanced risk going forward. Two facts stand out. The first is that fair value amounts have increased quite significantly even though notioals have not. For instance, we can see that the increases in both gross and the net derivative liability amounts for JP Morgan (from $891.2 billion to $2.7 trillion gross; $68.7 billion to $121.6 billion net), Citigroup (from $489.4 billion to $1.2 trillion gross; $103.5 billion to $116.8 billion net) and Bank of America ($436.9 billion to $1.5 trillion gross; $22.4 billion to $30.7 billion net) have been very significant. This phenomenon is a reflection of the wide credit spreads and high volatility levels that have come to prevail. While the major financial institutions have consistently stressed the netting effect of "protection" acquired on "protection" written, clearly the margin for error has diminished and the potential for losses grown.

A look at changes in the Value at Risk (VaR) measures of daily trading risk confirms the unprecedented levels of risk that banks now operate with. Bank of America, Citigroup and JP Morgan have all seen their VaRs more than double since 2007. Among investment banks, Goldman Sachs' VaR is also very high, making it more vulnerable to a miscalculation.

($ billions)	Bank of America		Citigroup		Goldman Sachs		JP Morgan Chase		Merrill Lynch		Morgan Stanley	
Notionals	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007
IR/FX swaps	36,588.1	30,839.4	23,747.0	25,362.9	NA	NA	77,616.0	74,376.0	NA	NA	NA	NA
CDS purchased	1,032.5	1,504.2	1,590.2	1,907.0	4,034.1	2,180.0	4,191.1	4,069.0	NA	NA	4,000.0	7,000.0
CDS sold	1,006.2	1,542.2	1,443.3	1,767.8	3,778.9	2,045.3	4,200.0	3,898.0	3,465.3	4,562.9	5,562.9	7,120.4
Total CDSs	2,038.7	3,046.4	3,033.5	3,674.8	7,813.0	4,225.3	8,391.1	7,967.0	NA	NA	9,562.9	14,120.4
Others	525.3	485.8	5,333.4	6,670.9	NA	NA	2,166.0	2,564.0	NA	NA	NA	NA
	39,152.1	34,371.6	32,113.9	35,708.6	NA	NA	88,173.1	84,907.0	NA	NA	NA	NA
Fair Values	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007
Assets												
IR/FX & Others	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDS purchased	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gross Deriv. Asset	1,535.5	452.0	1,172.7	467.2	NA	NA	2,741.7	909.9	1,285.1	553.0	NA	NA
Netting	(1,473.3)	(417.3)	(1,057.4)	(390.3)	NA	NA	(2,579.1)	(832.7)	(1,195.6)	(480.3)	NA	NA
Net Derivative Asset	62.3	34.7	115.3	76.9	130.3	105.6	162.6	77.1	89.5	72.7	99.8	77.0
Liabilities												
IR/FX & Others	1,380.6	406.3	970.9	421.3	NA	NA	2,209.3	891.2	925.3	402.9	NA	NA
CDS sold	118.8	30.6	192.3	68.1	469.5	33.0	460.2	0.0	372.3	164.5	659.3	131.7
Gross Deriv. Liab.	1,499.4	436.9	1,163.3	489.4	NA	NA	2,669.5	891.2	1,297.6	567.4	NA	NA
Netting	(1,468.7)	(414.5)	(1,046.5)	(385.9)	NA	NA	(2,547.9)	(822.5)	(1,226.3)	(494.2)	NA	NA
Net Derivative Liab.	30.7	22.4	116.8	103.5	117.7	99.4	121.6	68.7	71.4	73.3	73.5	71.6
VaR	*110.7*	*52.6*	*292.0*	*142.0*	*180.0*	*138.0*	*202.0*	*106.0*	*51.0*	*65.0*	*115.0*	*92.0*

2007 Total ↓ $42,159.7

The second fact that stands out from the data above is that if we sum the notionals of the credit default swaps written and bought by just these six players, we can see that they represented over 75% of the total credit default swaps outstanding in the U.S. market. (Because the notionals for Merrill Lynch's credit default swaps purchased was not available, we doubled its amount of credit default swaps written as an approximation)

The concentration of credit default swaps in a few financial institutions was also observed by Bernadette Minton, Rene Stulz and Rohan Williamson in a June 2006 paper titled "How Much Do Banks Use Credit Derivatives To Reduce Risk." [60] Using banks' FR Y-9C filings with the regional Federal Reserve Banks instead of 10-Ks and 10-Qs, they document how of 345 banks with assets in excess than $1 billion, only 19 use credit derivatives. They comment as follows:

> "We would expect banks with less capital, banks with more non-performing loans, with weaker liquidity, and with smaller interest margins to be more likely to hedge since such banks are more likely to face financial distress."

Should Wall Street Be Bailed Out?

A growing number of pundits – including many prominent economists – have argued that financial institutions should be allowed to fail. They argue that attempting to save them extends the regulatory shortcomings that led to the crisis in the first place and interferes with the normal interplay of incentives and disincentives that lead economic actors to behave rationally. The quasi-moral overtones of these experts' observations have appealed to many who bemoan the bifurcation of high-pay and civic responsibility and struggle with the notion of leaving unpunished people who concocted toxic products that have had such deleterious consequences.

In the government, by contrast, the predominant view appears to be that the financial system is too critical to the proper functioning of the economy to be allowed to fail and that while excesses were clearly committed, punishing the experts would serve no purpose since they are needed to undo what was done.

Should Wall Street be bailed out? It seems the moral arguments – those who say it should not – while satisfying a desire for accountability and no doubt helping prevent the next crisis, have one weakness: the medicine will do little to solve the current predicament. It seems that a principal consideration should be to identify the elements in the financial system that caused the damage, on the one hand, and those other elements that need to be preserved for the overall health of the economy, on the other.

From the discussion above, we would submit that three arguments can be put forth:

- That the massive asset selloffs, opacity surrounding subprime valuations, continued high market volatility and a payment system that only functions as a

[60] "How Much Do Banks Use Credit Derivatives To Reduce Risk?" Bernadette A Minton, Rene Stulz, Rohan Williamson, June 2006

result of $600 billion in government support, that these factors have led to a breakdown of the pricing mechanism;

- That with banks' depositary and lending activities representing on average less than two-thirds of banks' activities, the implication is that one third of their activities are not directly related to or necessary for the real economy; as the Washington Mutual and Wachovia transactions underscored, the depositary and lending activities of large financial institutions are typically conducted through discrete subsidiaries that can be relatively easily separated from their parent structures;
- That the paper that caused the current crisis can deteriorate further while having little chance of coming back. It can deteriorate because the pool of capital it can access is small and the current accounting for it is dependent on assumptions which may prove unreliable. The likelihood that this paper could come back is, meanwhile, remote at best. Because of this very uncertainty, it is very difficult to imagine that CDOs could be back in vogue any time soon, let alone appeal to investment grade investors.

In these circumstances, there would seem to be considerable risk involved in any program that would have the property of being primarily additive rather than substitutive in nature. That is, any program that does not remove the bad paper, financing it with good paper (Treasuries), but rather lets it survive alongside the newly created debt, would have significant drawbacks within the framework of the alternative theory of the crisis. This would not necessarily be an issue if the bad paper were a manageable amount – say $100 or $150 billion. However, subprime as we saw is approximately ten times that amount.

Let us illustrate this by imagining a company that has issued too much debt – say $500. It can no longer service it and the bond holders are worried the business might eventually fail. Let us assume that the company has someone that is willing to lend it $100 in order to buy back as much of the debt as possible. The last time the bonds traded, it was at a discount of 25%, implying a value for the bonds of $400 instead of $500. In order to keep it simple, we consider that there are two possible scenarios, one where the business can buy back bonds at 25¢ and another one where it can buy them at 65¢. All this is illustrated as follows:

Impaired bonds - original value	$500	Interest at 10%
Impaired bonds - last trade value	400	

$0.25 Repurchase Case	Valuation		Cash Flow
Existing obligations	($150)	Gross income	$110
New debt	(100)	Interest	(10)
Impaired bonds after repurchase	(25)	Net income	100
Total obligations	(275)	Multiple	7x
Value of enterprise	700		
Equity	$425		

$0.65 Repurchase Case	Valuation		Cash Flow
Existing obligations	($150)	Gross income	$110
New debt	(100)	Interest	(35)
Impaired bonds after repurchase	(225)	Net income	75
Total obligations	(475)	Multiple	5x
Value of enterprise	377		
Equity	($98)		

One can readily see that the company has no choice but to restructure its debt: its revenue is $110 and if it continues to pay interest on the full amount of bonds outstanding, it would be left with only $60 ($110 – [$500 x 10%] = $60), not to mention principal repayment. Now, in the 25¢ repurchase case, with $100 it can buy back $400 of bonds, so it will end up with only $100 to service. Its net income will go up substantially, to $100. In the 65¢ case, by contrast, it could only buy $154 worth of bonds and would end up still having $346 outstanding and interest expense will continue weighing on income.

Where we can see how the company really fares, however, is by looking at the positive equity in one case and the negative equity in the other. Essentially what happens is that in the 25¢ repurchase case, it has more income and the outside world feels it is more stable and so deserving of a higher valuation multiple. In the 65¢ case, it has lower revenue and its prospects are less certain because of the continued large presence of the bonds, so the outside world feels a lower multiple should apply – one more in line with the multiples that companies in trouble have. By the size of the negative equity, one can see that the company is in an unenviable position: it has added new debt and not been able to remove enough of the problematic bonds.

This simple illustration shows why it is important to remove as much subprime paper as possible and to force this to happen at a low value: as in the parable, subprime priced at 65¢ would displace value away from other asset classes (the equity in our example) and continue weighing on the overall system by maintaining a level of uncertainty. Unlike the company hypothesized here, the U.S. economy is so large that the interest on subprime would have little effect on revenues. However, with continued uncertainty and a recession induced by the travails of the financial sector, tax revenues would in fact come in lower so that the simplified example above does illustrate a point. While a lower multiple is not a concept that is readily applicable to an economy, one might look at it as a proxy for consumer confidence.

Ingredients for a Solution

If one subscribes to the alternative theory of the financial crisis, what steps would be called for to resolve the crisis? No doubt, the solution would be to remove the subprime paper that is causing the overhang and to do so in such a way as to cause a series of unwinds in the CDOs and CDSs, thereby forcing a settling up among market participants.

Removing the Overhang

Quite clearly, while this settling up process will lead to a number of offsets it also holds the potential for some debilitating losses that could render some institutions insolvent and require them to merge or be taken over. The challenge is finding the mechanism that will not only be effective in unraveling the problem but will do so in an orderly fashion. In other words, the two principal considerations are: how do we do it; and, given that this could trigger massive losses at some financial institutions, how do we prevent a debilitating shock to the financial system?

- First, clear criteria can be set to determine which residential and commercial mortgage-backed securities are impaired and should be removed. The securities can be identified

based on their cumulative defaults, slow prepayment history, and/or non-investment grade ratings, with an appropriate cut to determine what level of subprime in a securities issue will identify it as falling under the program. Because subprime mortgages were wrapped into structures – pooled securities often containing straight mortgages, jumbos and Alt-A as well – which were in turn wrapped into trading vehicles – CDOs – which were sold in separate tranches, some CDOs may be affected at one level and not at another. Similarly, CDSs with tight triggers could activate while other CDSs with looser ones may not despite referencing the same or similar entities. Therefore, clear criteria are needed to avoid getting bogged down: the only way to cut through the complexity would be to have a standard that can be used uniformly and force the entirety of an impacted issue to be treated as being in default.

- The price at which these impaired securities would be bought can either be based on recent transactions such as the Merrill Lynch transactions, or a percentage of par as determined through a discounted cash flow valuation. However, both price and the compulsory nature of the process would need to be uniformly managed. Whether to sell or not to sell, in particular, could clearly not be left at the discretion of security holders.

- There is really only one way the determination of price and forced sales described above can be enforced. It is for the government to exercise the securities equivalent of "eminent domain" rights. When a road needs to be built, the interests of the general public are deemed to be more important than the private property rights of a few. Here financial institutions, funds and CDOs would be compelled to sell the impaired securities.

- Attempting to arrive at the same result by forcing a default through a systematic review of agency ratings (for possible downgrade) or by requiring a writedown by institutions and CDOs through inspections, would likely not be effective. For one thing, uniformity of implementation would be difficult to achieve due to disparate regulatory and oversight jurisdictions and responsibilities. More importantly, the process would have to guard from any appearance of selectivity while from the outset facing challenges with the CDOs.

