

Demystifying the Credit Crunch

A Primer and Glossary

July 2008



Contents

- Introduction..... 1
- Origins of the Credit Crunch..... 2
 - The Subprime Crisis..... 2
 - Financial Institutions Begin Feeling the “Crunch”..... 7
 - Impact on Private Equity..... 7
 - Regulators Respond..... 8
- Glossary of Terms..... 10
- Sources Consulted..... 20

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Introduction

The term “credit crunch” has entered the popular lexicon. Barely a day passes when the media is not opining on the topic. Rarely does an economic event have such a profound ripple effect on institutions and individuals throughout the world. Understandably, policy makers are working to respond to the credit crunch and its aftershocks. Thoughtful policy in this area will flow from a solid grasp of the evolution of the issue and current trends in global financial and capital markets, as well as an understanding of the many new products and terms that even some of the financial world’s best and brightest have acknowledged they do not fully comprehend. This paper, then, is an effort to contribute to a better understanding of the issues, the terms, and the trends that gave rise to the credit crunch and which will continue to be relevant in the years ahead. It is not an advocacy paper or an effort to steer toward an outcome. Precisely because the processes and events described are constantly changing, our goal is only to provide a foundation for further exploration and analysis by those tasked with writing and thinking about the credit crunch and developing appropriate public and private sector responses to prevent future dislocations.

Origins of the Credit Crunch

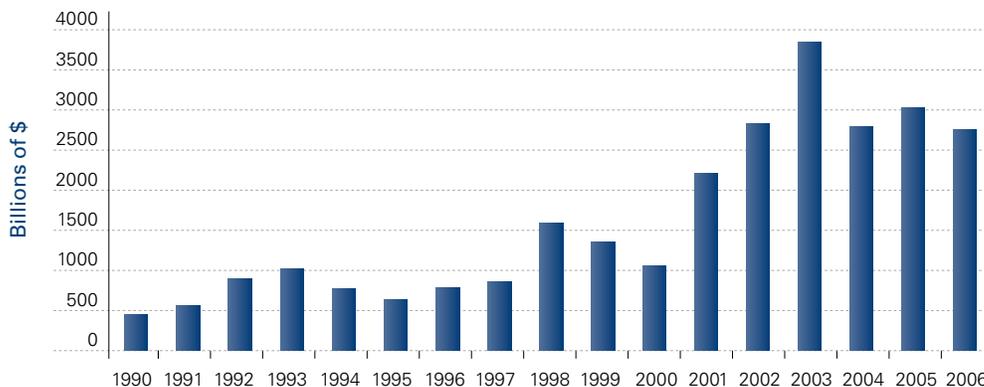
The Subprime Crisis

The roots of the subprime crisis can be traced back to the early 1990s. As economic growth resumed following the recession of 1991, new U.S. mortgage loans increased significantly, reaching \$1 trillion in 1993 (see figure 1). Then, as new loan volumes dropped in 1994 and 1995, several major mortgage lenders entered the sub-prime market in an effort to sustain their new loan levels to capture additional market share. **Securitization** was the primary method to fund the new **subprime mortgages**. Securitization is the process of repackaging otherwise illiquid individual loans (loans for which there is no ready market) and converting

them into liquid (easier to buy and sell), marketable securities. The individual loan borrowers make their interest and principal payments to the firms issuing the securities which, in turn, funnel these profits to their investors.

Before the subprime market developed, most loans were conforming loans, that is, loans subject to specific criteria such as credit scores, income verification, **loan-to-value ratios**, and loan size limits. When securitized, these loans would be sold to Government-sponsored entities (Freddie Mac, Fannie Mae and like agencies) under strict standards. Government-sponsored entities would then repackage a pool of mortgage loans into **mortgage-backed securities**.

Figure 1
New Residential Mortgage Loans, 1-4 Family



Source: Fannie Mae

Because these securities were backed by the full faith of the U.S. government, the risk of the investments was low. Due to this low risk, these securities had lower returns for investors compared to other—potentially riskier, but more lucrative—investment vehicles such as stocks and corporate bonds.

