

The Story of a Credit Crisis

As the credit markets, and the country itself, faces what is arguably the greatest economic crisis since the Great Depression, the clients of financial planners (and often the planners themselves) struggle to understand what happened, and how we got to the point at which we now find ourselves.

The purpose of this month's newsletter is to explain what has unfolded over the past several years, and how it has evolved into the crisis we face today. In the process, we will explore and understand the veritable alphabet soup created by Wall Street in recent years, how the troubles of Main Street have translated into magnified problems for Wall Street, and some of the financial and economic risks if Wall Street's difficulties don't get resolved before they revert to Main Street again. For my especially finance-oriented readers, you may note that in a few places, I have simplified the complicated technical details a bit to focus on the underlying concept and the fundamental point of the investment structure or problem; I hope that you won't hold it against me.

This will not be a pretty story, but we cannot address the challenges we face without understand the path that got us here. With that, let us begin...

About the Author

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It Started With Subprime...

As you have no doubt heard by now, the troubles in the U.S. financial system started with subprime. But to understand why subprime became the issue it did, we must step back a few years earlier, into the heyday of subprime mortgage lending during the housing boom.

The key to maximize mortgage lending, or really any lending, is to get access to capital that wants to do the lending. The challenge for lending in the subprime market, in particular, is that – as most investors know – it is a high risk market. Consequently, if you want to attract lending into the subprime market, you have to offer a higher interest rate to entice the investor. As a borrower, that means you face a higher interest rate.

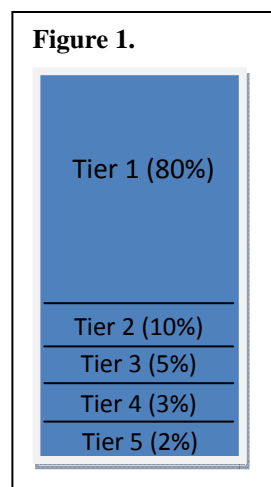
For many years, this was the natural balance to the system. Banks – often local or regional – would do the lending to borrowers in their area, and would carefully analyze the risks of (i.e., underwrite) the loan and charge an appropriate(ly high) interest rate. Since the bank was lending its own capital, it had a vested interest in ensuring that the loan itself was sound. After all, it could mark up a higher interest rate to compensate it for the risk, but if it misjudged the risk overall and experienced higher losses than anticipated, the excess interest rate might not make up for the loss of principal. This would result in a relative (or absolute) loss for the bank, especially when compared to other lending opportunities for which it might deploy its capital.

At the same time that local bank lending was occurring as usual, investors both nationally and globally were demanding more yield and investment opportunities, in a world that was awash with available capital to invest, and an ultra low yield environment into which it was being invested. Certainly, subprime mortgages were an investment option, but it just wasn't feasible for large institutional investors to lend money one individual at a time. However, Wall Street investment banks had a solution to the investment problem – one that had been used before in other contexts as well – and offered investors the chance to invest into a pool of subprime mortgages. This way, the mortgages could be packaged

together by the lender and Wall Street, securitized into an investment offering for institutional money (a process out of which the investment bank would receive a cut, as compensation for packaging the deal), and the investors could buy the pool of mortgages with greater ease, and some implicit diversification value as well.

Unfortunately, though, subprime mortgages still had limited appeal. After all, even a *pool* of subprime mortgages was still pretty risky – so risky in fact, that if you had to share in the losses of the pool, the risks and the magnitude of the potential loss were high enough that the subprime mortgages still wouldn't merit a favorable investment grade (BBB or better) rating from a rating agency, and/or would simply still be too risky for the portfolio. Of course, this risk of loss was predicated on a pool of mortgages where everyone shares equally in the losses. So the investment banks came up with an alternative solution – what if the losses weren't shared evenly, but instead were borne sequentially through a series of tranches/tiers?

Thus was born the various tranches of a Residential Mortgage-Backed Security (RMBS) – the first of our alphabet soup of investment vehicles and structures. With an RMBS, investors agreed that they would not share equally in the losses of the underlying (subprime) mortgages. Instead, investors would be paid out one tranche at a time, according to the structure shown in Figure 1 below.



foremost by the individuals who purchased Tier 5 (which, for a subprime mortgage, was appropriately viewed as being extremely risky). (Some RMBSs had more than 5 tiers, but the fundamental structure was the same.)

With the tiered RMBS structure, no investor would receive any return of principal in Tier 2 until all of the Tier 1 investors had been paid back. Likewise, no investor in Tier 3 could receive back their principal until Tiers 1 and 2 had been paid, and so forth down the line. Thus, principal was paid from the top down, which effectively means that all the losses were borne from the bottom up, first and

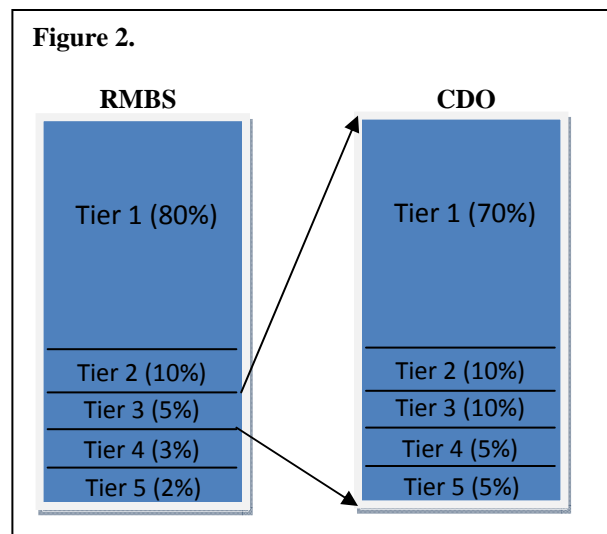
As a result of this ordering to the payments into the RMBS, suddenly a large portion of subprime investors were actually quite “safe”. A Tier 1 investor didn't face any risk of losing principal until and unless all of the Tier 2, 3, 4, and 5 investors had already lost all of their principal. For example, let's assume that 15% of the subprime borrowers actually defaulted, and the investor was only able to recover 75% of the mortgage loan by foreclosing on the property (a 25% loss of principal). According to the structure above, this would mean that the overall RMBS security would experience a loss of 3.75% (losing 25% of the value on 15% of the mortgages), which would be borne entirely by the Tier 5 and Tier 4 investors (where the former would lose all of their principal, and the latter a significant portion, although both may have received some interest payments in the meantime). Because over 96% of the principal would be remaining, the Tier 1, 2, and 3 investors would still receive 100% of their principal back – and that's even though 15% of the mortgages had 25% losses!

Consequently, Tier 1 investments received an AAA rating from the ratings agencies. After all, it would take incredibly significant default and loss rates on the mortgages in the pool for those investors to face any principal risk. Tier 2 segments of the RMBS weren't quite as safe, and depending on the details of the RMBS might also face short-term cash flow risks if interest payments were late, but nonetheless were still “pretty” safe, often receiving an A or AA rating. By the time you reached Tier 3, you might be down to a BBB rating, as investment risk became a more significant, but a security with a BBB rating still has investment grade rating (and the tier percentages would often be set to ensure that it would receive a BBB investment grade rating). The 4th tier, clearly well into the risk zone now, would receive a “junk” bond rating, and Tier 5 was appropriately viewed as being extremely risky. After all, for Tier 5, it was likely just a question of how many interest payments would be received before the first few defaults and losses occurred that wiped out some or all of the tranche (and consequently, Tier 5 debt was *extremely* cheap with an incredibly high yield, as the investor's eventual principal loss was often only a matter of time).

Not surprisingly, this new structure was incredibly well-received by investors. It represented an opportunity for investment banks to gather capital for funding a large volume of subprime loans, while still bringing AAA-rated debt securities to most of their interested investors. For investors that wanted an even higher yield, they could buy a lower tier, purchasing at the exact level of desired risk that fit their portfolio needs.

As the demand poured in, investment banks were faced with the “challenge” of finding borrowers that wanted to receive the available investment capital! As a result, the nature of mortgage lending began to shift. Mortgage brokers, who had access to capital from Wall Street that they could lend by brokering a mortgage deal, were paid to get the deal through underwriting and done. Investors, comforted by the agency-provided rating on the RMBS tranche, didn’t have to worry about underwriting anymore – a notable contrast to the traditional process, where the lender who provides capital would carefully evaluate the loan, the borrower, and the risks, for their own protection. As a result – and as we’ve seen from the stories of the past several years – underwriting standards relaxed dramatically. Appraisals became “sloppy” at best, and nearly fraudulent at worst. Less scrupulous mortgage brokers were attracted to the industry, with the appeal of being able to broker deals quickly for a high income, effectively getting paid for lending someone else’s money without any personal risk if the loan turned out badly in the future.

However, the investment banks found that not all of the tiers could be effectively distributed to investors. In particular, the BBB Tier 3 couldn’t be sold as effectively, given its placement “on the line” between investment grade and junk bond status. In order to make the debt in Tier 3 more palatable to investors, the investment banks simply replicated the process used to create the RMBS in the first place – breaking Tier 3 itself into a standalone mortgage-backed security, with tranches to determine the order of payments. This new mortgage security was called a Collateralized Debt Obligation (CDO). Figure 2 below shows the typical structure of a CDO.