The aim of compulsory purchases at a price reflecting impairment would be to force defaults of CDOs, causing most of them to unwind or restructure. In either case, CDS payments and counterpayments would become due. CDO and CDS unwinds would be numerous, much preferable to purchasing the CDOs in order to eliminate the CDS as was done with AIG.

Managing Consolidation

As noted, the impact of this program could be devastating for some banks. On this score, however, several observations can be made. The first is that research suggests that the majority of the CDSs which were written by banks and which are causing most of the losses only involve a small number of institutions and only the large ones at that (see footnote, p. 122). As it turns out, these firms are largely illiquid and quasi-insolvent as it is. More importantly, the idea is not to let the banks cope with this unaided, but to actively manage the process of downsizing and merging that needs to take place. Regulatory capital rules, which have enabled institutions to count risky assets for regulatory capital purposes so long as they had insurance in the form of CDSs, might in fact be changed within the framework of the repurchase program in order to foster these mergers.

Generally, it is not clear that the economy would necessarily be impacted unless banks' depository and lending activities were affected. As the Wachovia and Washington Mutual transactions showed, these activities tend to be easily separable from the parent organizations. Ultimately bringing the banking system back down to those activities may be a goal that should be pursued in such bank mergers.

Whether these initiatives are undertaken or not, the financial system on its own is likely to change even more dramatically than it has to date. Like the unhappy families mentioned earlier, financial players have had different reasons for their difficulties. Going forward these differences are likely to be more pronounced as some institutions find themselves better positioned than others to cope with further turbulence but also to emerge as the winners as government actions unfold.

The interests of the various firms on Wall Street are not and have never been aligned. Some have an almost vested interest in seeing other firms fail. Securities firms for example will need access to deposits. Now that they are bank holding companies, they will be able to acquire the next Wachovia or Washington Mutual. The only question is which institution that will be – a Citigroup? A Bank of America?

Much of the recent controversy over bonuses has much to do with firms' desire to best position themselves for the restructuring that many realize will inevitably take place. While the publicity over bonuses has not helped either the industry or Congress, the reason why bonuses are viewed as necessary is largely misunderstood. Several firms are now expected to return TARP funds in order that they may pay bonuses to their employees and operate without government support. The reason they are doing this is that they feel they need these people in order to be able to strike the most advantageous trades with counterparts – including the government if the government becomes a counterpart. The Treasury's recently announced PIPP will likely only lend urgency to this matter.

When reports surfaced, for example, that Goldman Sachs had refused to settle on its contracts with AIG at a discount, its chief financial officer, David Viniar, defended its position in these terms:

> "We don't think we did anything wrong, we had commercial terms. It is our responsibility to our shareholders to make sure that we are protecting ourselves. That's why we enter into these contracts. That's why we have terms in the first place, to make sure that we are protected." [61]

[61] "Goldman Rejected Settling of AIG Trades At A Discount," MarketWatch, March 20, 2009

Appendix 1

CDO Listing

801 Grand CDO Series 2006-2, LLC	60
A3 Funding LP	996
A4 Funding LP	700
ABACUS 2004-1, Ltd.	195
ABACUS 2004-2, Ltd.	1,000
ABACUS 2004-3, Ltd.	139
ABACUS 2005-2, Ltd.	1,250
ABACUS 2005-3, Ltd.	528
ABACUS 2005-4, Ltd.	6,000
ABACUS 2005-CB1, Ltd.	750
ABACUS 2006-NS1 Ltd.	226
ABACUS 2007-18 Ltd	147
ABS Capital Funding II, Ltd	301
ABS Capital Funding, Ltd	300
ACA ABS 2002-1, Limited	404
ACA ABS 2003-1 Ltd.	400
ACA ABS 2003-2, Limited	725
ACA ABS 2006-1 Limited	750
ACA ABS 2006-2 Limited	750
ACA ABS 2007-1 Limited	1,500
ACA Aquarius 2006-1 Ltd.	734
ACA CDS 2002-1	149
ACA CLO 2005-1, Limited	327
ACA CLO 2006-2, Limited	308
ACA Euro CLO 2007-1 PLC	-
ACAS CRE CDO 2007-1	1,175
AIMCO CDO, Series 2000-A	432
AIMCO CLO Series 2005-A	344
AIMCO CLO Series 2006-A	410
ALCO	-
ALESCO Preferred Funding IV Ltd	396
ALESCO Preferred Funding IX, Ltd.	703
ALESCO Preferred Funding VII Ltd.	627
ALESCO Preferred Funding X, Ltd.	937
ALESCO Preferred Funding XI, Ltd.	664
ALESCO Preferred Funding XII, Ltd.	685
ALESCO Preferred Funding XV, Ltd.	681
ALESCO Preferred Funding XVII, Ltd	419
AMAC CDO Funding I	400
AMMC CDO I, Limited	367
AMMC CDO II, Limited	465
AMMC CLO III, Ltd	375
AMMC CLO IV, Ltd	503
AMMC CLO V Ltd	300

AMMC CLO VI, Ltd	500
AMMC VII Limited	500
AMMC VIII Ltd	500
ANSONIA CDO 2006-1 Ltd.	807
APEX (IDM) CDO Ltd.	837
ARCC Commercial Loan Trust 2006	400
ARCap Resecuritization Trust CDO Certificates, Ser	414
ARLO VI Limited.	50
Acacia CDO 1, Ltd	300
Acacia CDO 10, Ltd	500
Acacia CDO 11 Ltd	512
Acacia CDO 12 Ltd	500
Acacia CDO 2, Ltd	300
Acacia CDO 3, Ltd	300
Acacia CDO 4 Ltd	293
Acacia CDO 5, Ltd.	300
Acacia CDO 6, Ltd.	282
Acacia CDO 7 Ltd	300
Acacia CDO 8 Ltd	265
Acacia CDO 9 Ltd	296
Acacia CRE CDO 1 Ltd	288
Adagio CLO I.B.V.	-
Adagio II CLO PLC	-
Adagio III CLO PLC	-
Addison CDO Ltd	409
Adirondack 2005-1 LTD	1,520
Adirondack 2005-2 LTD	1,545
Admiral CBO Ltd.	308
Airlie CLO 2006-I Ltd.	400
Ajax One Ltd.	345
Ajax Two Limited	374
Aladdin CDO I Ltd	537
Aladdin Synthetic CDO 2006-1	111
Aldersgate Finance Ltd.	-
Alesco Preferred Funding V, Ltd	378
Alesco Preferred Funding VI, Ltd	699
Alesco Preferred Funding VIII, LTD	690
Alesco Preferred Funding XIII, Ltd.	536
Alesco Preferred Funding XIV, Ltd.	870
Alexander Park CDO I, Ltd	300
Alliance Collateralized Holdings Ltd	262
Alliance DHO, Limited	124
Alliance Global Diversified Holdings, Limited	130
Alliance Holding International II Ltd	196

Allmerica CBO I, Limited	371
Alpine III	105
Alpstar CLO 1 PLC	-
Alpstar CLO 2 PLC	-
Altius I Funding, Ltd.	2,000
Altius III Funding, Ltd.	2,018
Alzette European CLO S.A.	-
American General CBO 1998-1, Ltd	380
American General CBO 2000-1, Ltd.	325
Amstel Amortising Corporate Exposures	-
Amstel Corporate Loan Offering 2000-1 B.V.	1,130
Amstel Corporate Loan Offering 2007-1 B.V.	-
Amstel SCO 2003-1 B.V	-
Amstel Securitisation of Contingent Obligations 20	-
Anchorage Crossover Credit Finance, Ltd.	880
Angel Court CDO PLC	-
Antares Funding L.P.	600
Anthea SRL	-
Anthracite 2004-HY1 Ltd	346
Anthracite 2005-HY2 Ltd.	478
Anthracite CDO I, Ltd	419
Anthracite CDO II, Ltd	288
Anthracite CDO III Ltd.	356
Anthracite CRE CDO 2006-HY3 Ltd	645
Anthracite Euro CRE CDO 2006-1 PLC	-
Apidos CDO I	322
Apidos CDO III	286
Apidos CDO IV	350
Apidos Quattro CDO	351
Aquilae CLO I PLC	-
Aquilae CLO II PLC	-
Arch One Finance Ltd - Series 2005-5	100
Archimedes Funding III, Ltd.	1,000
Archimedes Funding IV	415
Ares Enhanced Loan Investment Strategy II, Ltd.	420
Ares Enhanced Loan Investment Strategy Ltd.	650
Ares Euro CLO I B.V.	-
Ares High Yield CSO II, Ltd	2,092
Ares III CLO, Ltd	367
Ares IIIR IVR CLO Ltd	700
Ares IIR CLO Ltd.	250
Ares IV CLO Ltd.	530
Ares IX CLO Ltd.	605
Ares V CLO Ltd.	400

Ares VI CLO Ltd	368
Ares VII CLO Ltd	558
Ares VIII CLO Ltd	550
Ares VR CLO Ltd	1,250
Ares X CLO Ltd	505
Argon Capital PLC Series 1	-
Argon Capital PLC Series 2 - Baltic Star	13
Ariel CBO Limited	131
Ark CLO 2000-1 Ltd.	1,271
Armitage ABS CDO Ltd	3,001
Arosa Funding Limited Series 2006-4	-
Arosa Funding Limited Series 2006-7	100
Arosa Funding Ltd. Series 2007-1	-
Arran Corporate Loans No.1 B.V	-
Arroyo CDO I Ltd	400
Artus Loan Fund 2007-I Ltd	101
Ascension High Grade CDO Ltd	349
Asgard CDO PLC	-
Ashwell Rated S.A. (Constellations Synthetic CDO 2	-
Aspen Funding I, Ltd	184
Astrea LLC	743
Athos Funding, Ltd.	104
Atlas CDO I, Limited	148
Atrium CDO	314
Atrium II	225
Atrium III	500
Atrium IV	650
Atrium V	900
Attentus CDO I LTD	514
Attentus CDO II Ltd	512
Auriga CDO Ltd.	535
Aurum CLO 2002-1 Ltd.	394
Aurum Investments S.A.	-
Avalon Capital Ltd. 2	690
Avalon Capital Ltd. 3	600
Avalon Capital, Ltd	565
Avebury Finance CDO PLC	932
Avenue CLO II	460
Avenue CLO VI, Ltd.	503
Avery Point CLO, Limited	510
Avoca CLO I B.V.	-
Avoca CLO II B.V.	-
Avoca CLO III PLC	-
Avoca CLO IV PLC	-

Avoca CLO V PLC	-
Avoca CLO VI PLC	-
Avoca CLO VII PLC	-
Avoca CLO VIII Ltd	-
Avoca Credit Opportunities PLC	-
Axius European CLO S.A.	-
Ayresome CDO I, Ltd	400
Ayt Hipotecario Mixto IV	584
BACCHUS 2006-2 PLC	-
BACCHUS 2007-1 PLC	-
BEA CBO 1998-1 Ltd	297
BEA CBO 1998-2 Ltd	246
BFC Genesee CDO Ltd	301
BFC Silverton CDO Ltd	750
Babson CLO Ltd 2005-II	515
Babson CLO Ltd 2005-III	581
Babson CLO Ltd 2006-I	599
Babson CLO Ltd 2006-II	564
Babson CLO Ltd 2007-I	768
Babson CLO Ltd. 2003-I	356
Babson CLO Ltd. 2004-I	470
Babson CLO Ltd. 2004-II	458
Babson CLO Ltd. 2005-I	902
Babson Mid-Market CLO Ltd 2007-II	409
Bacchus 2006-1 Plc	-
Baker Street CLO II LTD	393
Baker Street Funding CLO 2005-1 Ltd.	359
Balanced High Yield Fund I Ltd	400
Balboa CDO I Ltd.	310
Baldwin 2006-II	26
Baldwin 2006-IV	51
Ballyrock CDO I Limited	400
Ballyrock CLO 2006-1 Ltd	400
Ballyrock CLO 2006-II Ltd	600
Ballyrock CLO II Limited	400
Ballyrock CLO III, Ltd.	600
Balthazar CSO I B.V.	-
Base CLO I BV	-
Battalion CLO 2007-1, Ltd.	500
Bauhaus Securities Ltd.	1,008
Beacon Hill CBO III Ltd.	300
Beacon Hill CBO Ltd	270
Beethoven CDO S.A.	-
Belhurst CLO Ltd.	494