Very large (jumbo) loans or lower credit quality loans with less rigorous underwriting were classified by the government-sponsored entities as non-conforming loans. Mortgage backed securities containing non-conforming loans could only be sold to private entities such as investment banks and similar institutions. These loans were riskier; therefore the potential returns were higher.

In the mid-90s, underwriters began to create new forms of **asset-backed securities (ABS)**. An asset-backed security is a security issued on a pool of underlying non-mortgage assets. The collateral underlying asset-backed securities may be either commercial or consumer receivables. The most common asset-backed securities are backed by credit card receivables, home equity loans (loans for which the borrower uses their equity in their home as their collateral), or automobile loans. Some asset-backed securities are backed by **collateralized debt obligations (CDO)**—a type of asset-backed security backed by a pool of diversified debt instruments with differing risks and rewards. CDOs can be backed by investment-grade corporate bonds, high-yield corporate bonds, emerging market bonds, mortgage-backed securities, real estate investment trusts (REITs), bank loans, special situation loans, distressed debt, or other CDOs.

Subprime loans (non-conforming mortgage loans and home equity loans to less credit-worthy borrowers) were packaged into mortgage-backed securities and other forms of asset-backed securities.

Subprime lending created opportunities for lenders to expand the pool of potential home buyers and increase their income and market share. Lenders' desire to expand their market, combined with an investor community looking to make greater profit in the non-conforming loan sector, accelerated growth in subprime lending. Lenders enjoyed greater liquidity and sources of funding for subprime loans, and investors enjoyed higher returns on their subprime securities.

Subprime-related asset-backed securities (ABS) were often rated by credit agencies. To make the subprime ABS marketable and attractive, underwriters tried to minimize the default risk of ABS securities by offering **credit enhancements** through third parties. A common type of credit enhancement is insurance offered through a bond insurance agency that covers losses in the event of default.

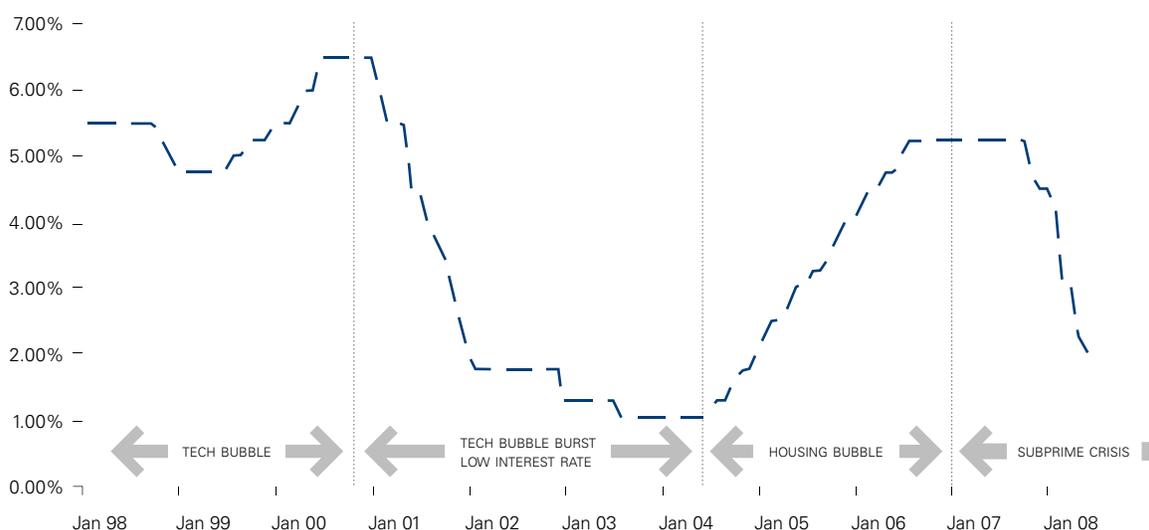
Until 1997, most ABS offerings backed by home equity loans utilized bond insurance as the primary method of credit enhancement. In this case, bond insurers assess the credit risk (default risk) of insured securities and set the premium for securities based on an analysis of the underlying assets and on the issuer's track record. The riskier the underlying loans, the higher the insurance premium.