With a CDO security, the process was repeated again, and this narrower subset of mortgages was once again broken into a series of tranches with ordered payments. Given that there was originally only limited risk to the Tier 3 tranche, once again the rating agencies affirmed that the top levels of the new CDO security would receive a high rating, as they received the first payments back within the tranche. For instance, in the earlier example, we saw that if 15% of the mortgages defaulted with a 25% loss on each loan, the total losses would be 3.75%, causing a total loss to the Tier 5 investors, a significant loss to the Tier 4 investors, and no losses to the top 3 tiers. On the other hand, if an extremely unfavorable result occurred, and the borrowers actually had a 25% default rate with a 25% loss on each loan, the total losses to the pool would be 6.25%. In this case, the Tier 4 and 5 investors would receive nothing. The remaining 1.25% of losses would be allocated to Tier 3 – and under the original RMBS structure, would have resulted in a 25% loss (which would be 1.25% of the total 5% in Tier 3). However, with the losses allocated to the CDO, once again the 25% loss is allocated up the tier structure, resulting in a total loss for tiers 5, 4, and 3, and only a partial loss to tier 2. The lion’s share of the CDO investors, safely in Tier 1, would still experience no losses, even with a “catastrophic” event like 25% defaults with a 25% loss per defaulted loan. (It’s important to note that the percentage allocations to these tiers, while somewhat representative of many RMBS and CDO securities, is just an example; in reality the percentage allocations to various Tiers, and the detailed terms associated with them, could vary from one security to another.)

For those of you who have heard discussions of how Wall Street “turned lead into gold” – this is where it occurred. Suddenly, 70% of a pool of BBB RMBS securities were turned into AAA investments (and to further diversify the risk, typically a CDO pool would be made up of the BBB tiers of *multiple* RMBS securities). Of course, the risk for the lower tiers of the CDO were incredibly risky – in fact, the bottom tranche of a CDO was often called the “toxic waste”, as it represented the worst pool (and first potential losses) amongst all of the RMBS BBB tranches that were gathered together. But the majority of the CDO pool allowed the investment banks to create a subset of AAA securities out of a pool of BBB securities, by ordering the tranche payments to ensure that the investors who purchased the top tier would be paid first. And in point of fact, this tiering of tranches was so effective, a limited number of “CDO-squared” securities were created – where once again, the investment banks took the Tier 3 pools from a number of CDOs, to establish

yet another diversified pool of mortgages, with tranche payments to make higher-rated tiers available to investors. Remarkably, this means the top tier owner of a CDO-squared security was simply receiving the top payments from a pool of BBB CDO tranches, which in turn came from a pool of BBB RMBS tranches – yet the ordering of the payments still allowed the top tiers to secure higher ratings, making them more palatable to investors and attracting more investment capital.

Investors Hunger For More...

The securitized tranche structure became so appealing as a method to give investors exposure to more desirable yields while providing a “controlled” environment to select the precise level of desired risk, that such structures spread beyond just subprime mortgages, and in fact beyond all Residential Mortgage-Backed Securities. By the peak of the credit markets in late 2006, similar securities existed for a broad range of ‘asset-backed securities’ (ABS), ranging from securitized tranche pools of various mortgages, student loans, and credit cards, as well as repackaged forms of other types of loans (e.g., Collateralized Loan Obligations, or CLOs, used to help provide the funding for many leveraged buyouts, and mergers & acquisitions, during the bull market).

Not only did investor demand (and the desire of the investment banks to sell them something) lead to the creation of a broad range of securitized pools of assets for investors to purchase. The availability of capital also meant that some investors found it even more desirable to borrow money, simply to buy more of the securitized investments. Most notably, this included many hedge funds that borrowed money to invest with leveraged into these pools (often with leverage of 10:1, 15:1, or even as high as 30:1). In light of the upward sloping yield curve (lower short-term rates and higher long-term rates), hedge funds could borrow shorter-term money at low

rates, and then invest in various securitized pools with a higher return. This provided the opportunity to “earn the spread” with leverage, creating incredible investment returns – all viewed as extremely safe, since the primary investments were all AAA-rated securities!

In fact, the opportunity for “safe” leverage in the world of securitized investments led to the creation of the Structured Investment Vehicle (SIV; we can add that to the alphabet list, including RMBS, CDO, and ABS!). The idea of the SIV was fairly straightforward – create a standalone investment vehicle that would borrow money, and use it to invest in (generally AAA rated) asset-backed securities of various types. Given the investment environment at the time – with very low short-term interest rates – this generally meant that the ‘optimal’ structure was to borrow money in the commercial paper market. Notably, commercial paper is generally very short-term (tying into the low interest rate end of the yield curve), so the SIV would be required to regularly refinance its commercial paper as it expired, into a new round of commercial paper. But since the world was awash with capital, and most of the securities in the SIV were AAA-rated, this was not a problem, and the interest rates that many SIVs paid on their commercial paper debt were just barely above the London Inter-Bank Offering Rate (LIBOR). The leverage available with the SIV structure, along with many years of a significant gap between short-term commercial paper rates (the cost to borrow) and the yields on even AAA-rated longer-term ABSs of various sorts, allowed SIV investors to earn very substantial

returns (not unlike the hedge funds that took on similar leverage), as the leverage magnified the size of the income spread between borrowing cost and investment yield.

The Times Are Booming...

The booming times for earning generous AAA-rated yields through the top tranches of various ABSs attracted a great deal of capital. Institutional investors plowed money into leveraged hedge funds, SIVs, and made their own direct investments in ABSs.

Out and About

- Michael will be moderating “The Value and Stewardship of Using Variable Annuities Vs. Mutual Funds” – a debate between Harold Evensky and John Huggard – at the FPA Annual Convention in Boston on October 6th

- Michael will be speaking on “Safe Withdrawal Rates” for the IMCA Advanced Wealth Management Conference on October 27th.

- Michael will also be presenting at the NAPFA Northeastion Regional Conference on November 13th on “Rethinking Risk Tolerance” and other topics.

Interested in booking Michael for your own conference or live training event? Contact him directly at speaking@kitces.com, or see his list of available presentations at www.kitces.com/presentations.php.

The flow of capital in turn served to help keep rates themselves down, which meant continued affordability for individuals who wanted to borrow, and capital available for mortgage brokers to find deals and earn their own compensation. The flow of lending capital was so significant, the investment gurus at PIMCO, notably Bill Gross and Paul McCulley, dubbed this the “shadow banking” system – a tremendous amount of capital that was funding the lending as a bank might, but operating entirely outside of the regulatory scope of the banking system, and without the transparency to clarify how much money was where, who was lending to what, and ultimately (as we will see later) where the risks might be.

The decoupling of lenders from the underwriting process, and the incredibly depth of available capital in the shadow banking system, led to the borrowing and buying boom/bubble (of which we are now aware, at least in retrospect). The low interest cost for borrowers, combined with lax underwriting, made it easy to purchase investments – particularly real estate – and in the style of a classic bubble, the demand led to higher prices, which in turn led to more demand on the expectation that the sheer passage of time alone would entitle the real estate purchaser to re-sell (i.e., flip) the property for a sizable return. The inherent leverage of borrowing to purchase real estate for a fast turnaround led to incredible leveraged returns on the equity the borrower invested (and in many cases the borrower’s equity into the deal was virtually \$0 with no-downpayment loans!), and the hunger of individuals to buy more real estate for more leveraged returns in turn continued to fuel even higher prices.

In the process of creating a bubble-like upwards price spiral in real estate prices, though, the houses themselves became less affordable, particularly for those who actually were purchasing a property to live in (and not solely for a short turnaround investment). For a while, the solution to this was for many to buy increasingly “exotic” mortgages, including adjustable-rate mortgages (ARMs) with short terms before the first reset (which were of little concern at the time, as the borrower was expected to simply refinance before the interest rate increase occurred), mortgages with “teaser” rates that increased significantly after the first year or two (again, anticipated to be refinanced anyway), or other types of “option-ARM” loans that allowed other forms of payment modifications (e.g., negative amortization loans with ultra-low payments allowed in the early years). Thanks to institutional investor demand for various ABS tranches, these loans could be packaged together into securitized pools that were still appealing to investors, allowing borrowers

to continue receiving favorable terms. These exotic loans were also more appealing to those who were buying real estate as an investment, as the reduced early-year cash flow requirements for the real estate buyer simply meant that less personal investment was needed during the time a property was held (i.e., there was less of a “carrying cost” after the purchase, before the property had been flipped for a quick sale). And with reduced underwriting standards, an astonishing number of loans (at least in retrospect) were written in an incredibly lax manner, including such borrowing programs as “stated income” loans – originally designed to provide a borrowing alternative for those whose tax and personal information were so complex that it was easier to simply borrow based on ‘stated’ income – that became so open and flexible in the underwriting process that they were eventually dubbed “liar loans” because of the outright (and often unverified) lies that borrowers told to get access to the loan to buy real estate.