Belle Haven ABS CDO, Ltd.	1,000
Bering CDO I Ltd	400
Berkeley Street CDO Ltd.	306
Bernard Global Loan Investors Ltd.	537
Bernard National Loan Investors, Ltd.	801
Bernoulli High grade CDO I, Ltd	1,176
Bingham CDO LP	380
Black Diamond CLO 2005-1 Ltd	1,027
Black Diamond CLO 2005-2 Ltd	1,028
Black Diamond CLO 2006-1 (Luxembourg) S.A.	1,007
Black Diamond International Funding, Ltd	1,266
BlackRock Senior Income Series	400
BlackRock Senior Income Series II	543
Blackrock Senior Income Series IV	503
Blackrock Senior Income Series V	500
Bleecker Structured Asset Funding Ltd.	457
Blue Eagle CDO I S.A.	-
Blue Edge ABS CDO Ltd	1,250
Blue Heron Funding VI, Ltd.	1,250
Blue Heron Funding VII Ltd	1,233
BlueMountain CLO II, Ltd.	400
BlueMountain CLO III, Ltd.	450
BlueOrchard Loans for Development S.A.	84
Bluegrass ABS CDO I, Ltd.	401
Bluegrass ABS CDO II Ltd.	391
Bluegrass ABS CDO III, LLC	408
Boston Harbor CLO 2004-1, Ltd	318
Boyne Valley B.V.	-
Brant Point CBO 1999-1, Ltd	349
Brant Point II CBO 2000-1 Ltd	372
Brascan Real Estate CDO 2004-1, Ltd.	301
Brascan Structured Notes 2005-2, Ltd.	300
Brentwood CLO Ltd	700
Brevan Howard CDO I	-
Bridgeport CLO Ltd	514
Brigantine High Grade Funding Ltd	2,000
Bristol Bay Funding Ltd.	163
Bristol CDO I, Ltd	302
Broderick CDO 1 Ltd	1,000
Broderick CDO 2 Ltd.	1,600
Broderick CDO 3 Ltd	1,500
Brooklands ABS Euro Referenced Linked Notes 2002-2	-
Brooklands Euro Referenced Linked Notes	276
Brooklands Euro Referenced Linked Notes 2004-1 Ltd	-

Brooklands Euro Referenced Linked Notes 2005-1	200
Bruckner CDO I B.V.	-
Bryant Park CDO Ltd.	142
Bryn Mawr CLO Ltd.	300
Buckingham CDO II Ltd	1,137
Buckingham CDO III Ltd	1,500
Buckingham CDO Ltd	1,067
Burnham Harbor CDO 2006-1 Ltd	813
Burnham Harbor CDO 2006-1 Ltd (Cash)	723
C-BASS CBO IX LTD.	300
C-BASS CBO XIX Ltd	477
C-Bass CBO III, Ltd.	381
C-Bass CBO IV Ltd.	29
C-Bass CBO V, Ltd	365
C-Bass CBO VI Ltd.	337
C-Bass CBO VII Ltd.	381
C-Bass CBO VIII, Ltd	322
C-Bass CBO X Ltd.	400
C-Bass CBO XI Ltd.	479
C-Bass CBO XII, Ltd.	393
C-Bass CBO XIII Ltd	472
C-Bass CBO XV Corp Dependant	691
C-Bass CBO XVI, Ltd	386
C-Squared CDO Ltd	385
C-Symbol, Limited	300
CAM CBO I, Ltd	142
CAMBER 3 plc	710
CAMBER 4 PLC	904
CART 1 Ltd.	-
CBO Holdigns III, Ltd	34
CBRE Realty Finance CDO 2006-1, LTD.	600
CBRE Realty Finance CDO 2007-1, Ltd.	1,000
CDC Ixis Capital Markets - ESANO Credit Linked Not	-
CDO Master Investments S.A.	-
CEDO I plc	-
CEDO PLC - Series 4 - CSAM	-
CELF Loan Partners B.V.	-
CELF Loan Partners II PLC	-
CELF Loan Partners III PLC	-
CELF Loan Partners IV PLC	-
CELF Low Levered Partners PLC	-
CHYPS CBO 1997-1 Ltd	309
CIFC Funding 2007-II, Ltd.	614
CIFC Funding 2007-III, Ltd.	450

CIT CLO I Ltd	512
CMBSpoke 2005-II Ltd.	75
CMBSpoke 2005-III Ltd.	133
COLUMBUS NOVA CLO 2006-II	500
CS Advisors CLO I Ltd	340
CSAM Funding I	750
CSAM Funding II	480
CSAM Funding III	358
CSAM Funding IV	550
CSAM High Yield Focus CBO, Ltd	349
CT CDO IV	489
CVC Capital Funding, LLC	1,000
CWCapital Cobalt I, Ltd	451
CWCapital Cobalt II Ltd	700
Cabral No.1 Limited	-
Cadogan Square CLO B.V.	-
Cadogan Square CLO II B.V.	-
Cadogan Square CLO III B.V.	-
Cadogan Square CLO IV B.V.	-
Caesar Finance 2000 S.A.	-
Cairn CLO I B.V.	-
Cairn CLO II B.V.	-
Cairn High Grade ABS CDO II Ltd	187
Cairn High Grade Funding I Ltd.	1,587
Cairn Mezz ABS CDO I PLC	500
Cairn Mezz ABS CDO II Ltd	313
Cairn Mezz ABS CDO III Ltd	1,000
Cairn Mezz ABS CDO IV Ltd	208
Calhoun CBO, Limited	294
Callidus Debt Partners CDO Fund I, Ltd.	368
Callidus Debt Partners CLO Fund II, Ltd	708
Callidus Debt Partners CLO Fund III, Ltd	400
Callidus Debt Partners CLO Fund IV, Ltd.	460
Camber 1 Plc	1,000
Camber 2 SA	-
Camber 5 Ltd	502
Camber 7 PLC	916
Canyon Capital CDO 2001-1 Ltd.	292
Canyon Capital CDO 2002-1 Ltd	275
Canyon Capital CLO 2004-1 Ltd	400
Canyon Capital CLO 2006-1 Ltd	380
CapLease CDO 2005-1, Ltd.	300
Capital Guardian ABS CDO I, Ltd.	353
Capital Guardian High Yield CBO Ltd.	316

Capital Trust RE CDO 2004-1, Ltd	324
Capital Trust RE CDO 2005-1 Ltd	338
CapitalSource Real Estate Loan Trust 2006-A	1,300
Capstan CBO Limited	196
Captiva CBO	280
Carbon Capital II Real Estate CDO 2005-1, Ltd	455
Cardinal CDO LLC	1,560
Carlyle High Yield Partners III, Ltd.	450
Carlyle High Yield Partners IV, Ltd.	450
Carlyle High Yield Partners IX Ltd.	500
Carlyle High Yield Partners VI, Ltd	371
Carlyle High Yield Partners VII, Ltd.	400
Carlyle High Yield Partners VIII Ltd	525
Carlyle High Yield Partners X Ltd	400
Carlyle Loan Opportunity Fund	266
Carnuntum High Grade I Ltd.	-
Cascade Funding CDO I, Ltd.	403
Cashel Rock CBO, Ltd	305
Castle Garden Funding	875
Castle Hill I - INGOTS, Ltd	350
Castle Hill II - INGOTS, LTD.	400
Castle Hill III CLO, Limited	274
Catalina CDO Ltd	202
CeDeos 1 Ltd. Series 1	-
CeDeos 1 Ltd. Series 2	-
Cedar Lake CBO Ltd.	134
Celerity CLO Ltd.	277
Cent CDO 10 Limited	410
Cent CDO 12 Limited	618
Cent CDO 14 Limited	500
Cent CDO 15 Limited	617
Cent CDO XI Limited	726
Centre Square CDO Ltd	502
Centurion CDO 8 Limited	604
Centurion CDO 9 Limited	901
Centurion CDO I, Ltd	269
Centurion CDO II, Ltd	466
Centurion CDO III, Ltd.	252
Centurion CDO IV Limited	220
Centurion CDO VI, Ltd	400
Centurion CDO VII Limited	1,012
Centurion Global Sovereign CBO I Limited	257
Century Funding Ltd.	285
Chambers Street CDO II, Ltd	87

Chambers Street CDO, Ltd.	102
Champlain CLO, Ltd	478
Charles Fort CDO I	400
Charles River CDO I, Ltd	290
Chartwell CBO I Ltd.	160
Chatham Light II CLO Limited	536
Cherry Creek CDO I Ltd	300
Cherry Creek CDO II Ltd	500
Chess II Ltd. Series 5 (Guinevere)	-
Cheyne ABS Investments I PLC	178
Cheyne CBO II, Limited	204
Cheyne CLO Investments I Ltd.	141
Cheyne Credit Opportunity CDO I B.V	-
Cheyne Investment Grade CDO I, Ltd	458
Chiswell Street Finance Limited	-
Chrome Funding Ltd Series 15 to 17 (Odeon Linked N	-
Chrome Funding Ltd.	-
Churchill Financial Cayman Ltd.	1,250
Cimarron CDO, Ltd	1,000
Cirrus Funding Ltd.	287
Citadel Hill 2000 Ltd	475
Citation High Grade ABS CDO I, Ltd.	1,105
Clare Island BV	-
Clarenville CDO S.A.	-
Clarion CBO, Ltd.	285
Claris	-
Claris Limited	-
Claris Limited (Nappa Valley V(II) Mezzanine Tranc	-
Claris Ltd Series 100 2007	-
Claris Ltd. Series 41 2005 Voltaire	-
Claris Ltd. Series 42 2005 Voltaire	-
Claris Ltd. Series 69 2006	-
Clearwater Funding CBO 2000-A, Ltd.	299
Clearwater Funding CDO 2001-A Ltd.	509
Clearwater Funding CDO 2002-A Ltd	383
Clover Funding PLC	1,039
Cloverie PLC Series 2007-24	200
Cloverie Plc - Series 47 48 49 50	-
Clydesdale CBO I Ltd.	357
Clydesdale CLO 2003 Ltd	300
Clydesdale CLO 2004, Ltd.	364
Clydesdale CLO 2005, Ltd.	492
Clydesdale CLO 2006 Ltd	450
Clydesdale CLO 2007, Ltd.	350

Clydesdale Strategic CLO I, Ltd.	300
Coast CFO 2005-1	750
Coast Investment Grade 2000-1, Limited	400
Coast Investment Grade 2001-1, Limited	410
Coast Investment Grade 2002-1, Limited	308
Coco Finance 2006-1 Plc	-
Coldwater CDO, Ltd.	401
Coliseum Funding Ltd.	582
Colombo S.r.l.	-
Colts 2005-1 Ltd	423
Colts Trust 2004-1	247
Columbus Loan Funding, Ltd	411
ColumbusNova CLO Ltd 2007-I	500
Commodore CDO II Ltd	300
Commodore CDO III, Ltd.	501
Commodore CDO IV, Ltd.	400
Commodore CDO Ltd	300
Comstock Funding Ltd.	467
Concerto I B.V.	-
Concerto II B.V.	-
Concord Real Estate CDO 2006-1, Ltd.	465
Connecticut Valley Structured Credit CDO I Ltd.	400
Conseco Funding Ltd.	596
Coolidge Funding, Ltd.	410
Copernicus Euro CDO-I B.V.	-
Copernicus Euro CDO-II B.V.	-
Copper River CLO Ltd	717
Cordatus CLO I PLC	-
Cordatus CLO II PLC	-
Coriolanus Limited - Series 60	-
Coriolanus Limited.	-
Corona Borealis CDO Ltd	1,551
Coronado CDO Ltd	479
Corsair (Jersey) No.4 Limited - Series 12	200
Corsair (Jersey) No.4 Limited - Series 4	150
Corsair Finance (Ireland)	-
Corvus Investments Limited	1,000
Credico Funding 2 S.r.l.	-
Credico Funding 3 SRL	-
Credico Funding S.r.l.	-
Credit Linked Asset Securities I, Ltd	67
Crest 2002-IG, Ltd	660
Crest 2000-1, Ltd.	500
Crest 2001-1, Ltd	500