The bond insurers were the primary group of market participants pricing the credit risk on securities backed by sub-prime mortgages. There were strong incentives for bond insurers to assess credit risk thoroughly because the agencies would have to compensate the claims in the event of default.

Around mid-1997, subprime mortgage ABS issuers began to use subordination as an alternative way to enhance the rating of the ABS securities. Subordination is a way to segment a pool of loans into different **tranches** or levels that reflect the risk and reward of each tranche. Holders of the senior, or top level tranche, have priority of payment over the holders of any junior or lower level debt tranche. In the case of default, the senior tranche holders have priority to claim the collateral before the subordinate tranche holders. Therefore, junior debt tranches have lower credit ratings than the senior debt. To compensate for the lower credit quality and thus greater risk, the junior debt carries a higher interest rate, which provides investors with higher returns.

From the late 1990s until the early 2000s, subordination gained popularity as the preferred tool to enhance credit ratings of subprime-related, asset-backed securities. The investors in the subordinated tranches were usually professionals with extensive knowledge of each security's underlying assets and risk exposure. As the transaction volume increased, a liquid market was developed with pricing mechanisms.

Figure 2
Federal Funds Target Rate 1998–2008



Source: The Federal Reserve, Standard & Poor's

Credit rating agencies, bond insurers, and subordinated tranche investors were important contributors to the overall stability of the subprime-related and asset-backed securities market. Each of them served as independent parties that assessed the risks of different subprime ABS with their own professional approaches. Bond insurers and subordinated tranche investors are generally cautious in their decisions, because failing to accurately assess the credit risk and price the securities correctly could result in significant losses.

Following the burst of the technology bubble and subsequent economic downturn in 2001, the Federal Reserve maintained a low interest rate policy for three years, before raising rates again in 2004 (see figure 2). Residential home buyers began to take advantage of the low interest rate and the amount of new mortgages originated continued to grow rapidly. Mortgage lending agencies competed for mortgage business and became

relatively lenient toward less credit-worthy borrowers. Due to the increase in available funds for subprime borrowers through asset-backed securities, mortgage lending agencies began issuing subprime loans with various interest rate options, such as **adjustable rate mortgages (ARM)**, a type of mortgage where the interest rate is periodically adjusted.

With favorable interest rates and growing leniency concerning credit-worthiness, demand for home equity asset-backed securities increased dramatically. Home equity asset-based securities eventually became the main underlying asset group backing CDOs.

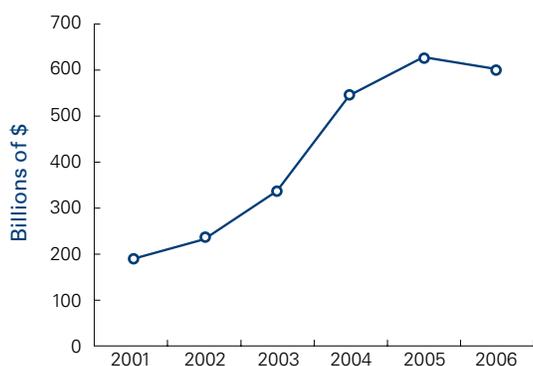
The surge in demand decreased the **credit spread** (the difference between the interest rates paid on home equity ABS and low-risk short-term interest rates such as **LIBOR—the London Interbank Offered Rate**). For subprime mortgage lenders, the narrowing of the credit spread meant

that funds became cheaper and more widely available to issue new subprime loans (see figure 3).