As the early generation of aggressive loans reached the point where their terms were “resetting” (e.g., 1- and 3-year ARM resets), particularly for those who had taken the loans with the intention of moving into the property and thus had been holding the property (and the loan) for a few years, suddenly there were a few more sellers. In addition, as real estate prices continued to increase – becoming less and less affordable for many buyers – the number of buyers began to decrease. Eventually, a significant portion of the real estate buyers themselves were only investors who sought to re-sell the properties they purchased, to other short-term buyers. The reduction in the demand of house purchases slowed the rate of growth in real estate prices, until the real estate market ultimately peaked in 2006 and began its slow decline, suddenly revealing some problems with the elaborate financing structures that had fueled much of the growth in the first place.

The Music Stops...

As the price of real estate peaked and began to decline, and some early purchasers began to sell their properties and/or were foreclosed on (particularly of the ARM loans that were resetting in 2006 and early 2007 at much higher rates than they were originally acquired around 2003 and 2004), cracks began to appear in the system. Remember from our earlier examples, that many hedge funds and SIVs were purchasing all forms of ABS with very high leverage. As a result, even modest declines in value, or a small number of loan defaults, could result in very significant losses to the investor. For investors who thought “their tier was safe”, *any* losses might come as a

“surprise”, and with significant leverage could quickly cause problems. Unfortunately, this is exactly what happened.

To understand why the problems began to accumulate so quickly, think back to the CDO structure that was shown in Figure 2. As we had discussed earlier, if an investor didn’t anticipate that the defaults would even reach Tier 3, there appeared to be little risk. And in point of fact, many projections by the rating agencies for analyzing the risk of various CDOs were predicated on default rates as low as 1% for some types of loans – assumptions like this account for how so many of the securities in the RMBSs, and in the CDOs derived from it, could be rated as AAA. Furthermore, in an environment where home prices were appreciating, even if the defaults began, your investment wasn’t necessarily at risk. If the loans defaulted after the homes had already appreciated in value, even a partial recovery could still secure your principal – for example, if a foreclosure recovered only 80% of the home’s value, but the home had already appreciated from \$200,000 to \$275,000, then a 20% loss would still recover \$220,000 of principal, leaving more than enough money to pay off the original \$200,000 loan. Unfortunately, though, many investors, the investment banks, and the rating agencies themselves (which often used the data provided by the investment banks to “calculate” the appropriate ratings), assumed either slow appreciation, or fast appreciation, when considering the risk. In other words, the possibility of real estate price *declines* weren’t even factored into the ratings evaluation – after all, these were (generally) diversified pools of mortgages, and the U.S. had not experienced a nationwide decline in home prices for over 7 decades!

Unfortunately, though, the assumptions used in the ratings didn’t hold, at all. Defaults suddenly began to occur, at rates much higher than anticipated, and real estate (at least in certain local areas) began to decline. As a result, RMBS tiers, and especially CDO tiers, that had been AAA rated and considered virtually sacrosanct, suddenly began to fear the specter of losses, and a few actually began to experience mild losses. Moreover, for investment vehicles like CDOs, the original pool of mortgages had been split so delicately that relatively mild shifts in the overall defaults of the mortgages in the original RMBSs could produce devastating losses for CDO (and especially CDO-squared) investors.

For example, let’s imagine that 20% of the mortgages default, with a 25% loss rate. These defaults result in

total losses in the RMBS of 5%, which means that Tiers 4 and 5 of the RMBS lose out completely, but there are no losses in the CDO. Now, look at what happens if instead of a 25% loss rate on the 20% of mortgages that fail, it’s actually a 27% loss rate. This is a remarkably modest difference in losses – across the entire RMBS structure, it means the aggregate losses are 5.4% instead of 5%. However, for the CDO, the losses are more significant – the extra 0.4% of total losses represents a loss of 8% of the entire CDO (because it’s a 0.4% loss on the total of 5% of RMBS attributable to this CDO). With an 8% loss on the CDO, the entire Tier 5 investment is wiped out, as is 2/3rds of the Tier 4! Just a tiny difference in the losses on the defaults becomes magnified dramatically for a particular few tiers of the CDO!

Fortunately, this isn’t necessarily catastrophic yet. Certainly, the Tier 4 and 5 investors have been devastated, but those were already typically rated as highly speculative, especially Tier 5. But what happens if we continue our prior scenario, but now instead of having 20% defaults with a 27% loss rate, we increase slightly further, and have a 22% default with a 29% loss rate. At this point, the total losses for our RMBS add up to 6.38%, of which 1.38% is allocated to the Tier 3(s) that created a CDO. But given that Tier 3 was only 5% in total size to begin with, a 1.38% loss allocation means that investors in the Tier-3-based CDO will lose 27.6% of their investment! And thanks to the CDO tier structure, 27.6% of losses means that we don’t only lose the speculative Tiers 4 and 5! We experience a total loss on the *investment grade* Tier 3! And the losses on Tiers 5, 4, and 3 still don’t absorb all of the losses for the CDO! The loss wipes out 7.6% of the 10% allocated to Tier 2. This is a 76% loss, on what had been a AA-rated security! And what happens if the numbers get a little worse still, and we have a 25% default with a 30% loss rate? Now the investors in Tiers 2 through 5 all lose their entire investment, and Tier 1 experiences a 28.6% loss! On a AAA-rated security!

It is important to reflect once more on how the losses magnified here. Experiencing 20% defaults with a 25% loss rate preserved 100% of the CDO. Experiencing 25% defaults with a 30% loss rate destroyed the entire principal for Tiers 2 through 5 of the CDO, and brought a similarly catastrophic 28.6% loss to a AAA-rated CDO tranche!

As mentioned earlier, the size of the Tiers in these examples is for illustrative purposes only, and particular RMBS and CDO securities may have had different levels, and/or had ratings assigned differently. But the fundamental point remains – a difference of only 5% in

the default rate and 5% in the loss rate could be the difference between a CDO that remained 100% intact, and a CDO that experienced total losses to well-rated securities and catastrophic losses to AAA-rated securities. In an environment where many of the ratings were established based on default rates as low as 1%, and an assumption that national home prices would never actually decline, it is easy to see how securities previously viewed as ultra-safe AAA investments suddenly became toxic.

In point of fact, dangerous losses at important CDO (and CDO-squared) tiers was exactly what began to happen by the spring of 2007, as real estate began local and ultimately national scale price declines. As we've seen from this recent example, even modest shifts in the default and loss recovery rates could result in a catastrophic loss for a particular CDO tranche. Moreover, as mentioned earlier, many SIVs and hedge funds bought these securities with leverage as high as 10:1, 15:1, or even 30:1. In an environment where a 5%-10% loss could cause the entire SIV or hedge fund to default, it is not difficult to imagine why many began to experience financial problems, even if such investment vehicles were otherwise "well diversified".

What Happened To All The Mortgage Companies...

As it suddenly became clear that many mortgages had far more risk than was originally anticipated, investors suddenly began to demand higher returns to keep financing additional mortgages. As the purchases of mortgages are essentially like buying one giant bond, the only way to achieve a higher return (current yield) is to demand a lower price for the bond.

Unfortunately, this shift in demand was catastrophic to a large number of mortgage companies. As discussed earlier, many mortgage companies were not directly lending their own bank funds anymore. Instead, they made loans that were intended to be immediately packaged and re-sold on Wall Street as various forms of RMBSs and CDOs. Consequently, most mortgage companies actually operated with very little of their own capital at all; instead, they functioned by maintaining open lines of credit (with many of the same investment banks that also facilitated the sales of the RMBS and CDO securities) and used those to facilitate their lending. For instance, if the mortgage company brokered \$100 million worth of loans, it would tap \$100 million of its credit line to give the

cash to the borrowers. Once the full \$100 million of loans had been completed, the loans could be packaged together into an RMBS security, and would be resold on Wall Street. With investor demand, the mortgage lender might be able to sell the package of loans, in various tranches, for a total of \$101 million, allowing them to pay off the \$100 million credit line, pocket \$1 million of profits, and then begin the process anew.

But when investors suddenly began to insist on paying less for the securitized mortgages – especially for the subprime loans – the mortgage companies were immediately faced with a severe problem. In many cases, they discovered that when they loaned out \$100 million worth of funds, that by the time they were packaged, securitized, sold to investors, and everyone had taken their cut, that the company was only receiving proceeds of \$0.98 on the dollar (or worse)! In other words, they were borrowing \$100 million to loan out, and then were only able to re-sell the pool of mortgages for \$98 million, effectively losing the \$2 million difference on every pool of mortgages, not only eliminating any profit whatsoever for each loan that was completed but actually depleting the mortgage company's own assets quite rapidly!

Because the mortgage companies operated primarily through credit lines and other access to investor capital, their value of their own companies was often quite small relative to the volume of loans that they processed. Consequently, losing a few cents per dollar on a loan, multiplied by tens or hundreds of millions of dollars at a time, took many companies to bankruptcy in literally a span of just a few days or weeks. Other mortgage companies managed to sell off their current pool of mortgages, but then discovered that banks would no longer offer them credit to do more loans, for fear that the next \$100 million loan would leave the mortgage company with only \$95 million to pay back, potentially causing the original bank to lose some of its own money! Without access to any capital to loan out, the mortgage companies realized they had to close quickly or they too would be bankrupt, since they no longer had any source of profit.