Crest 2002-1 Ltd.	500
Crest 2003-1 Ltd.	600
Crest 2003-2, Ltd	325
Crest 2004-1, Ltd.	429
Crest Clarendon Street 2002-1 Ltd.	300
Crest Dartmouth Street 2003-1, Ltd.	350
Crest Exeter Street Solar 2004-1 Ltd.	350
Crest G-Star 2001-1 LP	500
Crest G-Star 2001-2, Ltd	350
Crown CLO 2002-1	1,000
Crystal Cove CDO, Inc.	481
Crystal River CDO 2005-1 Ltd	378
Crystal River Resecuritization 2006-1 Ltd	390
Cumberland II CLO, Ltd	400
Cygnus Finance PLC	-
DELTA CDO PLC Series 2005-1	84
DELTA CDO PLC Series 2005-2	143
DHYNO 1998-1 LLC	62
DLJ CBO Ltd	655
DUTCH CARE 2001-I B.V.	-
Dalradian European CLO I B.V.	-
Dalradian European CLO II B.V.	-
Dalradian European CLO III B.V.	-
Daphne Finance I Plc	-
Davis Square Funding I Ltd	995
Davis Square Funding II, Ltd	1,225
Davis Square Funding III Ltd.	502
Davis Square Funding IV Ltd	550
Davis Square Funding V Ltd	2,018
Davis Square Funding VI	2,000
Davis Square Funding VII, Ltd.	4,020
Dawn CDO I Ltd.	369
De Meer Middle Market CLO 2006-1, Ltd.	410
Dekania Europe CDO I PLC	-
Dekania Europe CDO II	-
Dekania Europe CDO III PLC	-
Denali Capital CLO I, Ltd	400
Denali Capital CLO II, Ltd	361
Denali Capital CLO III, Ltd	403
Denali Capital CLO IV Ltd	392
Denali Capital CLO V Ltd	407
Denali Capital CLO VI, Ltd	490
Deutsche Bank Aktiengesellschaft	-
Diamond Investment Grade CDO, Ltd	500

Dillon Read CMBS CDO 2006-1 Ltd.	375
Diogenes Cdo I Ltd	400
Diversey Harbor ABS CDO, Ltd	2,500
Diversified Asset Securitization Holdings I L.P.	300
Diversified Asset Securitization Holdings II L.P	500
Diversified Asset Securitization Holdings III, L.P	351
Diversified Global Securities Limited	253
Diversified Global Securities Limited II	207
Diversified Strategies CFO S.A.	243
Dorset Street Finance Ltd.	-
Dresdner RCM Global Investors CBO II, Ltd	341
Dryden High Yield CDO 2001-1	370
Dryden IV Leveraged Loan CDO 2003 Ltd.	318
Dryden IX - Senior Loan Fund 2005 Plc	532
Dryden Leveraged Loan CDO	737
Dryden VIII - Leveraged Loan CDO 2005	459
Dryden X-Euro CLO 2005 - Plc	397
Dryden XI-Leveraged Loan CDO 2006	767
Dryden XV - Euro CLO 2006 Plc	-
Duane Street CLO 1, Ltd.	350
Duane Street CLO II, Ltd.	430
Duane Street CLO III, Ltd.	550
Duchess I CDO S.A.	-
Duchess II CDO S.A.	-
Duchess III CDO S.A.	480
Duchess IV CLO B.V.	-
Duchess V CLO B.V	-
Duchess VI CLO B.V.	-
Duchess VII CLO B.V	-
Duesenberg CSO 2001-3, LLC	100
Duke Funding High Grade I, Ltd.	2,508
Duke Funding High Grade II-S/EGAM I, Ltd	332
Duke Funding High Grade III, Ltd.	3,307
Duke Funding High Grade IV, Ltd.	1,500
Duke Funding High Grade V, Ltd	1,500
Duke Funding I, Ltd	300
Duke Funding II, Ltd	301
Duke Funding III, Ltd	498
Duke Funding IV, Ltd	351
Duke Funding IX, Ltd	841
Duke Funding V, Ltd.	480
Duke Funding VI, Ltd	930
Duke Funding VII Ltd.	750
Duke Funding VIII Ltd.	1,160

Duke Funding X, Ltd	1,200
Duke Funding XI, Ltd.	-
Duke Funding XII Ltd.	2,250
Duncannon CRE CDO I PLC	-
Dunhill ABS CDO, Ltd	518
Dutch Hill Funding I, Ltd.	413
E*Trade ABS CDO I, Ltd	250
E*Trade ABS CDO II, LTD	409
E*Trade ABS CDO III Ltd	322
E*Trade ABS CDO IV, Ltd.	300
ELC (Cayman) Ltd 1998-I	394
ELC (Cayman) Ltd 1999-II	537
ELC (Cayman) Ltd 2000-I	509
ELC (Cayman) Ltd. 1999-III	407
ELM B.V Series 47	-
ELM B.V Series 66	125
ELM B.V.	160
ELM B.V. Series 80	-
Eastland CLO Ltd	1,532
Eastman Hill Funding I, Limited	595
Eaton Vance CDO II Ltd	401
Eaton Vance CDO III Ltd.	400
Eaton Vance CDO IX Ltd	509
Eaton Vance CDO Ltd.	245
Eaton Vance CDO VI Ltd	500
Eaton Vance CDO VIII, Ltd.	750
Eaton Vance CDO X PLC	-
Egret Funding CLO I PLC	-
Eirles Two Limited - Series 215	-
Eirles Two Limited - Series 216	-
Eirles Two Limited - Series 228	-
Eirles Two Limited - Series 235	-
Eirles Two Limited - Series 332	-
Eirles Two Limited Series 231 232 303 - Moorgate C	122
Eirles Two Ltd -Series 214	500
Electric Lights Orchestra	-
Emerald Investment Grade CBO II Ltd	492
Emerald Investment Grade CBO, Limited	513
Endeavor Funding Ltd.	565
Endeavour, LLC	435
Endurance CLO I, Limited	299
Enhanced Loan Facility I, Ltd	60
Enhanced Loan Facility III, Ltd	30
Enhanced Mortgage-Backed Securities Fund III	200

Equinox Funding	122
Essential Public Infrastructure Capital PLC	-
Essex Park CDO Ltd	383
Etoile 2002-1	-
Euro Liberte PLC	-
Euro Max III MBS Ltd	-
Euro Multi-Credit CDO S.A.	-
Euro ZING I SA	-
Euro Zing II B.V	-
Euro-Galaxy CLO B.V.	-
Euro-Galaxy II CLO B.V.	-
Eurocredit CDO I, B.V.	-
Eurocredit CDO II, B.V.	-
Eurocredit CDO III B.V.	-
Eurocredit CDO IV B.V.	-
Eurocredit CDO V PLC	-
Eurocredit CDO VII PLC	-
Eurocredit CDO VIII Limited	-
Eurocredit Opportunities I PLC	675
Euromax II MBS S.A.	-
Euromax IV MBS S.A	-
Euromax V ABS PLC	-
Euromax VI ABS Ltd	-
European Enhanced Loan Fund SA	-
Eurostar I CDO	-
Eximius Capital Funding, Ltd.	505
F.A.B. CBO 2002-1 BV	-
FAB CBO 2003-1 B.V.	-
FAB CBO 2005-1 B.V.	-
FAB UK 2004-1 Ltd.	-
FAB US 2006-1 PLC	407
FAXTOR ABS 2003-1 B.V.	-
FAXTOR ABS 2004-1 B.V.	-
FAXTOR ABS 2005-1 B.V.	308
FC CBO II Ltd	835
FC CBO IV Limited	330
FM Leveraged Capital Fund I	384
FMA CBO Funding II	400
FMA IG Funding IV Ltd	425
FMC Real Estate CDO 2005-1, Ltd	439
Fairway Loan Funding Company	1,235
Falcon IV CBO Ltd.	295
Federated CBO II Limited	301
Federated CBO Ltd.	434

Fenway I, Ltd	20
Fenway II, Ltd	5
Fermat Ltd.	-
Field Point II Ltd	865
Finsbury Finance PLC	-
Fiorente Funding Ltd	138
First 2004-I CLO, Ltd.	500
First 2004-II CLO Ltd	400
First Dominion Funding I	1,000
First Dominion Funding II	750
First Emerging Markets CBO I, Ltd	115
First Source Loan Obligations Trust	717
Flagship CLO 2001-1 Ltd.	500
Flagship CLO II	387
Flagship CLO III	357
Flagship CLO IV	429
Flagship CLO V	500
Flagship CLO VI	500
Flagstone CBO 2001-1 Ltd	278
Fleet Commercial Loan Master LLC	4,455
Flint European Debt Investments Trust	994
Force 2005-1 Limited Partnership	-
Force 2007-1	-
Fore CLO Ltd 2007-1	503
Forest Creek CLO Ltd.	1,000
Forge ABS High Grade CDO I, Ltd.	678
Fort Dearborn CDO I Ltd	507
Fort Point CDO I Ltd	400
Fort Point CDO II Ltd	500
Fort Sheridan ABS CDO Ltd	1,006
Forte CDO (Cayman) Ltd.	295
Fortius I Funding Ltd	612
Fortress Credit Opportunities I LP	1,700
Fortress Credit Opportunities II LP	300
Four Corners CLO 2005-1, Ltd	305
Franklin CLO I, Limited	400
Franklin CLO II, Ltd	551
Franklin CLO III, Ltd	533
Franklin CLO IV, Ltd	350
Franklin CLO V, Ltd	500
Franklin CLO VI, Ltd	385
Freedom 1999-1 CDO, Ltd	375
Freedom 2000-1, Ltd (fka CIGNA CDO 2000-1)	375
Freeport Loan Trust 2006-1	525

Fresco 1	-
Fulton Street CDO, Ltd	400
G Square Finance Ltd	125
G Street Finance, LTD	1,501
G-Force CDO 2001-1 Limited	551
G-Force CDO 2002-1 Ltd.	1,105
G-Force CDO 2003-1 Ltd.	615
G-Star 2002-1 Ltd.	324
G-Star 2002-2 CDO, Ltd.	386
G-Star 2003-3 Ltd.	450
GATE SME CLO 2006-1 Ltd	-
GEM VII Targeted Value and Income Fund, Limited	314
GEM VIII, Limited	455
GIA Investment Grade CDO 2001 Ltd	430
GIA Investment Grade SCDO 2002-1, Ltd	80
GSC ABS CDO 2005-1 Ltd	315
GSC ABS Funding 2006-3g Ltd	2,685
GSC European CDO I S.A.	-
GSC European CDO I-R S.A.	-
GSC European CDO II S.A.	-
GSC European CDO III S.A.	-
GSC European CDO IV S.A.	-
GSC European CDO V PLC	-
GSC Partners CDO Fund II, Limited	737
GSC Partners CDO Fund III, Limited	580
GSC Partners CDO Fund IV, Ltd	440
GSC Partners CDO Fund, Limited	657
GSC Partners Gemini Fund Limited	693
Galaxy CLO 2003-1, Ltd.	300
Galaxy III CLO Ltd.	344
Galaxy IV CLO, Ltd	408
Galaxy V CLO, Ltd	509
Galaxy VI CLO Ltd	511
Galaxy VII CLO Ltd.	468
Galaxy VIII CLO Ltd.	518
Gale Force I CLO Ltd	413
Galena CDO I (Cayman Islands No.1) Limited	211
Gallatin CLO II 2005-1 Ltd.	514
Gallatin CLO III 2007-1 Ltd	434
Gallatin Funding I Ltd	402
Galleria CDO IV, LTD.	375
Galleria II, Ltd	313
Galway Bay B.V.	-
Gannett Peak CLO I Ltd.	618

Gate SME CLO 2005-1 Ltd	-
Geldilux 2002-1	-
Geldilux TS-2003-1 S.A.	-
Gemstone CDO II Ltd.	399
Gemstone CDO III Ltd	4,000
Gemstone CDO IV Ltd.	600
Gemstone CDO Ltd.	440
Gemstone CDO V Ltd.	644
Gemstone CDO VI Ltd.	700
Gemstone CDO VII Ltd.	1,102
Gennaker I CDO Ltd	587
Gibraltar Ltd.	400
Glacier Funding CDO I, Ltd.	297
Glacier Funding CDO II, Ltd.	485
Glacier Funding CDO III, Ltd.	499
Glacier Funding CDO IV, Ltd.	401
Glacier Funding CDO V Ltd	499
Glastonbury Finance 2007-1 PLC	-
Gleacher CBO 2000-1 Ltd.	400
Gleneagles CLO Ltd	925
Global Enhanced Loan Fund S.A.	-
Global Senior Loan Index Fund 1 BV	-
Golden Key Ltd	1,648
Golden Knight CDO Ltd.	175
GoldenTree High Yield Opportunities I L.P.	630
GoldenTree High Yield Opportunities II, L.P.	400
GoldenTree Loan Opportunities I, Limited	700
GoldenTree Loan Opportunities II, Limited	434
GoldenTree Loan Opportunities III Limited	771
Goldman Sachs Asset Management CBO	400
Goldman Sachs Asset Management CBO II Limited	300
Goldman Sachs Asset Management CLO PLC	400
Golub Capital Loan Trust 2005-1	300
Golub Capital Management CLO 2007-1 Ltd	510
Golub Capital Partners Funding 2007-1 Ltd	400
Gonzaga Finance S.r.l.	-
Gracechurch Corporate Loan Series 2005-1	-
Gracechurch Corporate Loan Series 2007-1	-
Gramercy Real Estate CDO 2005-1 Ltd	1,000
Gramercy Real Estate CDO 2006-1, Ltd.	1,039
Gramercy Real Estate CDO 2007-1, Ltd.	1,100
Grand Avenue CDO II Ltd	1,500
Grand Central CDO I Ltd	289
Granite Ventures I Ltd.	360