The market also developed alternative credit enhancement methods for securities beyond traditional bond insurance. The newest form of credit enhancement involved the use of **credit derivatives** including financial products such as **credit default swaps (CDS)**. A CDS is an instrument where the “buyer” of the CDS makes periodic premium payments to the “seller” of the CDS in exchange for the promise of a pay-off if the third-party (“reference entity”) defaults. Thus the risk of default is transferred from the actual holder of the security to the seller of the swap, so the buyer of the swap effectively has insurance against the credit risk of the underlying asset. Unlike traditional bond insurance, the underlying debt issuer is not involved in the CDS transaction. The market for credit derivatives grew to be larger than the market for the underlying assets themselves. This led to concerns that a large-scale default would impact a much broader set of market participants than previously.

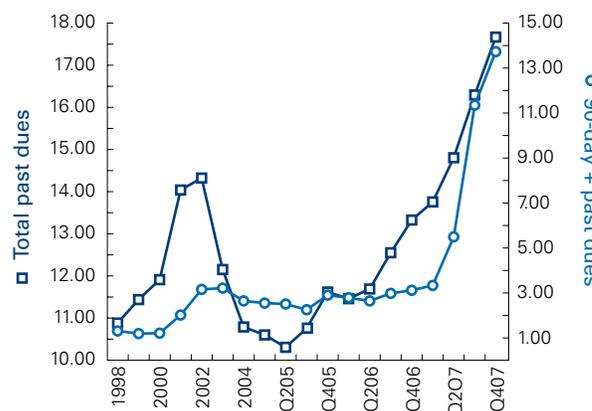
In 2005, CDOs backed by home equity ABS and CDS continued to gain in popularity among investment fund managers. However, the complex structure of CDOs and CDS made it difficult for investors and rating agencies to understand the true credit quality of the underlying assets in any given CDO. The increasing demand for home equity ABS further decreased the rate of return on these securities. As a result, the credit spread became so tight that the bond insurers and traditional investors could not expect the typical returns required for the amount of risk involved in the home equity ABS. In short order, CDOs and CDS replaced traditional investors and bond insurers as the main investors and risk assessors for subordinate tranches in sub-prime mortgage ABS, because the CDOs were willing to accept riskier loans in securitizations that the bond insurers and the traditional investors would have rejected. Thus, when the bond insurers and the traditional investors left the market, the benefit that they had provided—a limit on the riskiness of loans that originators could securitize—disappeared. In effect, there was less constraint on the riskiness of sub-prime loans that