Consequently, the headlines erupted with the failure or shutdown of one mortgage company after another, and the actual loans available to subprime lenders began to disappear since they could no longer be securitized and repackaged profitably.

The Losses Begin To Mount...

As losses began to mount in some of the RMBS pools that were believed to be safe but were actually turning out to be risky – most notably, subprime CDO and CDO-squared investments – the problems of the financial system began to shift. Early on, the losses of various hedge funds and SIVs in RMBS, CDO, and other ABS securities, was simply the investment vehicles experiencing their own losses, as their leverage in particular brutally punished their thin equity levels with catastrophic losses on even just a few of their investments.

What began to shift in the spring of 2007 was the increasing fears of those who were *lenders* that funded the leverage of those hedge funds and SIVs, who suddenly realized that when individual securities can go through such catastrophic losses, it takes relatively few such losses before the entire equity of the hedge fund or SIV can be wiped out, suddenly creating the possibility that the borrower simply wouldn't have enough assets to pay back all the creditors.

The new fears of lenders, who now realized that their own collateral might be at risk, resulted in two problems for hedge funds and SIVs that occurred almost simultaneously. The first was that lenders, where possible, began to call in their loans, raise the collateral requirements, shut down access to credit lines or refuse to renew them, or do whatever else they could to reduce their risk exposure. By whatever means, the net result was the same – several hedge funds lost access to some of their loan funds, forcing them to begin selling down some of their positions to raise the cash necessary to either pay back the lender or accommodate the increased collateral requirements.

The second problem struck at the heart of the SIV structure in particular. As you may recall, SIVs were predicated on borrowing short-term money in the commercial paper market, to buy longer-term RMBS, CDO, and other ABS securities with higher yields. The caveat to funding this investment approach with commercial paper is that, by its nature, it's a very short-term loan, and ongoing SIVs had to refinance their commercial paper every few weeks or months to maintain their leverage exposure. When the risks began to appear for the commercial paper used by the SIVs – often called asset-backed commercial paper, or ABCP, because of the assets (or asset-backed securities) that provided the collateral for the

commercial paper – funds that bought ABCP suddenly decided they just didn't want to buy it anymore. Commercial paper in general – including ABCP – is typically issued, owned, and purchased by cash-equivalent investment vehicles like money market funds, and there was just no longer any interest in ABCP transactions; it wasn't worth the risk. As it is termed in the credit markets, the ABCP market “froze” in place, as investors with cash simply weren't interested in buying ABCP from others anymore, or renewing the ABCP of borrowers.

Notably, at this point very few ABCP investors had actually experienced any material losses. The issue was simply a concern that material losses might appear. Nonetheless, the results were devastating to SIVs. As money market funds and other entities refused to buy any ABCP, very few funds had any interest in issuing new ABCP anymore, and the ones who did insisted on significantly higher rates to compensate them for the newly perceived risks. Remember, the key for a SIV was that every few weeks, it was necessary to refinance all of its old expiring ABCP with a new issuance of ABCP, so that the SIV had the capital available to maintain its leveraged asset investments. And the SIV depending on the ultra-low rates it could achieve by being short-term, and by having AAA-rated collateral, to achieve the necessary spread between the borrowing cost and the available investment yield of its assets.

Suddenly, in the span of just a few weeks, numerous SIVs were forced to liquidate rapidly, as they lost access to the ABCP entirely, or found that the interest rate cost to get ABCP loans (as ABCP spreads widened significantly) were too expensive for the SIV structure to be sufficiently profitable. Unfortunately, the selling itself complicated the matter dramatically. As investors suddenly realized that at least *some* CDOs, RMBSs, and other ABSs might actually be starting to experience losses, they became wary to purchase *any* of them. As discussed earlier, an RMBS was a pool that could include a broad range of mortgages from all over the country; to say the least, it would take some time to really analyze all of the underlying holdings to determine whether it was a “safe” RMBS tranche to buy. CDOs were comprised of the BBB tranches of *multiple* RMBSs, which meant that you would have to dig even further to get a handle on all of the underlying mortgages to a CDO, which might require you to analyze both the default risk of the mortgages in the CDO and how they fit into the

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default risk for each particular RMBS from which they came (assuming you could even get access to all of the necessary information!). CDO-squared investments required even more depth. The paralysis caused by the required analysis spread to other ABS securities as well. If you had to do the transaction quickly, or not at all, buyers increasingly decided that “not at all” was the safest response.

As the liquidity dried up for buyers of various types of ABSs, including the RMBSs and CDOs, while at the same time the SIVs and hedge funds were being forced to at least partially liquidate as they lost access to the loans, credit facilities, and ABCP that was used to fund their leverage, the SIVs and hedge funds did what they could. Usually, this meant they either sold the ABS at whatever price they could get, often experiencing significant losses simply because they were forced to sell large amounts of questionable hard-to-analyze (or at least, hard-to-analyze *quickly*) securities into an illiquid market (even though many of ABSs were NOT actually experiencing losses or significant financial risk). Alternatively, if the hedge fund was more diversified, it kept the ABS and sold the *other*, more liquid and higher quality securities instead! Yes, that’s right – ironically, losing access to the funding for their leverage, and being faced with a forced liquidation, many hedge funds were forced to sell the *good* securities and keep the *questionable* ones, because the good ones had the liquidity to be sold immediately without exacerbating the losses!

Unfortunately, the phenomenon of being forced to sell the “good” assets had other unintended consequences. Not only did it generally exacerbate the market declines in the late summer of 2007, but it was particularly damaging to a number of other hedge funds, whose focus was not investing in ABS, but instead in a broader range of arbitrage transactions. For example, assume that Company A and Company B have announced that they will merge in 3 months, when Company A’s stock price is \$80 and Company B’s stock price is \$79. A merger arbitrage fund might respond to this opportunity by buying a large amount of Company B stock, and shorting an equivalent amount of Company A stock. This protects the fund from any direct changes in the price of either company; instead, the fund will make money as the prices of Companies A and B converge towards each other (as they will eventually do when the merger is consummated). With some leverage added, this can produce a significant return for a “relatively” sure bet (although there is risk if the merger doesn’t come to fruition). However, as just mentioned, this transaction (and the success of its leverage) is predicated on the

prices of Companies A and B converging. What happens if a fund that owned ABS, which is losing access to its ABCP and needs to deleverage, was *also* using this merger arbitrage strategy at the same time (perhaps for diversification from its ABS strategies)? Since the fund can’t sell its ABS to raise capital because the ABS is illiquid and would face significant losses in a fire sale, the fund sells what it can – by unwinding the liquid Companies A and B that were held in the arbitrage transaction. This will require the fund to simultaneously sell a large amount of Company B (to unwind the long position), and buy a large amount of Company A (to unwind the short position). At least in the short term, a large leveraged hedge fund selling so much stock at once may move the price – the result is that Company B goes down (due to selling) and Company A goes up (due to the short covering). Now the prices are \$81 for Company A, and \$78 for Company B. Unfortunately, though, this means that all the *other* hedge funds that were investing in the same arbitrage transaction suddenly experience an incredibly undesirable event – instead of converging, the stock prices are now spreading *further* apart, causing losses to the hedge fund as it loses money on its short and long positions simultaneously. Due to their leverage, that means *other* hedge funds must now unwind some of their long and short positions due to margin calls – which means more funds buy Company A to cover their shorts, sell Company B to close out the long positions, and drive the prices further apart, causing even *more* losses to other hedge funds with similar positions, additional margin calls, and more unwinding. The net result, as was witnessed last summer, is the potential for dramatic losses (some hedge funds lost upwards of 25%) in the span of just a few days, with investments that previously produced ultra-low-volatility steady returns with “market neutral” positions! Many arbitrage and similar types of “quant” hedge funds experienced a similar phenomenon in the summer of 2007 (particularly in August).

Of course, the losses that the funds experienced by either unwinding arbitrage transactions (and moving the pricing unfavorably in the process), or selling their illiquid ABSs, and or selling other assets in a fire sale to pay off lenders in a short period of time, exacerbated the fears of lenders to other SIVs and hedge funds, further freezing the ABCP market and other lending options, and further reducing the amounts and availability of other types of lending for those funds. For many of the hedge funds, redemption requests rose significantly as well, as the hedge fund investors also became concerned. The result was that over the span of just a few months, a large number of SIVs and hedge funds liquidated entirely, revealing modest losses that due to

high leverage turned into catastrophic losses. The losses and selling itself forced more similar funds to sell and deleverage, and the sheer volume of the sellers resulted in both a sharp market decline at the time, and a few notable headlines (e.g., the two infamous Bear Stearns hedge funds that were liquidated with significant losses). Many investment banks, which had previously been earning profits by raising capital for the creation of the hedge funds and SIVs, and had then facilitated or even outright provided the lending to fuel them, were forced to absorb the funds and SIVs back onto their own balance sheets. To some extent, this was to restore confidence and save face with clients who had been recommended into the funds. However, some investment banks likely absorbed their hedge funds and SIVs because the investment bank itself was the primary lender to the fund or SIV; forcing the fund to liquidate in a fire sale might have further depressed its values even further, causing the fund or SIV to outright default on the loan, resulting in a loss to the investment bank anyway. At least by absorbing the assets of the fund or SIV, the investment bank could hold the assets, not be forced to sell them for the time being, and ultimately either sell them once the values recovered more, or hold them until they (hopefully) matured.