Granite Ventures II Ltd	361
Granite Ventures III Ltd	412
Grayston CLO II 2004-1	363
Green Lane CLO Ltd	484
Green Park CDO B.V.	-
Grenadier Funding,Limited	1,478
Gresham Capital CLO 1 B.V.	-
Gresham Capital CLO II B.V.	-
Gresham Capital CLO III B.V.	-
Gresham Capital CLO IV B.V.	-
Greylock Synthetic CDO 2006	72
Greyrock CDO Ltd	308
Grosvenor Place CLO I B.V.	-
Grosvenor Place CLO II B.V.	-
Grosvenor Place CLO III B.V.	-
Guggenheim Structured Real Estate Funding 2005-1,	507
Guggenheim Structured Real Estate Funding 2005-2,	271
Gulf Stream - Compass CLO 2003-I Ltd	300
Gulf Stream - Compass CLO 2004-1 Ltd	424
Gulf Stream - Compass CLO 2005-1 Ltd	500
Gulf Stream-Atlantic CDO 2007-1 Ltd	200
Gulf Stream-Compass CLO 2002-1 Ltd	300
Gulf Stream-Compass CLO 2005-II, Ltd.	500
Gulf Stream-Rashinban CLO 2006-I, Ltd.	400
Gulf Stream-Sextant CLO 2006-1, Ltd.	400
Gulf Stream-Sextant CLO 2007-1 Ltd	500
H.E.A.T Mezzanine S.A	-
H.E.A.T Mezzanine SA I -2007	-
H.E.A.T Mezzanine SA I-2005	-
HSPI Diversified CDO Fund I Limited	623
HSPI Diversified CDO Fund, II Ltd.	726
Halcyon 2005-2, Ltd.	16
Halcyon Loan Investors CLO I Ltd.	412
Halcyon Loan Investors CLO II Ltd	411
Halcyon Securitized Products Investors ABS CDO II	478
Halcyon Structured Asset Management CLO I Ltd.	460
Halcyon Structured Asset Mgmt European CLO 2006-I	400
Halcyon Structured Asset Mgmt European CLO 2006-II	-
Halcyon Structured Asset Mgmt European CLO 2007-1	-
Hamlet I Leveraged Loan Fund B.V.	-
Hamlet II, Ltd	502
Hampden CBO Ltd.	502
Hampton CDO Ltd	916
Hanover Square CLO Ltd.	580

Harare SCDO 2002-1 Ltd.	1,000
HarbourView CDO II Ltd	400
HarbourView CDO III Ltd	375
Harbourmaster CLO 1, Limited	-
Harbourmaster CLO 2, Limited	-
Harbourmaster CLO 3 B.V.	-
Harbourmaster CLO 4 B.V.	-
Harbourmaster CLO 5 B.V.	-
Harbourmaster CLO 6 B.V	-
Harbourmaster CLO 7 B.V.	-
Harbourmaster CLO 9 B.V.	-
Harbourmaster Pro-Rata CLO 2 B.V.	-
Harbourmaster Pro-Rata CLO 3 B.V.	-
Harbourview CBO I Ltd.	360
Harbourview CLO IV, Limited	322
Harbourview CLO V Ltd	307
Harch CLO III Limited	436
Harch Capital Management Inc.	425
Harch Capital Management, Inc.	400
Harp High Grade CDO I, Ltd	1,000
Harvest CLO II S.A.	-
Harvest CLO III PLC	-
Harvest CLO IV PLC	-
Harvest CLO S.A	-
Harvest CLO V Plc	-
Helios Series I Multi Asset CBO, Ltd	509
Hereford Street ABS CDO I Ltd.	1,200
Hewett's Island CDO, Ltd	253
Hewett's Island CLO III, Ltd.	393
Hewett's Island CLO V Ltd	413
Hewetts Island CLO II Ltd	330
Hewetts Island CLO IV Ltd	412
Hewetts Island CLO VI Ltd	413
High Grade Structured Credit CDO 2005-1 Ltd.	812
High Tide CDO I S.A	101
Highgate ABS CDO Ltd	752
Highland Legacy Ltd.	750
Highland Loan Funding V Ltd.	503
Highland Park CDO I, Ltd.	600
Highlander Euro CDO B.V.	-
Highlander Euro CDO II B.V.	-
Highlander Euro CDO III B.V.	-
Hillcrest CDO I Ltd	425
Hillmark Funding Ltd.	500

Holborn Finance Ltd	188
House of Europe Funding I Ltd	1,000
House of Europe Funding II PLC	-
House of Europe Funding III PLC	1,000
House of Europe Funding IV PLC	1,000
House of Europe Funding V PLC	-
Hout Bay 2006-1 Ltd.	1,504
Hudson Mezzanine Funding 2006-1 Ltd	837
Hudson Straits CLO 2004 Ltd.	446
Huntington CDO Ltd	751
Hyde Park CDO B.V.	-
I-Preferred Term Securites II Limited	523
I-Preferred Term Securities III Limited	521
IGLOO II	-
IMAC CDO 2006-1 Ltd	300
ING Investment Management CLO I, Ltd.	400
ING Investment Management CLO II Ltd	500
ING Investment Management CLO IV Ltd	500
ING Oryx CLO Ltd	378
IONA CDO I Ltd.	1,500
Icons Ltd	336
Iliad Investments P.L.C	-
InCapS Funding I, Limited	386
Independence I CDO Ltd.	301
Independence II CDO Ltd.	403
Independence III CDO, Ltd.	300
Independence IV CDO Ltd.	624
Independence V CDO, Ltd.	602
Independence VI CDO, Ltd	962
Indosuez Capital Funding IIA Ltd.	755
Indosuez Capital Funding III, Limited	566
Indosuez Capital Funding VI, Ltd	482
Ingress I, Ltd	307
Inman Square Funding II Ltd	300
Inner Harbor CBO 2001-1 Ltd.	345
Intercontinental CDO S.A.	-
Intermediate Finance II PLC	-
Intermediate Finance PLC	-
Invesco CBO 2000-1 Ltd.	191
Invesco European CDO I S.A.	-
Inwood Park CDO Ltd	1,250
Ipswich Street CDO Ltd	1,705
Iris SPV PLC (Avon Ridge 2006-I) Series 6 2006	20
Ischus CDO I Ltd	400

Ischus CDO II Ltd	403
Ischus High Grade Funding I Ltd.	400
JER CRE CDO 2005-1 Limited	416
JER CRE CDO 2006-2 Limited	1,201
JFIN CLO 2007 Ltd	407
JWS CBO 2000-1, Ltd.	278
Jackson 2006-I	20
Jackson 2006-IV	33
Jackson 2006-V	27
Jackson Creek CDO, Ltd	161
Jasper CLO Ltd	645
Jazz CDO I B.V.	-
Jazz CDO II B.V.	-
Jazz III CDO (Ireland) PLC - Euro	-
Jazz III CDO (Ireland) PLC - US	379
Jubilee CDO I B.V.	-
Jubilee CDO I-R B.V.	-
Jubilee CDO II B.V.	-
Jubilee CDO III B.V.	-
Jubilee CDO IV B.V.	-
Jubilee CDO V B.V.	-
Jubilee CDO VI B.V.	-
Jubilee CDO VII B.V.	-
Juniper CBO 1999-1 Ltd	521
Juniper CBO 2000-1 Ltd	166
Jupiter High Grade CDO II, Ltd.	1,005
Jupiter High Grade CDO Ltd	753
Jupiter High-Grade CDO III, Ltd	2,011
Jupiter High-Grade CDO IV, Ltd	2,500
KINTYRE CLO I PLC	-
KKR Financial CLO 2005-1 Ltd	1,007
KKR Financial CLO 2005-2 Ltd	1,019
KKR Financial CLO 2006-1 Ltd	1,017
KKR Financial CLO 2007-1 Ltd	3,530
KKR Financial CLO 2007-A Ltd	1,468
Katonah II, Ltd	436
Katonah III, Ltd	425
Katonah IV, Ltd	350
Katonah V, Ltd.	247
Kefton CDO I Ltd	670
Kennecott Funding Ltd	513
Kent Funding, Ltd.	1,010
Khaleej II CDO, Ltd.	151
Kleros Preferred Funding III Ltd.	2,002

Kleros Preferred Funding Ltd.	1,007
Kleros Preferred Funding V PLC	1,200
Kleros Preferred Funding VI, Ltd.	3,000
Klio Funding Ltd.	2,423
Klio II Funding Ltd.	220
Klio III Funding, Ltd.	4,030
Knight Funding Ltd.	501
Knight II Funding Ltd.	485
Knollwood CDO Ltd	304
Korea First Mortgage No.1	422
LCM I Limited Partnership	335
LCM II Limited Partnership	360
LCM III Limited Partnership	350
LCM IV Ltd.	323
LCM V Ltd	600
LEAF Master Trust	5,984
LNR CDO 2002-1 Ltd	801
LNR CDO 2003-1 Ltd	763
LNR CDO III Ltd.	986
LNR CDO IV Ltd	1,601
LYNX 2002-I	500
Lacerta ABS CDO 2006-1 Ltd	600
Lafayette Sovereign CDO I Limited	171
Laguna ABS CDO Ltd.	1,303
Lakeside CDO I Ltd	785
Lakeside CDO II Ltd	1,480
Lambda Finance B.V.	-
Lancer Funding Ltd	1,498
Landmark CDO LTD.	400
Landmark II CDO Ltd	250
Landmark III CDO Ltd	320
Landmark IV CDO	2,663
Landmark IX CDO Ltd	479
Landmark V CDO	362
Landmark VIII CLO Ltd.	516
Latitude CLO I Ltd	302
Latitude Synthetic I B.V.	210
Laurelin B.V.	-
Lenox Street 2007-1, Ltd.	350
Leopard CLO I B.V.	-
Leopard CLO II B.V.	-
Leopard CLO III B.V.	-
Leopard CLO IV B.V.	-
Leopard CLO V B.V.	-

Leveraged Finance Europe Capital B.V	-
Leveraged Finance Europe Capital IV B.V.	-
Lexington Capital Funding III Ltd	1,209
Lexington Capital Funding, Ltd.	521
Libertas Preferred Funding I Ltd	602
Liberte American Loan Master Trust	1,650
Liberty CLO Ltd	966
Liberty Harbour CDO Ltd. 2005-1	234
Liberty Harbour II CDO Ltd	269
Liberty Square CDO I Limited	417
Liberty Square CDO II Limited	271
Libra CDO Ltd.	515
Lifestar CDO S.A.	-
LightPoint CLO 2004-1, Ltd.	317
LightPoint CLO V Ltd	600
LightPoint Pan-European CLO 2006 Plc	-
Lightpoint CLO III Ltd	499
Lightpoint CLO IV Ltd	391
Limerock CLO I	519
Lincoln Avenue ABS CDO Ltd	1,250
Lisa Synthetic CDO BV	120
Logan CDO II Ltd	150
Lombard Street CLO I PLC	-
London Wall 2002-1 PLC	-
London Wall 2002-2 PLC	-
London Wall 2006-1, Ltd.	-
Lone Star CBO Funding Ltd.	290
Long Grove CLO Ltd	415
Long Hill 2006-1 Ltd	810
Longhorn CDO (Cayman) Ltd.	484
Longhorn CDO II (Cayman) Ltd.	328
Longport Funding II Ltd.	300
Longport Funding Ltd	333
Longshore CDO Funding 2006-2, Ltd	1,000
Longstreet CDO I, Ltd.	506
Loomis Sayles CBO II Ltd.	300
Lunar Funding V PLC	200
Lusitano Global CDO No.1 PLC	-
M-2 SPC Series 2005-E	120
M-2 SPC Series 2005-G	125
MBNA Credit Card Master Note Trust	25
MC Funding Ltd.	410
MKP CBO I, Ltd.	307
MKP CBO III Ltd.	384