Figure 3
Total New Subprime Loans Originated, 2001–2006



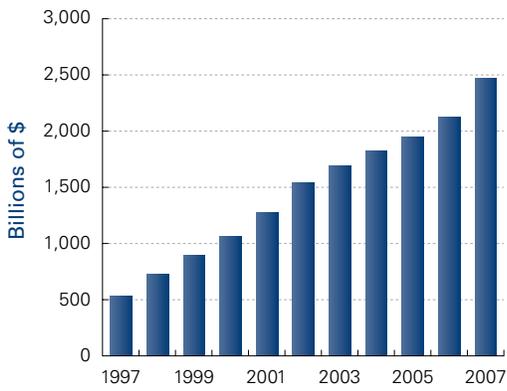
Source: The Federal Reserve

Figure 4
Subprime Mortgage Delinquency Rate



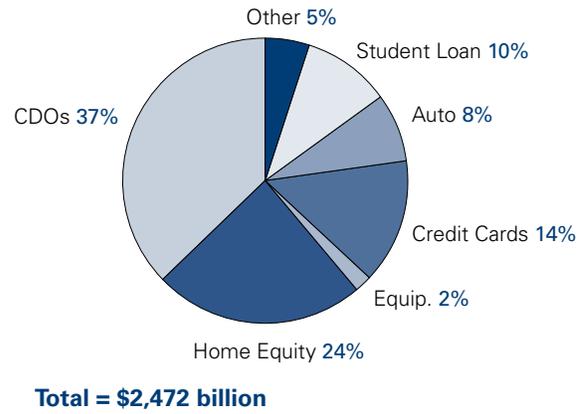
Source: MBA, Credit Suisse

Figure 5
US Asset-Backed Security Outstanding



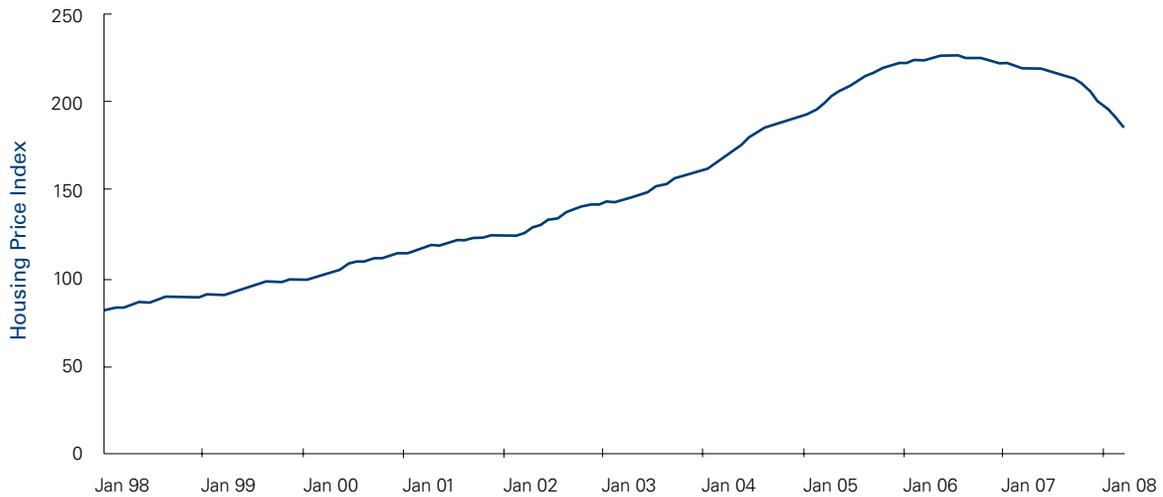
Source: SIFMA

Figure 6
US 2007 Year End ABS Outstanding by Collateral



Source: SIFMA

Figure 7
Case-Schiller Home Price Indices 1998-2008



Source: Standard & Poor's

could be included in securitizations. With fewer constraints, lenders began originating riskier loans. In fact, there is a clearly discernable trend of deteriorating sub-prime loan quality that starts in late 2005 and runs into 2007 (see figure 4). As of 2007, CDOs were the largest underlying asset group of the total outstanding asset-backed securities, followed by home equity loans (see figures 5 and 6).

Home prices started to decline in the beginning of 2006 (see figure 7). Adjustable rate mortgages had been attractive to consumers who wished to pay an initial low fixed rate for two to three years, followed by a reset to a higher adjustable rate for the remainder of the loan period. Troubles began to arise when, in the face of rising interest rates, subprime adjustable rate mortgages began resetting to rates which were too high for many consumers. Late payments led to defaults on home equity asset-backed securities. Since most of the CDOs were backed by home equity ABS, the effect multiplied. All of a sudden, the impact of subprime mortgages defaults was felt all the way from investors to lenders to financial institutions.

Financial Institutions Begin Feeling the “Crunch”

The effects of defaulting subprime mortgages began to impact financial institutions as early as December 2006, when several large mortgage companies filed for bankruptcy citing sub-prime issues. Beginning in July of 2007, credit rating agencies began to downgrade certain mortgage backed securities. Since the pricing of many of these securities was in large part predicated on the strong rating applied by these agencies, the market for the downgraded securities disappeared. Securities that were once considered only slightly riskier than U.S. Treasuries were now becoming virtually untradeable, and were quickly falling in value and demand.

The evaporation of this market forced financial institutions to decrease the value of the securities held as assets on their books through write-downs, significantly reducing the book value of these assets to reflect the decreased market value and recording these adjustments as losses on the income statement. Throughout the summer of 2007 and into 2008, major financial institutions worldwide took sizable write-downs related to their sub-prime mortgage backed securities exposure. The mounting write-downs resulted in an

evaporation of liquidity from the system as financial institutions tightened borrowing terms in order to preserve their remaining capital and financing became increasingly difficult to secure.