And Then The Losses Get Worse...

As the availability of lending tightened, the rate of foreclosures increased as more ARMs reset, and homebuyers began to show skepticism about the value of buying real estate in a now-declining environment, the prices of housing began to fall further, and in fact the pace of real estate price declines accelerated.

The increasing pace and depth of the real estate price declines began to cause additional problems in the market for RMBSs and various CDOs. Early on, the problems were concentrated primarily in the last few mortgage-backed securities issues in early 2007, and from much of 2006, when the prices (in hindsight) had peaked – if a buyer bought at the top with 100% financing, then virtually any default inevitably meant the mortgage would experience losses, and it was just a matter of how many would default and how bad the losses would be. However, as the pricing declines continued, the projected losses for many securities began to worsen, rapidly. As discussed earlier, because of how finely sliced many tranches were, particularly in the CDO market, a small difference in default rates and/or losses could produce large

differences at the margin for whether a particular tranche received all, some, or none of its principal back.

With the depth of price declines, the significant losses when a property was sold in foreclosure, and the rising rate of foreclosures as more buyers experienced unmanageable ARM interest rate resets (and couldn't refinance anymore due to the reduced availability of loans and the fact that the property was underwater), the losses began to accelerate significantly, at levels that were entirely unanticipated. By late 2007 and early 2008, AAA tranches of CDOs believed to be pristine were facing catastrophic losses. In fact, either CDO issuances were being wiped out completely, as some subprime RMBS securities faced losses so severe that the Tiers *above* the CDO subset were now experiencing losses. And the depth of the price declines was becoming so severe, that RMBSs and CDOs from early 2006 and into 2005 were suddenly generating losses as the real estate price declines were now reaching far enough that they wiped out all prior growth *and* began to dip below the original mortgage.

Writedowns began in earnest from a wide range of financial institutions that held direct or indirect exposure to ABS investments on their books. The firms that had invested in higher tranches had fewer losses (although their magnitude was beginning to grow), while firms that had taken large positions in lower, more aggressive tranches were suddenly facing devastating losses on those securities.

It's worth noting that for individual investors who have a well diversified bond holding, losses on any particular bond or other position, even if it is a total 100% loss for that particular security, is not necessarily devastating. It may be 1%-2% of the portfolio, and although the loss is felt, it is manageable within the context of the entire portfolio. Unfortunately, the result is different for many banks, because banks themselves inherently contain a great deal of leverage on their balance sheet. A bank typically generates loans and holds assets that are approximately 10 to 12 times the size of its equity – for example, a bank with \$10 billion in equity capital might have a total of \$100 billion of assets in the form of various loans and other investments. Thus, even a total loss of just 1% to 2% on a subset of subprime CDOs can become devastating. Continuing the prior example, if the bank with \$100 billion of assets experiences a 2% loss, its assets decline to \$98 billion, and its equity capital declines to \$8 billion. Unfortunately, if the bank's balance sheet leverage limit was only 10:1, this loss means that the bank's \$8 billion of equity capital requires it to reduce its asset exposure to only \$80 billion; not unlike a margin call, a loss of only 2%

forces the bank to sell down \$18 billion of assets, or to otherwise restructure its assets and liabilities to bring its equity leverage down to the proper ratios.

Who Else Owned RMBSs...

As the markets discovered in late 2007 and early 2008, the exposure to RMBS (particularly subprime) wasn't just a problem for banks. Another class of institutions had also bought significant amounts of the debt, and were suddenly facing significant defaults: the bond insurers.

Several of the major bond insurers, most visibly including AMBAC Financial Group and MBIA, reported that they were experiencing significant losses on their RMBS (and other ABS) securities. Although the losses were by no means bankrupting the companies at that time, the losses were significant enough that the bond insurers were eventually downgraded by the rating agencies.

To understand why this is a problem, it's helpful to look back at how bonds are issued in many situations. For a number of riskier borrowers – for example, many municipalities – it is challenging to issue a bond, or at least to be able to issue it at an interest rate that is affordable for the desired project. The alternative to issuing a less-than-pristine bond at the market's rates for lower quality borrowers is to go to a company like AMBAC or MBIA, and get your bond insured. If the bond insurer's financial rating is AAA, then effectively your bond offering is also AAA. And because the lender who purchases the bond is only at risk if both the municipality declares bankruptcy, AND the bond insurance is exercised, AND the bond insurance defaults, the bond is considered to be remarkably safe. As a result, the bond insurance company earns a premium, the municipality issues the bond at a desirable interest rate and pays a modest premium, and the investor receives a safe bond backed heavily by the pristine rating on the bond insurance company.

But when AMBAC and MBIA were downgraded, the value of the insurance guarantee was diminished for nearly every bond they insured (which was estimated to be guarantees on as much as \$1.2 trillion of debt!). As a result, a large number of the bonds themselves were downgraded to reflect the new rating of the bond and bond insurer. And when the bonds were downgraded, they experienced an immediate price decline, causing a new wave of losses and write

downs for institutions that had held a broad range of insured bonds. In some cases, bonds even lost their investment grade ratings, forcing large quantities of certain bonds to be sold rapidly (since many institutional and other funds are required to only hold investment grade bonds).

In addition, the reduced ratings of the bond insurers made the interest rate higher for new bonds that municipalities and other entities wanted to issue. After all, they were now issuing bonds backed by insurers that weren't AAA. As a result, borrowing costs for municipalities increased, slowing the growth rate for municipal spending.

As The Losses Continue...

In early 2008, many financial institutions responded to the challenges of bond write downs and losses on various ABSs not by selling assets, but instead by trying to raise capital. Numerous firms had new issuances of bonds, or of stock, to bring cash into the organization in order to restore the equity capital to a level that would support the existing assets at the appropriate leverage requirements. Unfortunately, though, the problems were more significant for some of the investment banks, tracing in no small part to a change in their own regulatory rules in the recent decade that had relaxed their leverage limits from 10:1 up to approximately 30:1 for certain institutions!

As we saw earlier, at a 10:1 leverage ratio, even a modest loss on assets for a bank with \$10 billion of equity could require the bank to sell off upwards of \$18 billion in assets to restore its leverage ratios. With a balance sheet leverage ratio of 30:1, the situation could become far more dire, far more quickly! At such ratios, a bank with \$10 billion in capital might have as much as \$300 billion in assets; a 3% loss on assets resulting in a \$9 billion loss could wipe out nearly all of the bank's equity!

As the losses continued to mount, the most highly leveraged investment banks began to foresee the problem, and began to raise capital aggressively. This was a time where many headlines spoke of investment banks selling equity to foreign Sovereign Wealth Funds, where a significant amount of capital could be raised quickly to shore up the leverage on the balance sheet. Unfortunately, though, as the losses continued, it became harder for many institutions to continue raising capital.

The difficulty of mounting losses produces an unfortunately paradoxical situation. In order for the bank to raise capital (and keep the capital it has), it must try to assure new (and current) investors that their investment is secure. Commonly, this would mean the banks would repeatedly issue statements that their losses were manageable and under control. At the same time, the bank may also still need to raise a significant amount of capital, but making inquiries too loudly or broadly in times of distress can cause investors to question the stability of the bank in the first place. Ultimately, whether due to mounting losses that must be announced, or the concern of investors because the bank is trying “too hard” to raise capital, there is a risk that eventually the bank will eventually be unable to raise more capital. And unfortunately, if the bank is too open about its risks and problems in the first place, it likewise becomes more difficult for the bank to raise capital, potentially accelerating its own demise.

Unfortunately, though, being unable to raise capital is still not the end of the problem. If losses continue further, eventually the existing investors may become fearful that their investment is at risk. After all, a bank with \$10 billion in equity but \$300 billion in assets will also be holding, by definition, \$290 billion in various debts and liabilities on its balance sheet. If the investment bank actually “fails” and the equity goes negative, again by definition there will be more liabilities than assets, which means some creditors will not be getting all of their money bank! The natural response for most investors? Pull their money out before the bank fails!

In March of 2008, this is (at least in retrospect) what apparently happened to Bear Stearns. As losses grew, and more and more attempts to raise capital failed, investors and others who were creditors of Bear Stearns or for whom Bear Stearns held assets became concerned that the bank really might not survive, and that their own money could be at risk. The natural result – they began to make rapid withdrawals. As we saw earlier, losses in the assets of a bank can have a dramatically magnified effect on its equity level; unfortunately, bank withdrawals produce a very similar effect. The end result is that a high pace of bank withdrawals can reduce the bank’s equity rapidly, taking a bank that may not have been in trouble (at least, not yet), and putting it immediately on the brink of bankruptcy. As various institutions rapidly withdrew funds from Bear Stearns (allegedly exacerbated by rumors of their imminent demise propagated by hedge funds who had shorted the bank and/or otherwise stood to profit from its failure), the

situation that began as problematic for Bear Stearns due to its losses became catastrophic as withdrawals reduced its equity to unsustainable levels. In a matter of just days, the withdrawals were so significant that Bear Stearns’ equity capital levels were demolished, bringing a surprisingly rapid end to the venerable firm.