MKP CBO IV Ltd.	414
MKP CBO V, Ltd.	702
ML CBO IV (Cayman) Ltd.	679
ML CBO IX (CAYMAN) LTD.	299
ML CBO VII 1997-C-3	214
ML CBO XVIII (Cayman) Ltd.	403
ML CBO XXVI Ltd, Series 1999-Putnam-1	277
MM Community Funding IX Ltd	281
MM Community Funding, Ltd	526
MMCaps Funding XVII, Ltd.	312
MWAM CBO 2001-1, LTD.	251
Madison Avenue CDO I, Limited	350
Madison Avenue CDO II Ltd.	507
Madison Avenue CDO III, Limited	350
Madison Avenue Structured Finance CDO I Ltd	301
Madison Park Funding I, Ltd	628
Madison Park Funding II Ltd	796
Madison Park Funding III Ltd.	672
Madison Park Funding IV Ltd	507
Magi Funding I PLC	-
Magma CDO Ltd.	321
Magnetite Asset Investors L.L.C	1,000
Magnetite CBO II Ltd.	334
Magnetite IV CLO Limited	336
Magnetite V CLO, Limited	350
Magnolia Finance II PLC	307
Magnolia Finance II PLC Series 2006-6	349
Magnolia Finance II PLC Series 2007-2A	224
Magnolia Finance Series 2007-21 (Derwent)	-
Magnus Funding Ltd	289
Mainsail CDO I Ltd.	30
Mainsail CDO II Ltd.	4,519
Malin CLO B.V.	-
Man Glenwood Alternative Strategies I	550
Man Glenwood Alternative Strategies II Ltd	500
Manasquan CDO 2005-1 Ltd	308
Maps CLO Fund II Ltd.	403
Marathon CLO I Ltd.	330
Marathon Real Estate CDO 2006-1, Ltd.	1,000
Marc CDO I PLC	161
Mare Baltic	-
Mare Baltic PCC Limited - Series 2005-1	-
Margate Funding I Ltd	1,000
Mariner CDO 2002 Ltd.	411

Market Square CLO Ltd	300
Markov CDO I Ltd	2,140
Marquette Park CLO Ltd.	309
Marquette US/European CLO, P.L.C.	153
Marylebone Road CBO 2 Ltd.	239
Marylebone Road CBO 3 B.V.	-
MassMutual Global CBO I Limited	301
Maxim High Grade CDO I Ltd.	2,008
Mayfair Euro CDO I, B.V	-
McKinley II Funding Ltd	1,027
Melchior CDO I S.A.	-
Melrose Financing No. 1 PLC	-
Menton CDO II	105
Mercator CLO I PLC	-
Mercator CLO II PLC	-
Mercator CLO III Ltd.	-
Mercury CDO 2004-1 Ltd.	753
Mercury CDO II Ltd	1,000
Mercury CDO III Ltd	1,003
Merrill Lynch CLO 2007-1 Ltd	430
Merritt Funding Trust	1,636
Mesa West Capital CDO, Ltd.	600
Metrix Funding No. 1 PLC	-
Metrix Securities P.L.C - Series 2006-1	3,337
Midgard CDO PLC	-
Midgard CDO PLC Series 2006-1, Embla	20
Midori CDO Ltd.	507
Mill Reef SCDO 2005-1 Ltd.	264
Millennium Park CDO I Ltd	2,000
Millerton ABS CDO Ltd	300
Millstone Funding, Ltd.	995
Millstone II CDO Ltd.	1,511
Millstone III CDO Ltd.	2,200
Mint 2005-1 Ltd	1,000
Modjeska Canyon S.A	15
Modjeska Canyon S.A. Series 2006-4U	10
Monroe Harbor CDO Ltd.	1,502
Montauk Point CDO Ltd	402
Monterey CDO Ltd	1,002
Monument Capital Ltd.	410
Monument Park CDO Ltd.	1,083
Moon Synthetic Ltd.	-
Morgan Stanley 2007-XLC1, Ltd.	827
Morgan Stanley Investment Management Coniston B.V.	-

Morgan Stanley Investment Management Croton, Ltd.	300
Morgan Stanley Investment Management Garda B.V.	-
Morgan Stanley Investment Management Mezzano B.V.	-
Morgan Stanley Managed ACES SPC	1,683
Morgan Stanley Managed ACES SPC Series 2007-13	240
Morgan Stanley Managed ACES SPC series 2006-6	7,556
Moselle CLO S.A	-
Mount Skylight CDO Ltd.	1,000
Mount Wilson CLO Ltd.	307
Mountain Capital CLO I Ltd.	473
Mountain Capital CLO II, Ltd	500
Mountain Capital CLO III Ltd	332
Mountain Capital CLO IV Ltd	307
Mountain Capital CLO V Ltd	309
Mountain Capital CLO VI Ltd	400
Mountain View CLO II Ltd.	463
Mountain View CLO III Ltd.	508
Mountain View Funding CLO 2006-1, Ltd.	463
Mulberry Street CDO I, Ltd	500
Mulberry Street CDO II Ltd	672
Mustang SCDO 2002-1, Ltd	16
Muzinich CBO II, Limited	401
Muzinich Cashflow CBO II Ltd	535
Muzinich Cashflow CBO Ltd.	498
N-Star Real Estate CDO II Ltd	343
N-Star Real Estate CDO IV Ltd.	400
N-Star Real Estate CDO VI Ltd.	534
N-Star Real Estate CDO VII Ltd.	550
NYLIM Flatiron CLO 2003-1 Ltd.	350
NYLIM Flatiron CLO 2004-1 Ltd	322
NYLIM Flatiron CLO 2005-1 Ltd.	400
NYLIM Flatiron CLO 2006-1 Ltd.	618
NYLIM Flatiron CLO 2007-1 Ltd.	350
NYLIM High Yield CDO 2001 Ltd	250
NYLIM Stratford CDO 2001-1, Ltd	400
Nantucket CBO, Ltd	87
Nash Point CLO	-
Nassau CDO I Ltd	1,500
Natexis Banques Populaires	-
Nationwide CBO 2000-1 Ltd.	267
Nautilus RMBS CDO I Ltd	510
Nautilus RMBS CDO II Ltd	400
Nautilus RMBS CDO III Ltd	400
Nautilus RMBS CDO IV, Ltd	625

Nautilus RMBS CDO V Ltd	300
Nautique Funding Ltd	576
Navigare Funding I CLO Ltd.	300
Navigator CDO 2003, Ltd.	479
Navigator CDO 2005, Ltd.	558
Nemean CLO Ltd	613
Neptune CDO 2004-1 Ltd	388
Neptune CDO II, Ltd.	301
Neptune CDO III Ltd	406
Neptune CDO IV, Ltd.	460
NewStar Commercial Loan Trust 2006-1	456
NewStar Commercial Loan Trust 2007-1	600
Newbury Street CDO Ltd	2,000
Newcastle CDO I, Limited	444
Newcastle CDO II, Limited	500
Newcastle CDO III, Ltd.	875
Newcastle CDO IV, Limited	450
Newcastle CDO IX LLC	859
Newcastle CDO VI, Limited	500
Newcastle CDO VIII LLC	984
Newport Waves CDO	3,002
Newstar Trust 2005-1	375
Newton CDO Ltd	292
Nicholas Applegate CBO I Ltd.	462
Nob Hill CLO II Limited	401
Nomura CBO 1997-1 Ltd	351
Nomura CRE CDO 2007-2, Ltd.	875
Norse CBO Ltd.	668
North Cove CDO III	288
North Sea Island CDO I Limited	129
North Street Referenced Linked Notes 2000-1	184
North Street Referenced Linked Notes 2000-2	209
North Street Referenced Linked Notes 2001-3	160
North Street Referenced Linked Notes 2002-4	574
North Street Referenced Linked Notes 2003-5	290
North Street Referenced Linked Notes 2005-8	239
North Westerly CLO I BV	-
North Westerly CLO II B.V.	-
NorthLake CDO I Ltd.	290
Northland Funding I, LTD	400
Northstar CBO 1997-1, Ltd	322
Northstar CBO 1997-2 Ltd.	301
Northwestern Investment Management Co. CBO I Fund	392
Northwoods Capital II, Limited	438

Northwoods Capital III Ltd.	511
Northwoods Capital IV Ltd.	445
Northwoods Capital V, Limited	584
Northwoods Capital VI Limited	600
Northwoods Capital VII Limited	500
Northwoods Capital, Ltd	425
Nova CDO 2001, Ltd	300
ORYX European CLO B.V.	-
Oak Hill Credit Partners I, Limited	614
Oak Hill Credit Partners II, Limited	504
Oak Hill Credit Partners III, Limited	505
Oak Hill Credit Partners IV, Limited	658
Oak Hill European Credit Partners I PLC	-
Oak Hill European Credit Partners II PLC	-
Oasis CBO, Ltd.	587
Ocean Trails CLO I	357
Oceanview CBO I, Ltd.	41
Ocelot CDO I PLC	73
Octagon Investment Partners III, Ltd.	1,000
Octagon Investment Partners IV, Ltd.	377
Octagon Investment Partners V, Ltd	287
Octagon Investment Partners VI, Ltd.	281
Octagon Investment Partners VII, Ltd.	380
Octagon Investment Partners VIII ltd	459
Octagon Investment Partners X Ltd.	445
Octagon Investment Partners XI Ltd	512
Octans CDO I Ltd.	1,504
Octans II CDO Ltd.	1,575
Odin CDO I	328
Olympic CLO I Ltd.	307
Omega Capital Europe PLC Series 26 (Global Libert	1,068
Omega Capital Europe Plc (Global Liberte III)	676
Omega Capital Investments II PLC (Palladium CDO II	-
Omega Capital Investments PLC	-
Optimum Finance B.V.	650
Opus CDO I Ltd.	241
Orchard Park Ltd.	301
Orchid CDO LLC	238
Orchid Structured Finance CDO III, Ltd	516
Orchid Structured Finance CDO, II Ltd	301
Orient Point CDO Ltd	1,506
Orion Euro High Yield B.V.	-
Orkney Holdings, LLC	850
Overture CDO I (Ireland) Plc	-

Overture CDO I (Jersey) Ltd	520
Oxford Street Finance Limited	382
PANGAEA ABS 2007-1 B.V.	-
PASA Funding 2007 Ltd	3,017
PPM America High Grade CBO Ltd.	988
PPM America High Yield CBO I Company Ltd	589
PPM America Structured Finance CBO I Ltd	296
PPM Grayhawk CLO Ltd.	412
PREPS 2004-2	-
PREPS 2005-2	-
PREPS 2007-1 Plc	-
PRIME 2006-1 Funding Limited Partnership	-
PSION Synthetic CDO I PLC	67
PULS CDO 2006-1 PLC	-
PULS CDO 2007-1 Ltd.	-
Pacific Coast CDO Ltd.	602
Pacific Pinnacle CDO Ltd	999
Pacific Redwood CBO, Ltd.	200
Pacific Shores CDO, Ltd	701
Pacifica CDO II, Ltd	291
Pacifica CDO III Ltd.	395
Pacifica CDO IV, Ltd	320
Pacifica CDO V, Ltd	500
Pacifica CDO VI, Ltd	500
Padova Finance N.1 S.r.l.	-
Palisades CDO Ltd.	600
Pallas CDO I B.V.	-
Pallas CDO II B.V.	-
Palmer Square 2 PLC	1,979
Pam Capital Funding L.P.	1,358
Pamco Cayman Ltd.	820
Panther CDO I B.V.	-
Panther CDO II B.V.	-
Panther CDO IV B.V.	-
Panther CDO V B.V.	-
Paragon CDO Ltd	1,000
Park Mountain Capital 2002-I B.V.	-
Parthenon CSO 2001-2, PLC	-
Partholon CDO I PLC	-
Pasadena CDO Ltd.	526
Pascal CDO Ltd	164
Pembridge Square Finance Limited	-
Penta CLO 1 S.A.	-
Peritus CDO I Ltd	358