Impact on Private Equity

As financial institutions began to feel the dramatic effect of mounting sub-prime related write-downs, the impact began to be felt by the private equity investment industry. Through the booming buyout years of 2005 and 2006, financial institutions were highly willing to lend to private equity funds. This abundance of liquidity was attributed to growth in Asian markets, private wealth expansion and government surpluses. With plenty of liquidity in the market, and with private equity funds proving to be a profitable investment vehicle, financing terms were lenient and often negotiable. This financing leniency was also driven by the ability of financial institutions to maintain liquidity while securitizing CDOs. This enabled these financial institutions to continue lending to private equity firms at record levels.

Up until the sub-prime related write-downs, covenant lite structures made it relatively easy for private equity firms to secure financing. Covenant lite loans are loans offered by financial institutions for leveraged buyout transactions with little to no covenants tied to repayment. About \$8.3 billion in covenant lite loans were extended by financial institutions in June of 2007. Two months later, in the midst of the credit crunch, no covenant lite loans were extended at all. The principal reason for the disappearance of this loan structure was that financial institutions were unable to repackage these loans and sell them to other investors.

Another financing structure which became heavily restricted was the use of Paid in Kind (PIK) toggle notes to finance leveraged buyouts. Paid In Kind (PIK) toggle notes allow borrowers to make interest payments with securities instead of cash. This mechanism essentially allows the private equity investor to take a loan and then choose whether or not they wish to make the interest payments on time or in aggregate at the end of the loan period. These notes carry higher fees but allow for greater repayment flexibility.

Several high profile buyout deals have fallen apart based on financial institutions not being willing to finance the transactions at previously accepted terms. The impact of this credit squeeze has led to a substantial decrease in private equity deal flow.

The Crunch Hits, Regulators Respond

Between December 2006 and February 2007 two more mortgage companies filed for bankruptcy. By March 2007, the effect of subprime mortgage defaults started to spread within the mortgage lending industry as leading subprime lenders stopped making subprime loans.

In an effort to promote confidence, the Federal Reserve announced in March 2007 that it would draft regulations to tighten lending standards. Lenders would be required to grant loans on a borrower's ability to pay the fully indexed interest rate that would apply after the low, initial fixed-rate period of two or three years.

In April 2007, government-sponsored entity Freddie Mac announced plans to refinance up to \$20 billion of loans held by subprime borrowers who would not be able to afford their adjustable rate mortgages (ARM) at the reset rate. The government hoped the extra funding could help to ease the subprime mortgage crisis.

In June 2007, defaults on subprime mortgages reached an all time high. RealtyTrac, a real estate data tracking firm, announced that U.S. **foreclosure** filings surged 90 percent in May from the previous year. The subprime mortgage crisis also began to spread outside of the mortgage lending agencies. Goldman Sachs reported flat profits from the prior year due to mortgage market problems. Bear Stearns pledged up to \$3.2 billion to bail out one of its hedge funds due to excess exposure to subprime related mortgages. Soon thereafter, two hedge funds managed by Bear Stearns that invested heavily in subprime mortgages became insolvent. Countrywide Financial, the nation's largest mortgage lender drew down \$11.5 billion from its credit lines. On August 17, the Federal Reserve cut the discount rate by half a point.

On September 18, 2007, the Federal Reserve cut its target **federal funds rate**, the interest rate at which banks lend

balances to each other, by a half point to 4.75 percent, the first rate cut since June 25, 2003. This is significant because the federal funds rate is a tool that the Fed uses to encourage lending (by lowering the rate) or discourage lending (by increasing the rate).

Shortly after the rate cut, the Office of Federal Housing Enterprise Oversight (OFHEO), the regulator of Fannie Mae and Freddie Mac, agreed to relax restrictions on mortgage finance companies' investment holdings. That action enabled Fannie Mae and Freddie Mac to purchase \$20 billion of non-conforming subprime loans and repackage them into securities, replenishing the supply of lendable money for mortgages in the economy through the secondary mortgage market.