The Bailouts Begin...

As you may remember, Bear Stearns didn’t just fail. Instead, the Federal Reserve and the Treasury became involved to organize an emergency buyout of the firm by JPMorgan. And JPMorgan didn’t just buy Bear Stearns (for about \$1.2 billion); a part of the transaction was a so-called \$30 billion “bailout” by the Federal Reserve.

What really happened wasn’t so much of a traditional “bailout” – where the company being “saved” receives a direct infusion of cash. Instead, what the Fed did was to allow various Bear Stearns investments (primarily mortgage-backed securities) worth \$30 billion to be transferred into a separate entity (so that JPMorgan didn’t have to take the assets themselves). The Fed provided a loan of \$29 billion to the entity, which flowed directly to JPMorgan, while JPMorgan contributed \$1 billion itself. To the extent that the investments could be liquidated over time, the Fed would be paid back first for the full \$29 billion. If there was additional money left, then JPMorgan’s \$1 billion loan would be repaid. If there was still additional value left after that, it would all go to the Fed – in essence, an “equity kicker” if the assets were ultimately able to be liquidated for more than the \$30 billion loan used to purchase them.

The Fed’s involvement in this transaction ultimately begs the question of “why”? Why couldn’t JPMorgan just buy the assets, or even just take them for little or no value?

The answer to the question likely ties back into the remaining leverage that existed on the balance sheet of Bear Stearns. The Fed announced that the *equity value* of the MBS portfolio it loaned towards was \$30 billion. If this was simply because the portfolio included \$30 billion of assets, JPMorgan could have bought it directly. After all, the worst case scenario of a \$30 billion asset is simply that the \$30 billion goes to \$0. Considering the fact that JPMorgan bought Bear Stearns for about \$1.2 billion, why wouldn’t JPMorgan just take the \$30 billion in assets as well? If they turn out to have value, the deal is better for JPMorgan. If not, the worst

case scenario is just that they get the rest of the company for \$1.2 billion?

The problem is that having the value go to \$0 is not the worst case scenario. As articulated above, this was not apparently a purchase of \$30 billion of *assets*; it was a purchase of a portfolio that had \$30 billion of *equity value*, implying that it also had (an unknown amount of) leverage. The risk with leverage is that the value doesn't necessarily have to go to \$0. It could also go negative, if the value of the assets declines below the value of the liabilities. If JPMorgan didn't want to take the assets onto their books, it implies that they feared the risks weren't just the possibility of going to \$0; it was the possibility of further leveraged losses that could create negative equity.

The Fed's actions to facilitate the buyout – and put \$29 billion of taxpayers funds into a loan that apparently was backed by a leveraged portfolio so risky, even JPMorgan didn't want to buy it – also begs the question of why it was necessary to intervene in the first place. Of course, any bankruptcy is unfortunate, but if Bear Stearns had done such a bad job, why not just let them fail? For the answer, we have to introduce another member of the Wall Street alphabet soup.

Adding CDSs To The Mix...

The primary reason that the Fed felt the need to intervene and prevent Bear Stearns from declaring a total bankruptcy was due, in a word, to derivatives. Specifically, the problem was associated with over-the-counter (OTC) derivatives, which are private derivative contracts negotiated between parties (not on a regulated exchange, as most options and futures contracts are traded).

In particular, the fear of the Fed seems to have been concerned primarily focused on a type of derivatives contract called a Credit Default Swap (CDS). In simple terms, a CDS basically operates as an insurance policy against the risk that a particular company's bonds default. For example, if I want to purchase bonds from a major company like GE, but I don't want to take any risk that the company might default (notwithstanding their strong credit rating), I can choose to buy a CDS on GE along with my GE bond. The CDS would state, in essence, that if GE defaulted, the party on the other end of the CDS will pay me whatever is necessary to make me whole on my GE bond. Simplified slightly, this means that if

GE defaults and I only get \$0.80 on the dollar back, fulfilling the CDS will provide me the other \$0.20. If the company defaults entirely with no recovery, the CDS will make me whole entirely. To purchase the CDS, I might pay just a small fraction of the total bond cost to receive the insurance – for example, I might pay just 15 bps (0.0015%) of the price of the bond to get a CDS guarantee for a \$100 bond for a company like GE. If the company becomes more risky, the CDS becomes more expensive – a higher risk company might cost upwards of 100 bps (1%), 200 bps, 400 bps, or even more, to get the same insurance. But again, to get insurance on my bond in a time of low risk, the cost for a \$100 notional value (the amount guaranteed) might be as little as 15 bps, and in fact some companies can be evaluated for risk based on the price of their CDS.

Like any type of insurance policy, at the end of the day the guarantee of a CDS is only as good as the financial backing of the company on the other side of the CDS transaction – in this case, called the “counterparty”. So the good news is that when I buy a CDS on GE, I can remove the risk of GE from the equation when I purchase a GE bond. However, I do introduce the risk of a so-called counterparty event – if GE defaults, the CDS will make me whole, but only if the counterparty to the CDS is actually capable of paying out the guarantee!

The problem with Bear Stearns is that it was the counterparty to a lot of derivatives, including numerous types of interest-rate swaps, and also to a *lot* of CDSs. By some estimates, the total notional amount of all types of derivatives to which Bear Stearns was a counterparty may have been as high as \$3 trillion (and some estimates were even higher)! Thus, the risk was not simply that Bear Stearns might go bankrupt, or even that investors with assets in Bear Stearns might lose money. The risk was that if Bear Stearns defaulted, *other* companies would suddenly find that upwards of \$3 trillion of guarantees that their counterparty was supposed to protect would be worthless guarantees.

If this occurred, financial institutions that had no relationship to Bear Stearns outside of being the counterparty with whom they wrote a CDS would suddenly find themselves with losses of their own, as their insurance policies were marked down to \$0, even if they had never otherwise invested a dollar into Bear Stearns. This created the potential risk that other institutions would immediately face significant write-downs due to the losses of their derivatives, and the size of the write-downs could be *incredibly* high. Such losses would not only force those other institutions to either sell assets rapidly to deleverage (to restore their

capital ratios) or to desperately try to raise additional capital. It might also cause other institutions to fail.

Of course, if other institutions failed, then all of *their* CDSs and other derivatives would default, which means they would cause a counterparty failure to whatever institution was on the other side of *their* derivatives. Thus, the failure of Bear Stearns would cause Bear to default on its derivatives, causing another institution to experience significant losses and default on its derivatives... and the ultimate risk to the system was that like a series of dominoes, one failure could cause the next as the immense interconnected web of derivatives tried to unwind all at once amidst failing institutions.

In short, the Fed was willing to risk \$29 billion of taxpayer money to facilitate the buyout by JPMorgan to avoid an immediate and severe (and potentially catastrophic) counterparty default (or to at least give enough time for Bear Stearns assets to be liquidated in a manner that would allow them to close out some of their derivatives obligations to reduce the potential loss impact).

The Real Estate Decline Continues...

Many had hoped and expected that closing Bear Stearns (and the Fed's involvement) would help to stem the trouble in the financial system. Unfortunately, it did not, because the underlying problem – declines in real estate values causing ever-more-severe losses on mortgage-backed securities, and in higher and higher tranches – continued due to the ongoing supply/demand imbalance for real estate as the availability of loans reduced further, underwriting standards rose further, and fire-sale foreclosure transactions continued.

As the losses inexorably continue to mount, the landscape began to shift further. Sovereign wealth funds and other entities that had been willing to provide capital a year earlier were no longer interested in investing, having witnessed the losses from the first round of equity infusions. As banks continued to experience losses, eventually there was only one answer – to reduce leverage by selling the assets.

Of course, generally speaking selling assets isn't necessarily problematic. A willing buyer and a willing seller can usually agree on a price and transact business quickly. However, as we discussed earlier, asset-backed securities in particular can be very

difficult to value (or at least, to value them quickly). This is not only because the assumptions are difficult to formulate in a declining market (How bad will the defaults get? How bad will the real estate price declines be?), but because many securities involve a broad pool of mortgages or other loans (e.g., an RMBS), and may even include a subset of tranches from multiple different pools (e.g., a CDO), it simply isn't feasible to make a quick evaluation. And unlike the common stock of a publicly traded company, each asset-backed security has its own unique characteristics based on the geography, timing, and other details of the underlying loans, generally making it necessary to take the time to do a detailed analysis (ironically, this means that many bought such securities on the basis of their high ratings alone, yet cannot find a seller without a detailed analysis of the investment!). If the security has to be sold quickly, and especially if multiple ABSs need to be sold in bulk, there's really only one option – mark the price down in a “fire sale” of assets.