Perseus CDO I, Limited	565
Petrusse European CLO SA	-
Peverel Funding Ltd.	-
Phenix CFO Ltd	-
Phoenix CDO II Ltd.	401
Phoenix CDO Ltd.	244
Pilgrim America High Income Investments Ltd.	366
Pine Mountain CDO III Ltd.	500
Pine Mountain CDO, Ltd	381
Pinetree CDO Ltd	300
Pinnacle Point Funding II Ltd	4,341
Pioneer Valley Structured Credit CDO I Ltd	1,023
Plaza II Emerging Market CBO Ltd	253
Port Royal Synthetic CDO Ltd	85
Porter Square CDO III Ltd	400
Porticoes Funding, Ltd	367
Preferred Term Securities II, Ltd	347
Preferred Term Securities IX Ltd	533
Preferred Term Securities Ltd.	1,239
Preferred Term Securities VI, Ltd	500
Preferred Term Securities VII, Ltd	532
Preferred Term Securities VIII Limited	534
Preferred Term Securities X Ltd	581
Preferred Term Securities XI, Ltd	670
Preferred Term Securities XII, Ltd.	796
Preferred Term Securities XIII, Ltd	539
Preferred Term Securities XIV, Ltd.	504
Preferred Term Securities XIX, Ltd.	734
Preferred Term Securities XV, Ltd.	625
Preferred Term Securities XVI, Ltd	629
Preferred Term Securities XVII Ltd.	526
Preferred Term Securities XVIII, Ltd.	660
Preferred Term Securities XX, Ltd	632
Preferred Term Securities XXI, Ltd	752
Preferred Term Securities XXIII, Ltd	1,358
Preferred Term Securities XXIV Ltd	1,101
Preferred Term Securities XXV Ltd	920
Preferred Term Securities XXVI Ltd	1,009
Preferred Term Securities, XXII Ltd	1,455
Premium Emerging Managed Capital I, B.V.	155
Premium Loan Trust I Ltd	267
Preps 2005-1 Limited Partnership	-
Preps 2006-1 Plc	-
Prima Capital CDO 2005-1 LTD.	407

Prime Square CDO Ltd. Series 2006-1	50
Pro Rata Funding Ltd.	150
Prometheus Investment Funding 1, Ltd	500
Promus BV I	-
Promus BV II	-
Prospect Park CDO Ltd	435
Prospero CLO I B.V.	236
Prospero CLO II B.V.	373
Proventus European ABS CDO PLC	-
Provident CBO I Ltd.	401
Putnam CBO II, Limited	373
Putnam Structured Product CDO 2001-1, Ltd	300
Putnam Structured Product CDO 2002-1 Ltd.	1,120
Putnam Structured Product Funding 2003-1 Ltd.	561
Quadrum B.V.	-
Queen Street CDO II B.V.	-
Queen Street CLO I B.V.	-
Quicksilver Euro CBO I (Cayman), Ltd	-
RAIT Preferred Funding II, Ltd.	833
REVE SPC Dryden XVII Notes Series 2007-1	40
RFC CDO III, Ltd.	210
RFC CDO Ltd	300
RHYNO CBO 1997-1, Ltd	352
RMB CDO II Limited	400
RMF Euro CDO II S.A.	-
RMF Euro CDO III Plc	-
RMF Euro CDO IV PLC	-
RMF Euro CDO S.A.	-
RMF Euro CDO V PLC	-
RMF Four Seasons CFO Ltd.	-
ROCK 1 - CRE CDO 2006, Ltd.	500
Race Point CLO, Limited	461
Race Point II CLO, Limited	550
Race Point IV CLO Ltd	550
Rainier CBO I, Ltd	360
Rampart CLO 2006-I Ltd.	613
Redwood CBO S.A.	-
Regatta Funding Ltd	536
Regent Street Finance Limited	-
Regents Park CDO B.V.	-
Regional Diversified Funding 2005-1 Ltd.	372
Regional Diversified Funding Ltd.	364
Rendite Finance No.2 Inc.	-
Renoir CDO B.V.	-

Reservoir Funding Ltd	503
Residential Funding Corp.	300
Resonance Funding Pty Ltd. Series 2006-1	-
Resource Real Estate Funding CDO 2006-1, Ltd.	345
Restoration Funding CLO Ltd	474
Restructured Asset Backed Securities (RABS) 2003-3	130
Revelstoke CDO I Limited	1,000
Rhodium 1 B.V.	-
Ridgeway Court Funding I Ltd	2,010
Ridgeway Court Funding II, Ltd.	2,167
River North CDO Ltd.	300
Riviera Finance 1 S.A.	-
Robeco CBO I	300
Robeco CDO II Limited	411
Robeco CDO IV B.V.	-
Robeco CDO VI Limited	-
Robeco CDO VII Limited	-
Robeco CDO VIII Ltd	-
Robeco CSO III B.V	-
Rockwall CDO II Ltd.	1,032
Rosedale CLO Ltd.	315
Rosemont CLO Ltd.	325
Rosetta I SA	154
Royalton Company	430
Rubens CDO I Limited	-
Ruby Finance PLC Series 2007-3	-
Ruby Finance Plc Series 2006-5 (BISON)	-
Ruby Finance Public Limited Company	140
Rutland Rated Investment - Dryden XII IG Synthetic	105
Rutland Rated Investments	-
Rutland Rated Investments-Dryden XII IG Synthetic	5,432
S-CORE 2007-1 GmbH	-
SFA Collateralized Asset-Backed Securities II CDO	252
SFA Collateralized Asset-Backed Securities Trust	240
SKM-LibertyView CBO I Limited	313
SPA CBO Ltd.	343
SPF CDO I, Ltd.	750
SPRINT	108
STACK LTD	1,772
STARTS (Ireland) plc	-
STATIC Residential Trust 2005-A Ltd.	500
STEERS Thayer Gate CDO, Series 2006	58
SVG Diamond Private Equity PLC	-
Saar Holdings CDO, Limited	261

Sagamore CLO Ltd	300
Salt Creek High Yield CSO 2005-1 Ltd.	1,249
San Miguel CDO Limited	217
Sandelman Finance 2006-1, Ltd.	1,243
Sandelman Finance 2006-2 Ltd	763
Sandelman Partners CRE CDO I, Ltd.	507
Sands Point Funding Ltd	479
Sandstone CDO, Ltd	337
Sankaty High Yield Partners II	866
Santa Rosa CDO, Limited	300
Santiago CDO Limited	400
Saphir CDO (Ireland) PLC	-
Sapphire Valley CDO I Ltd	600
Saratoga CLO Ltd.	295
Saturn CLO Ltd	500
Saturn Ventures 2005-1, Ltd.	400
Saybrook Point CBO II, Limited	300
Saybrook Point CBO Ltd.	300
Scorpius CDO Ltd.	529
Script Securitisation Pvt Limited	1,268
Sea Fort Securities PLC	-
Segesta 2 Finance S.A.	-
Seneca CBO II, L.P.	290
Seneca CBO III Ltd.	258
Seneca CBO IV, Limited	286
Sequils Centurion Ltd	438
Sequils-Glace Bay, Ltd.	300
Sequils-Liberty, Ltd.	400
Sherwood Funding CDO II, Ltd.	476
Sherwood Funding CDO Ltd	550
Sherwood III ABS CDO Ltd	500
Shinsei Funding Master Trust	-
Shoreline Investment Grade SCDO 2002-1, Ltd	500
Sierra CLO I, Ltd	402
Sierra Madre Funding Ltd	1,497
Signature 4 Ltd.	466
Signature 5 L.P.	500
Signature 6 Ltd.	327
Signature 7 L.P.	216
Signature QSPE Limited	406
Signum Vermilion Ltd 2006-2	-
Signum Vermilion Ltd 2007-1	-
Silver Birch CLO I B.V.	-
Silver Elms CDO plc	771

Silver Leaf CFO 1 & Company SCA	269
Silverado CLO 2006-I Limited	300
Simsbury CLO Corp.	592
Sirius Finance 2000 PLC	-
Skellig Rock B.V.	-
Skybox CDO, Limited	800
Skye CLO I Limited	-
Solar Investment Grade CBO II Ltd.	408
Solar Investment Grade CBO Ltd.	467
Soloso CDO 2005-1 Ltd.	533
Soloso CDO 2007-1 Ltd	552
Solstice ABS CBO II, Ltd	450
Solstice ABS CBO III, Ltd	558
Solstice ABS CBO, Ltd	311
Somers CDO, Limited	485
Sonoma Valley 2007-2	-
Sorin CDO V Ltd	600
Sorin CDO VI Ltd	550
South Coast Funding I, Ltd	400
South Coast Funding II Ltd.	500
South Coast Funding III Limited	500
South Coast Funding IV Ltd	1,000
South Coast Funding IX Ltd	539
South Coast Funding V	1,147
South Coast Funding VI Ltd.	301
South Coast Funding VII Ltd	1,177
South Coast Funding VIII Ltd.	507
South Street CBO 1999-1	283
South Street CBO Ltd.	282
Southern Cross 2006-1	1,489
Southfork CLO Ltd	633
Southport CLO Ltd	444
Special Situations Opportunity Fund I, LLC	748
Special Value Absolute Return Fund, LLC	133
Special Value Bond Fund II, LLC	450
St. George Funding Ltd.	441
Stack 2004-1, Ltd.	300
Stanfield Arbitrage CDO Ltd	782
Stanfield Arnage CLO Ltd	605
Stanfield Bristol CLO Ltd	500
Stanfield CLO Ltd.	800
Stanfield Carrera CLO Ltd	300
Stanfield Daytona CLO, Ltd.	570
Stanfield Modena CLO Ltd	403

Stanfield Quattro CLO, Ltd.	279
Stanfield Vantage CLO Ltd	503
Stanfield Veyron CLO Ltd	500
Stanfield Victoria Finance Ltd.	30,000
Stanfield/RMF Transatlantic CDO Ltd.	750
Stanton CDO I S.A	491
Stanton MBS I PLC	302
Starts (Cayman) Limited (Maple Hill) Series 2006-3	293
Static Residential CDO 2005-B Ltd.	1,000
Static Residential CDO 2005-C Ltd	500
Static Residential CDO 2006-A Ltd	1,000
Sterlingmax I MBS Ltd	150
Stichting Eurostar CDO II	-
Stillwater ABS CDO 2006-1, Ltd	650
Stockbridge CDO Ltd	250
Stockhorn CDO, Limited	40
Stone Tower CDO II Ltd	305
Stone Tower CDO Ltd	306
Stone Tower CLO II Ltd.	300
Stone Tower CLO III Ltd	700
Stone Tower CLO IV, Ltd.	753
Stone Tower CLO Ltd	326
Stone Tower CLO V Ltd	762
Stone Tower CLO VI Ltd	1,008
Stony Hill CDO III (Strong CDO III) Ltd	255
Stony Hill CDO V Ltd.	291
Storrs CDO Ltd.	399
Straits Gloabal ABS CDO I, Ltd	-
Strata Trust, Series 2006-28	5
Streeterville ABS CDO Ltd	998
Strips CDO Ltd	421
Strips III Ltd.	745
Structured Finance Advisors ABS CDO II, Ltd	252
Structured Finance Advisors ABS CDO III, Ltd	276
Suffield CLO Limited	612
Summer Street 2005-1, Ltd.	400
Summer Street 2005-HG1, Ltd	1,100
Summit RMBS CDO I Ltd	404
Sundial 2004-1 B.V.	-
Sundial Finance Limited	-
Sunrise CDO Ltd.	285
Sutter CBO 1998-1, Ltd	28
Sutter CBO 1999-1, Ltd	265
Sutter CBO 2000-2 Ltd	328

Sutter Real Estate CBO 2000-1, Ltd	280
Sycamore CBO (Cayman) Ltd	306
Sydney Street Finance Limited	-
Symphony CLO III Ltd	410
TABERNA Perferred Funding VI Ltd	709
TABERNA Preferred Funding I Ltd.	729
TABERNA Preferred Funding II Ltd.	1,043
TABERNA Preferred Funding III Ltd.	780
TABERNA Preferred Funding V Ltd.	719
TABS 2005-2 Oakville Limited	402
TABS 2005-3 Ltd	304
TABS 2007-7 Ltd	2,316
TCW GEM VI Euro CDO S.A.	-
TCW GEM II Ltd.	352
TCW GEM IV, Limited	231
TCW GEM LIGOs Ltd.	304
TCW Global Project Fund II, Ltd.	605
TCW Global Project Fund III Ltd	1,534
TCW High Income Partners II Ltd.	186
TCW High Income Partners Ltd	352
TCW LINC III CBO Ltd.	507
TCW Select Loan Fund	556
TIAA High Yield CDO I, Limited	300
TIAA Real Estate CDO	500
TIAA Real Estate CDO 2003-1 Ltd.	300
TIAA Structured Finance CDO I, Limited	500
TIAA Structured Finance CDO II, Ltd.	301
TPref Funding I Ltd	682
TSAR 16	150
TSAR 18	977
Taberna Europe CDO I PLC	-
Taberna Preferred Funding VII	545
Tabs 2005-4, Ltd	402
Tagus Global Bond Securitisation No.1, PLC	-
Tagus Global Bond Securitisation No.2, PLC	-
Talcott Notch CBO I Ltd	277
Talon Funding Ltd.	500
Tara Hill B.V.	-
Tazlina Funding CDO I Ltd	1,497
Tempo CDO 1 Limited	-
Tenzing CFO, S.A	140
Theseus European CLO S.A.	331
Thunderbird Investments PLC	33
Tierra Alta Funding I, Ltd	390