Despite these large-scale efforts, investment banks began announcing plans to write down huge chunks of fixed income portfolios due to exposure to CDOs and subprime mortgages. The subprime crisis came to a dramatic head during the near-bankruptcy of Bear Stearns. Bear Stearns was the largest issuer of mortgage-backed securities. In early March 2008, investors began to express concerns about the ability of the company to meet its capital requirements. This resulted in Bear Stearns' cash position dropping from \$17 billion to \$2 billion in a span of three days as short-term financing became difficult to secure.

In response to the crisis, Bear Stearns was allowed to access the Federal Reserve discount window via JP Morgan. This discount window is normally not accessible to investment banks, but JP Morgan was able to access through its Chase retail banking arm. Next, faced with the prospect that Bear Stearns may need to file for bankruptcy, the Federal Reserve took the unprecedented step of offering support for JP Morgan to purchase the firm in order to protect the counterparties to Bear Stearns contracts and the rest of the financial system.

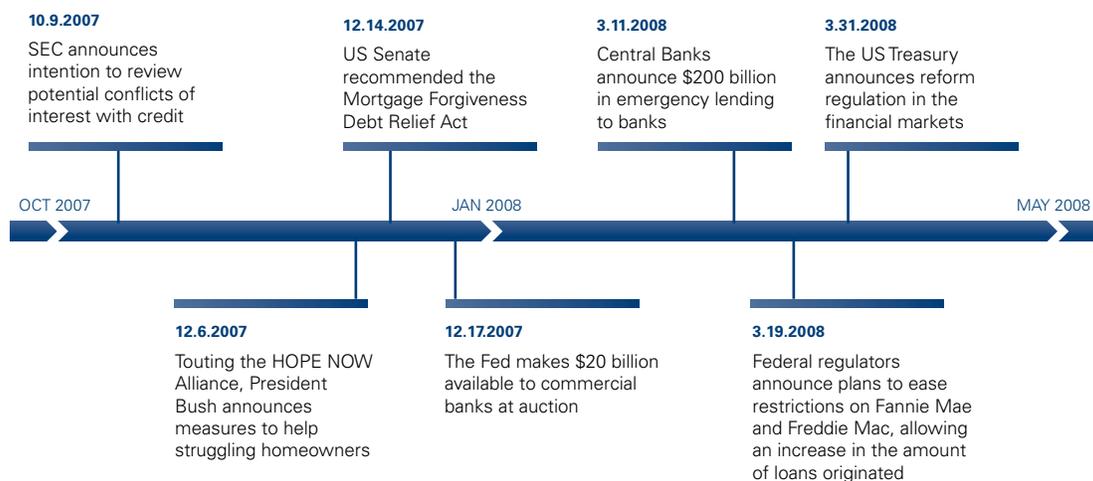
The decision of the Federal Reserve to assist in the JP Morgan purchase of Bear Stearns can be attributed in large part to the counterparty exposure that was inherent in many of the Bear Stearns positions. Counterparty risk is the risk that one party will default on its contractual obligations. Had the company gone bankrupt, many of these counterparties would have

encountered substantial, if not catastrophic losses. This could have triggered further write-downs and additional damage to the financial system.

One of the enduring legacies of the credit crunch is the Fed's decision to expand the list of participants who are eligible for loans from the Central Bank. Securities brokers are now eligible to borrow funds which were up until March 2008, restricted to depository institutions only. The Federal Reserve also has decreased the discount rate for short-term borrowing from the Central Bank. In addition to decreasing the discount rate, the Fed has lowered the federal funds rate, which is the rate at which financial institutions lend to each other overnight.

In the coming months and years, policy makers will continue to grapple with the complex issues that gave rise to the credit crunch. The purpose of the glossary of terms that follows is to make the discussion more accessible to a wider audience of interested parties – whether they be Congressional staff members, journalists, government officials or others with a keen interest in the outcome. The glossary is not exhaustive, but it does represent an attempt to clear away some of the haze that has surrounded the credit crunch debate to enable better understanding and more thoughtful public policy outcomes.