And thus, the fire sale of asset-backed securities began. Unfortunately, though, most institutions have been trying to sell at the same time – which means not only are institutions trying to sell illiquid, difficult-to-analyze (at least, not quickly) securities in bulk, but many of them are trying to do it *at the same time*, which means the prices have to fall even further to be sold. The only other alternative is to liquidate the more valuable, easier to sell assets – e.g., other profitable sub-divisions or lines of business, or other types of more liquid securities – but this can eventually depress the prices of the other assets, and/or sell off portions of the business that were crucial to generate *future* earnings for the business in the first place!

Welcome to FASB 157...

Unfortunately, selling at more and more depressed prices creates another problem. Due to Rule 157 of the Financial Accounting Standards Board (also known as FASB 157), financial institutions that carry investments must generally mark them down to the latest market price if there is a recent market transaction in that security. In most cases, this isn't an issue – it simply means that if you hold a stock that used to trade at \$30/share, and now it's trading at \$29/share, you need to mark it on your books at \$29/share when you evaluate the financial strength of your institution.

However, the problem becomes more severe when numerous financial institutions are trying to deleverage at the same time, and especially when many of them are

selling the same illiquid assets. For example, let's assume that once again, my bank has \$10 billion of equity based on \$100 billion of assets. We'll assume that amongst my assets are \$3 billion of RMBS, which are currently valued at \$0.80 on the dollar due to some of the losses experienced. But now, my neighbor bank, who is having financial problems, sells a large number of RMBSs and tries to get any price it can – in this case, it gets only \$0.72 on the dollar. Thanks to the mark-to-market accounting rules, I now need to write down my own RMBS by 10%, reducing their value on my balance sheet by \$300 million. This means that I now have \$9.7 billion in equity, and \$99.7 billion in assets, which means I am leveraged at slightly more than 10:1, so I need to sell a few billion in assets of some type to bring my leverage back in line – triggered entirely because some *other* bank sold the RMBS for a lower price, even if there hasn't otherwise been a change in the underlying security! So now, I sell off a few billion of other assets to bring my balance sheet in line (after all, if the RMBS just went for \$0.72 and I thought they were worth \$0.80, I'm probably not going to want to sell those at depressed prices unless I really, really have to!). Unfortunately, though, being forced to sell a few billion of assets at the same time depresses the price a little, while means I need to sell a little more to bring my leverage back in line. Even more unfortunately, when I depress the prices of the security I just sold, I set a new low in the market price – which means, once again, according to the mark-to-market rules, my neighbor bank now needs to write down the price of that asset on their balance sheet, reducing their capital, and forcing them to sell more of their assets again!

As the vicious spiral continues, more selling begets more write downs, which begets even more selling. Now my neighbor bank needs to sell a few more billion in assets, and in order to do so quickly, it sells more of the RMBS, this time at \$0.68 on the dollar! Now I have to write down about another 5% on the security, forcing me to experience further losses and do more selling! The back and forth process can quickly become devastating.

Fortunately, FASB 157 does acknowledge that some assets might be harder to value than others, and consequently separates assets into three levels, where level 1 assets are the easiest to value based on normal market prices, and level 3 assets are the most difficult to value and often require using a model (which creates the risk that the firm uses a model with assumptions that will simply make its balance sheet look better!).

The challenges of mark-to-market accounting in the midst of large fire sales and massive deleveraging is why you may hear more discussion in the coming days and weeks about its appropriateness. On the one hand, mark-to-market accounting provides a crucial mechanism of transparency so that banks can and must acknowledge their losses, reducing their ability to hide losses for an extended period of time that can turn a financial failure into a financial catastrophe. On the other hand, in a deleveraging environment, mark-to-market accounting can stimulate write downs during the emergency sale of assets that actually necessitates more sales, creating a downward spiral that actually can cause its own disasters.

And Real Estate Just Keeps Going Down...

As the summer of 2008 continued, the prices of real estate just continued to decline further (and in fact, the monthly pace of the declines accelerated!). With an even increasing rate of default – exacerbated by rising unemployment and a slowing economy – and a greater and greater depth of losses, the losses on mortgage securities continued to grow, and also began to spread to previously unseen exposures in a broad range of RMBS; the problem is no longer “just” subprime anymore! In addition, the slowing economy and struggling consumer began to create loss exposures in other types of ABS as well, as defaults rose on everything from mortgages to car loans to credit cards.

As the selling continued, access to capital continued to dry up, and the value of virtually all ABS continued to decline (both due to losses, and to mark-to-market write-downs due to selling triggering further deleveraging sales).

Eventually, the losses in the mortgage markets became severe enough that rumors began to swirl that the financial institutions of Fannie Mae and Freddie Mac themselves may be in trouble. Although they were by no means excessively exposed to subprime in particular (although they did have some exposure), the institutions were experiencing losses on both subprime and other mortgage loans. The challenge for Fannie and Freddie in particular, though, was that they could ill afford any losses at all. By many estimates, their balance sheets were effectively leveraged as high as almost 50:1 thanks both to Congress's explicit approval, and its implicit guarantees.

Ultimately, the Federal government decided once again to intervene, this time by taking over the institutions more directly and effectively bringing Fannie and Freddie onto the government's on balance sheet. In the case of Fannie and Freddie, once again the issue was more complicated though.

First of all, as we know, Fannie and Freddie provide critical funding for an incredible number of mortgages here in the U.S. – such that a sudden loss of these institutions would have caused a *severe* decline in the availability of mortgages, which would have dramatically exacerbated the declines in the housing market even further by making mortgages unavailable (or at least, available at a far less desirable interest rate) to a broad swath of Americans. And as we have seen, a significant reduction in the availability of mortgages can reduce buyers further, causing a further imbalance in supply and demand, resulting in even more severe real estate price declines and RMBS losses.

Beyond the direct impact in the mortgage markets, there was another (arguably much greater) problem underlying the potential of a Fannie or Freddie failure – once again, a problem with derivatives. In the case of Bear Stearns, the concern was that a default could trigger a domino-like toppling of institutions, as the counterparty of default by Bear Stearns could pose severe unanticipated losses for other financial institutions, for as much as \$3 trillion of notional value. On the other hand, for Fannie and Freddie the primary problem was not the portfolio of derivatives they held directly, but instead was the astronomical amount of CDS written on their debt. As you may recall, a CDS is effectively insurance against the risk that the bond defaults; and if it does default, the CDS counterparty basically ends out paying the CDS buyer the amount necessary to make the buyer whole. But in the case of Fannie and Freddie, estimates are that the amount of outstanding CDS may have been as high as \$30 trillion to \$60 trillion (yes, that's TRILLION with a 'T')! To put this in context, the entire Gross Domestic Product of the United States is only approximately \$14 trillion!

Thus, the government intervention was not solely to mitigate the impact to the mortgage market. It was that the entire global financial system was at risk if it suddenly needed to settle significant losses on tens of trillions of dollars of CDS guarantees! (It is worth noting that technically, the government's takeover still constituted a "failure" by most CDS contract, although the actual losses are negligible due to the government's terms. Nonetheless, in the coming

weeks of mid-October, global institutions will begin to settle this incredible amount of CDS contracts; whether this itself creates additional market turmoil remains to be seen.)

The Losses Provoke A Failure And More Bailouts...

No sooner had Fannie and Freddie been addressed, then other major institutions began to fail as well. In the weeks that followed, AIG was also "bailed out" to avoid a derivatives counterparty default far larger than Bear Stearns would have been (although it was "bailed out" at the cost of an \$85 billion loan, with an interest rate of LIBOR + 8%, in addition to giving the Fed a 79.9% interest in the company – an absurdly expensive loan by anyone's standards, but a necessity for a company that faced no other alternative!), Wachovia was sold, and Lehman Brothers failed (a genuine counterparty event whose effects remain to be seen).

The rapid pace of failures brings us to the current stage of the credit crisis, unfortunately complicating it further still. In today's current environment, the problem is no longer just the ever-declining prices in real estate causing losses in ABS, nor is it the rapid selling triggering further write downs due to mark-to-market accounting rules – all of which creates losses that place the security of financial institutions at risk, further exposing the far more fearsome specter of a global domino sequence of counterparty failures. Instead, the true problem to the system now is even more insidious – ***institutions simply don't trust each other to stay in business, and consequently don't want to let any cash out their doors. Period.***

The problem of distrust, and the lack of confidence in the system itself, introduces a whole new host of challenges into the credit crisis, and can potentially accelerate – quite dramatically – the pace of failures across the entire economic system. When banks are experiencing losses and need to sell, it reduces their funds available to lend, and can depress their prices – poorly positioned banks can fail. As we have seen, due to the natural leverage on a bank's balance sheet, moderate losses in capital lead to significant contractions in lending – at a 10:1 ratio, a bank that loses \$10 billion in equity must reduce its lending by \$100 billion! With estimates of bank losses from the mortgage and other markets crossing above \$500 billion, the amount of credit that contracts is quite significantly.

But when the system in the aggregate loses trust, then good healthy institutions find they lose access to normal funds, and consequently can unexpectedly turn into at-risk companies quickly.