Titanium CBO I, Limited	500
Topanga CDO II Ltd	1,015
Toro ABS CDO I Ltd	1,011
Toro ABS CDO II, Ltd.	1,000
Tourmaline CDO I Ltd.	1,263
Trabuco CDO Limited	121
Trainer Wortham First Republic CBO II, Limited	354
Trainer Wortham First Republic CBO III, Ltd	304
Trainer Wortham First Republic CBO IV, Limited	264
Trainer Wortham First Republic CBO V Ltd	354
Trapeza CDO I, LLC	337
Trapeza CDO II, LLC	412
Trapeza CDO III, LLC	290
Trapeza CDO IV, LLC	412
Trapeza CDO V, Ltd.	322
Trapeza CDO VI	362
Trapeza CDO VII, Ltd.	356
Trapeza CDO X Ltd	528
Trapeza CDO XI Ltd	509
Trapeza CDO XII, Ltd.	537
Trapeza Edge CDO, Ltd.	367
Travelers Funding Limited	413
Tremonia CDO 2005-1 PLC	1,000
Triaxx Prime CDO 2006-1, Ltd.	2,667
Triaxx Prime CDO 2006-2, Ltd.	5,000
Tricadia CDO 2003-1 Ltd	237
Tricadia CDO 2004-2, Ltd.	210
Tricadia CDO 2005-3, Ltd	259
Tricadia CDO 2005-4 Ltd.	260
Tricadia CDO 2006-5, Ltd	172
Trimaran CLO V Ltd	300
Trimaran CLO VI Ltd	308
Trimaran CLO VII Ltd.	492
Trinity CDO, Ltd.	303
Triplas Series II Synthetic CDO Limited	-
Triplas Synthetic CDO S.A.	-
Triton CBO III, Ltd.	750
Triton CDO IV, Ltd	252
Tropic CDO II Ltd	657
Tropic CDO IV Ltd	319
Tryon CLO Ltd. 2000-1	500
Tuscany CDO, Ltd.	898
U.S. Capital Funding I Ltd	210
U.S. Capital Funding II Ltd	349

U.S. Capital Funding III Ltd	239
U.S. Capital Funding IV Ltd	342
U.S. Capital Funding V Ltd	362
U.S. Capital Funding VI, Limited	611
UBS Brinson CBO Limited	239
UNION SQUARE CDO Ltd.	400
US Onyx III AAA Cloverie PLC - Series 2005-04	1,000
US Onyx XII - Cloverie PLC Series 2005-45	100
Unknown	104
Upper Thames, S.A.	-
Utliberg Limited	115
Valeo Investment Grade CDO II Ltd	504
Valeo Investment Grade CDO III Ltd	503
Valeo Investment Grade CDO Ltd.	479
Vallauris CLO PLC	-
Vallauris II CLO PLC	-
Valleriite CDO I PLC	456
Van Kampen CLO I, Ltd.	1,130
Van Kampen CLO II Ltd.	559
Velocity CLO Ltd	311
Venture CDO 2002, Ltd	300
Venture II CDO 2002, Limited	226
Venture III CDO Limited	375
Venture IV CDO Ltd.	500
Venture VI CDO Limited	400
Venture VII CDO Limited	733
Venture VIII CDO Limited	850
Verde CDO, Ltd.	1,008
Verdi Synthetic Public Limited Company	-
Veritas CLO I, Ltd.	308
Veritas CLO II, Ltd	334
Vermeer Funding, Ltd	354
Versailles CLO M.E. I PLC	-
Vertical ABS CDO 2005-1	463
Vertical CDO 2004-1 Ltd	67
Victoria Falls CLO	300
Vintage Capital SA	-
Vista Leveraged Income Fund	250
Vitesse CLO, Ltd	621
WG Horizons CLO I	400
Wachovia CRE CDO 2006-1	1,300
Wadsworth CDO Ltd	1,200
Watchtower CLO I PLC	761
Wave 2007-2	3,000

Waveland-Ingots Ltd.	350
West Coast Funding I Ltd	2,700
Westchester CLO Ltd	1,000
Westways Funding VI, Ltd.	300
Westways Funding VII, Ltd.	200
Westways Funding X, Ltd.	632
Westwood CDO I Ltd.	464
Whately CDO I, Ltd.	400
White Marlin CDO 2007-1, Ltd.	1,200
WhiteHorse I Ltd.	179
WhiteHorse II Ltd.	318
Whitney CLO I Ltd	432
Whitney Private Debt Fund, L.P.	322
Wilbraham CBO Ltd	363
William Street Funding Corporation	1,800
William Street Funding Corporation 2003-1,2	3,000
William Street Funding Corporation Series 2004-1&2	825
William Street Funding Corporation Series 2005-1&2	1,000
William Street Funding Corporation Series 2006-1&2	2,000
William Street Funding Corporation Series 2006-3&4	1,000
Wind River CLO I Ltd.	512
Wind River CLO II Ltd.	577

Appendix 2

Hedge Funds Listing

Abante Capital
Abria Financial Group
Absolute Value Capital Management
Adage Capital Management
Adam Smith Arbitrage and Venture Capital Hedge Fund
Adelphi Management
Advent Capital Management
Advocate Asset Management
Aequilibirum Investments
Alliance Capital Management
Alpha Equity Management
American Express Asset Management
Anchorage Capital Group
Angelo, Gordon & Co.
Appaloosa Management
Appleton Capital Management
AQR Capital Management
Ardsley Partners
Argent Financial Group (Bermuda)
Arlington Capital Management
Around-the-Clock Trading and Capital Management
Arsago Alternative Capital Management
ARX Capital
ADM Capital
Aspect Capital
Asset Alliance
Aster-X Capital Management
Astin Capital Management
Atlanta M&A Advisors
Atlantic Investment Management
Atticus Capital
Aviator Fund Management
Aventine Investment Management
Avenue Capital Group
Babson Capital Management
Bain Capital
Balyasny Asset Management
Barclays Global Investors
Barep Asset Management
Baupost Group
BBT
Bedford Oak Partners
Benchmark Funds
Bessent Capital
BKF Asset Management

BlackRock
Blue Ridge Capital
BlueCrest Capital Management
Blum Capital Partners
BNP Paribas Asset Management

BNY Asset Management
Braddock Financial
Brencourt Advisors
Brevan Howard Asset Management
Bridgewater Associates
Brookside Capital
Brummer & Partners Kapitalforvaltning
Camelot Management
Campbell & Co.
Cantillon Capital Management
Cardinal Fund Management
Carlson Capital
Cartesian Capital Partners
Catrock Capital Management
Caxton Associates
Cerberus Capital Management
Chapman Capital
Chelsey Capital
Cheyne Capital Management
Chilton Investment Company
Citadel Investment Group
Clareville Capital
Clinton Group
Coast Asset Management
Cobalt Capital Management
Context Capital Management
Convexity Capital
CooperNeff - BNP Paribas
Copper River
Corymb Capital
CQS Management
CPR Alternative Asset Management
Crescendo Partners
Davidson Kempner Partners
DB Absolute Return Strategies
D.E. Shaw & Co.
Deephaven Capital Management
Derivative Consulting Group
Dexia Asset Management
DKR Capital
Dingo Capital
Duquesne Capital Management
Eastbourne
Eco-Vest Advisors
Efessiou Group
Egerton Capital
EGM Capital
Elliott Management
Emergent Asset Management
Emerging Value Asset Management
Eminence Capital

EN Benten Asset Management
EnTrust Capital
Equinox Management Partners
ESL Investments
Eton Park Capital Management
Exis Capital
Fairfield Greenwich Group
Farallon Capital Management
Feinburg Management
FGS Capital
Fiducia Asset Management
Fir Tree Partners
Fortress Investment Group
Fortune Asset Management
Framework Investment Group
FrontPoint Partners
FX Concepts
Gabelli Asset Management
Galena Asset Management
Galleon Group
Ganimede
GAP Asset Management
Gavea Investimentos
Glazer Capital Management
GLG Partners
Glenview Capital Management
Global Partners Asset Management
GMO
GoldenPeaks Capital Partners
Goldman Sachs Asset Management
Graham Capital Management
Greenlight Capital
GSB Hedge Fund
GSC Group
Guertin Capital Management
Halcyon Asset Management
Hanseatic
Harch Capital Management
Harman Stoller Capital Partners
HBK Investments
Headstream Asset Management
HFR Asset Management
Highbridge Capital Management
Highfields Capital Management
HighYieldReturn.com
Hillsdale Investment Management
Husic Capital Management
Hygrove Partners
III Offshore Advisors
Indus Capital
Intergrated Asset Management

Intrepid Capital Management
iPerform Hedge Funds
J.P. Morgan Europe
J O Hambro Capital Management
Joho Capital
Jordan Asset Management
JWM Partners
K Capital Partners
KBC Alternative Investment Management
Kevin Teeple Management
King Street Capital Management
Kingate Management
Kingdon Capital Management
KingsGate Capital Management
Lancer Group
Lansdowne Partners
Lazard Asset Management
Leeward Hedge Funds
LibertyView Capital Management
Lindsell Train
Lone Pine Capital
Magnetar Capital
Man Investments
Marathon Asset Management
Mariner Investment Group
Marshall Wace Asset Management
MatlinPatterson Asset Management
Matthes Capital Management
Maven Capital Management
Maverick Capital
Mellon HBV Alternative Strategies
Merlin BioMed Group
Merrill Lynch Investment Managers
Midsummer Capital
Millennium International Management
Mondiale Asset Management
Moore Capital Management
Mortar Rock Capital Management
New Star Asset Management
Nextra Alternative Investments
North Capital
Oaktree Capital Management
Och-Ziff Capital Management Group
Octagon Asset Management
Odey Asset Management
Okumus Capital
Old Lane
Olympia Capital Management
Olympus Capital Management
Omega Advisors
Optima Fund Management

Option Strategist Asset Management
Orca Funds
Orbis Investment Management
Ore Hill Partners
Ostia Capital Management
P. Schoenfeld Asset Management
Pacific Income Fund
Park Place Capital
Parker Global Strategies
Paulson & Co. P.A.W. Capital Partners
PD Capital Management
Pembridge Capital Management
Pendulum Capital
Pequot Capital Management
Percipio Capital Management
Perry Capital Management
Pershing Square Capital Management
PH Chapman
Pinnacle Investments of America
Pirate Capital
Platinum Grove Asset Management
Prospero Capital Management
Provident Advisors
Quadriga
Quantitative Financial Strategies
Quest Partners
Quintium Capital Management
QVT Financial
RAB Capital
Ramius Capital Group
Ranger Capital Group
Regiment Capital Advisors
Renaissance Technologies
Resolute Capital Growth Fund
Rocker Partners
RR Capital Management
Rreef Alternative Investments
Rubicon Capital Advisors
Rubicon Fund Management
SAC Capital Advisors
San Francisco Capital Management
San Francisco Sentry Investment Group
Sandell Asset Management
Santa Monica Partners
Satellite Asset Management
Schindler Trading
Shaker Investments
Silver Point Capital
Soros Fund Management
Sowood Capital Management
Spinnaker Capital Group

Standard Asset Management
Standard Pacific Capital
Stark Investments
Staro Asset Management
State Street Global Advisors
Steel Partners
Sterling Stamos
Strategic Fixed Income
Symphony Asset Management
Swiss Polish Asset Management
Systeia Capital Management
T2 Partners Management
Tatica Asset Management
Tewksbury Capital Management
Thesis Capital Management
Third Point Management
Tontine Associates
Trafalgar Capital Management
Trian Fund Management
Tritone Capital Management
Trove Partners
Tudor Investment
UBS Alternatives & Quanititative Investments
Value Partners
Vardon Capital Management
Vega Asset Management
Vertex One Asset Management
Viking Capital
Viking Global Investors
Vision International Funds
Voltaire Asset Management
Watershed Asset Management
WG Trading Co.
Wanger Asset Management
Ward Ferry Management
Wayzata Capital Management
Weiss, Peck, Greer
Wellington Management
Weston Capital Management
York Capital Management
Zander Capital Management
Zurich Capital Markets
Zweig-DiMenna Associates