The risk today is that the credit crisis finally makes the ever-feared crossover from Wall Street to Main Street. The cause for the crossover is the cessation of any productive lending that can occur in the face of a crisis of trust in the system itself. In such an environment, large *non*-financial firms that depend on basic lending and lines of credit for routine business can suddenly find their credit unavailable, forcing them to dramatically curtail spending. Even a temporary disruption can have severe effects for a large firm. As an individual, imagine if one day, you went to work and discovered that your credit cards weren't working because the bank had temporarily shut down your access to credit (because they are afraid of a meltdown and simply won't let any cash out the door today); if you don't happen to have enough cash on you, you might not even be able to buy lunch if you can't find a "friend" to loan you the money! Multiply this by millions or even billions of dollars, across companies through the U.S. (and the world), and the risks of the crisis should become apparent – companies that lose access to critical funding for cash flow may be healthy one day, and closing their factories the next day for a "temporary holiday" because they simply don't have the cash to pay their employees and business partners until the banks will open their wallets again. To say the least, this can be devastating to revenues and profits for the company, turning an otherwise healthy company into one that really *isn't* earning profits anymore, as a result of losing access to credit. Layoffs increase significantly, wage growth slows dramatically, and entire large companies suddenly fail. It is a terrifying prospect, and is an environment that characterizes a deep and severe recession, if not an outright depression.

Nonetheless, many banks may feel that they have no choice. As the pace of failures quickened throughout September – to the point where a major bank was failing virtually every week – banks quickly faced the prospect that even an overnight loan to another "credible" major banking institution could be at risk, as the morning paper might reveal that the other bank who borrowed your money for the evening had just failed. Unfortunately, as we discussed above, if the system of banks refuse to make loans to each other for fear of a near-term bankruptcy, they can hasten the failure itself, as many institutions (both financial and otherwise) depend on continuously renewing a series

of short term loans to fund a broad range of basic cash flow needs for the business.

A Bailout To Restore Trust...

Thus, we reach the \$700 billion bailout plan proposed by Federal Reserve chairman Ben Bernanke and Treasury Secretary Hank Paulsen. Although it has morphed significantly in the past two weeks, the basic focus of the plan was relatively straightforward – the Treasury was to receive permission to spend up to \$700 billion of taxpayer funds to buy assets directly from banks, with a primary focus on mortgage- and other asset-backed securities.

Really, the purpose of the plan was two-fold. First of all, the concern of many institutions (particularly those begging that the mark-to-market rules be suspended) is that as assets are sold at "fire sale" prices, the transactions are occurring at values that are below the true value of the security. On this basis, the concern is that some institutions may be experiencing write downs and losses (and facing potential fire sales of their own, or outright bankruptcy) that are unnecessary, and are only occurring because the selling itself is forcing more selling. Accordingly, the desire of the Treasury is to purchase these securities at a "more genuine" fair market value, thereby both stabilizing the capital of the bank (if the asset isn't on their balance sheet, they aren't exposed to further mark-to-fire-sale writedowns), and potentially even infusing capital into the bank (to the extent that the Treasury pays more than the current "fire sale market" value of the securities).

The second purpose of the plan, more generally, is to help rebuild trust in the system, and specifically to help reduce the fears of banks that the other banks they work with won't suddenly go out of business tomorrow morning due to write-downs. By replacing the "troublesome" securities on the balance sheets with cash, the banks can not only be more secure by eliminating the risk of future write downs, but can also begin to reach out to private investors and get the additional capital contributions they need to fully recapitalize their balance sheet. In addition, a more stable banking system less exposed to further writedowns also reduces the risks of bank panics, where retail investors begin to withdraw funds out of fear that the bank might fail (and as we've seen earlier, due to the leverage that banks have, a suddenly withdrawal of funds can actually *cause* the bank to fail). Already, it appears that both Washington Mutual and Wachovia (not to mention Bear Stearns as an investment bank) lost

their ability to survive, and/or witnessed the hastening of their demise (possibility quite dramatically) by rapid withdrawals from investors that feared for their own funds.

Of course, the plan is subject to quite a bit of legitimate criticism as well. Whether the Treasury and the Federal Reserve can *really* come up with a way to reasonably value the bank assets remains to be seen. Although taxpayers really are buying assets with their \$700 billion – this is an asset purchase, not a free bailout giveaway! – there is still a risk that the government will pay too much for the securities, which would ultimately lead to a loss for taxpayers. Given that these assets are so hard to value – particularly in bulk, with limited time – there is no certainty that the government can get the price right. Some suggest that most banks already have been generous in valuing their assets, and that consequently they are actually still marked *too high* on the balance sheets; selling at a “fair market value”, even to the Treasury, might actually force more writedowns for some institutions. And of course, if the government offers to pay “too little”, many banks may simply keep the assets themselves and hope the price recovers on its own, rather than booking a further loss by completing the sale.

At a deeper level, though, the ultimate purpose of the bailout bill is not simply to purchase trouble assets – in the aggregate, there are too many assets for the government to buy all at once – it is to restore confidence and trust in the system, so that banks will be more comfortable and willing to lend. As we have seen, a refusal of banks to lend can actually hasten and cause a failure; the importance of trust to facilitate lending throughout the financial system cannot be understated.

But will it work? As this newsletter issue is completed, the House of Representatives has just passed a final version of the bill, including all of the Senate amendments, and it will be signed momentarily by President Bush on the afternoon of Friday, October 3rd. The passage of the plan itself, though, does not necessarily mean we’re out of the woods. To the extent that the primary purpose is to restore trust and confidence in the system, *no one* really knows for certain if it will work. Only time will tell, although if the market’s response on Friday afternoon is any indication, the contentious and slow passage of the bailout bill by Congress may not yet be enough to inspire the necessary confidence.

Where Do We Go From Here...

The remaining challenge is to determine where we go from here.

In the near term, economic risks are heightened significantly, in no small part due to the problems already permeating throughout the U.S. and global economies, and exacerbated by the turmoil already underway in the credit markets that does incremental additional damage every day. Given recent economic data, and the “normal” economic response to significant credit contractions as we have already experienced, the risk of a U.S. recession is now a virtual certainty (and some believe it may have begun as early as the start of 2008). The questions now are primarily about how deep, and how long, the recession will be – and to what extent the market will drop in response to these economic conditions. Of course, markets normally turn higher before the end of a recession, in anticipation of the subsequent recovery. But with the depth and duration of the recession still certain, extreme caution is merited. The purpose of the bailout bill is to avoid a catastrophic credit crisis and systemic failure; alone it cannot, and will not, lead the U.S. to avoid an economic recession. And if the bailout package is not as effective as it is hoped to be (as the Friday afternoon market’s response to the bill’s passage might suggest), the potential recession may still be quite severe.

To say the least, this means that as planners, it’s a time to be defensive. For those who are more active with their portfolio allocations, this is a time to be defensive for clients who cannot afford significant losses to their portfolios. Where retired clients have the capacity to moderate their spending, at least temporarily, in the face of an incredibly difficult economic environment, this is likewise the time for caution. This does not mean we need to plan for an implosion of the global financial system (in point of fact, there is little we can do to really plan for such a fearful event), but these will be genuinely trying economic times ahead, the likes of which many planners haven’t seen since the early days of their careers; for many, it will be the first time with clients though a significant recession.

Over the longer term, there seems to be little doubt that major changes in our financial system’s regulatory structure will be part of the aftermath of the credit crisis. The culprits that will likely elicit a future regulatory response include the incredible leverage allowed to investment banks, hedge funds, and other investment vehicles, including the government-sanctioned (and

government backed) leverage of Fannie Mae and Freddie Mac (does anyone *really* need leverage in excess of 15:1!? 20:1!? 30:1!? 50:1!?); the insufficiency of our current systems to model risk (particularly in the face of leverage) and the possibility of improbable but severe financial events; a significant lack of derivatives regulation (and especially the lack of a regulated exchange for derivatives) that started out as a mechanism to reduce risk in the system but ended out creating an unimaginably large speculative derivatives bubble (by some estimates, the total notional value of current outstanding derivatives globally may be as high as \$800 trillion, many times larger than the aggregate GDP of the entire world economy); and the asymmetric nature of how company executives and investment managers were compensated, where the rewards for success were generous and the costs of failure fell to the shareholders and investors, not the leaders that allowed them to happen. Many books, and a great deal of Ph.D. research, will be dedicated to the creation and unwinding of our credit excesses over the past 30 years.

Conclusion

Of course, it is impossible to detail every aspect of the credit crisis headlines over the past several years, and I have had to take the liberty of simplifying a number of issues to convey the concepts discussed here, but this issue of *The Kitces Report* has endeavored to highlight many of the important waypoints along the journey. It has been an amazing story that we have witnessed as financial planners.

Unfortunately, this story doesn't have a current ending. The ultimate conclusion of the deleveraging of our financial system remains to be seen. At a minimum, though, I hope that this has helped to illustrate the path that brought us to where we are today, particularly with respect to the events of the past 5 years or so. By better understanding the problems that are occurring, and those that we still face, I hope it will be easier for you to help your clients (and yourself) to achieve the goals that have been set.

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