Policy Timeline



Source: Joint Economic Committee

Glossary of Terms

Adjustable Rate Mortgage (ARM)

Adjustable rate mortgage is a type of mortgage on which the interest rate is periodically adjusted. In the U.S., interest rate changes on ARMs are based on changes in an interest rate index.

Mortgage borrowers typically select adjustable rate mortgages over other type of mortgages for one or more of the following reasons:

- If the borrowers have limited credit history, they might need an ARM to qualify for the type of loan they desire. Most subprime mortgages are ARMs.
- Borrowers may want to take advantage of low initial rates on ARMs because they expect to sell the house before the initial rate period ends.
- Borrowers expect future interest rate to be lower than the current rate; therefore, they expect to pay less on the ARM over the life of the loan.

The popularity of ARMs in the mid 2000's contributed to the credit crunch, as many ARM borrowers that were over-extended on their mortgages defaulted when the interest rates and monthly payments adjusted higher.

Asset-Backed Commercial Paper (ABCP)

Asset-backed commercial paper is a type of debt issued by companies to raise cash for short term financing. The proceeds of ABCPs are primarily used to obtain interests in various assets. Some common assets financed through ABCP include trade receivables (cash owed to businesses that allow customers to purchase goods on credit), consumer debt receivables, auto and equipment loans and leases, and collateralized debt obligations (CDOs). Companies are able to utilize asset-backed commercial papers to sell illiquid (not easy to buy or sell) short-term assets such as accounts receivables in exchange for cash to finance other company activities. Financial institutions also issue asset-

backed commercial paper to provide financing alternatives for their clients.

Similar to **corporate commercial paper**, asset-backed commercial paper usually matures within 1 to 270 days. In contrast to corporate commercial paper, asset-backed commercial paper is secured by assets of the debt issuer. In the event of default, individuals holding asset-backed commercial paper have the right to claim the assets linked to the commercial paper. Asset-backed commercial paper usually benefits from some combination of credit enhancements to protect against losses occurring in the assets linked to ABCP.

Asset-Backed Securities (ABS)

An asset-backed security is a security issued on a pool of underlying non-mortgage assets. The collateral underlying asset-backed securities may be either commercial or consumer receivables. The most common asset-backed securities are backed by credit card receivables, home equity loans (loans for which the borrower uses their equity in their home as their collateral), or automobile loans. One benefit is that asset-backed securities provide issuers with access to lower cost funding and greater balance sheet flexibility. Another benefit is that asset securitization provides investors with a broader range of debt investment alternatives. Asset-backed securities are an alternative investment vehicle to corporate bonds or other fixed income investments (i.e. investments that generate periodic payments of a fixed amount).

Collateralized Debt Obligation (CDO)

A collateralized debt obligation is a fixed-income security that is backed by a pool of diversified debt instruments with differing risks and rewards. CDOs can be backed by investment-grade corporate bonds, high-yield corporate bonds, emerging market bonds, **residential mortgage-backed securities (RMBS)**,

commercial mortgage-backed securities (CMBS), real estate investment trusts (REITs), bank loans, special situation loans and distressed debt, and even other CDOs.

CDOs are grouped into three or more tranches that have the same maturity (that is, the same timing of cash flows) but differing levels of credit quality. The senior tranche has the best credit quality and the lowest yield; the **mezzanine** tranche has slightly lower credit quality but a higher yield, and the equity/subordinate tranche has an unrated, riskier credit quality. Senior and mezzanine tranches are typically rated by a rating agency and must receive an investment-grade rating (BBB- or higher from Standard & Poor's, or Baa3 or higher from Moody's). Subordinated/equity tranches are typically not rated, and have the most credit risk exposure among the three tranches.

In the case of mortgages, CDOs usually comprise multiple home equity asset-backed securities or mortgage-backed securities, which are all then distributed into different tranches

based on credit quality. In principle, by being spread across varying types of securities, the overall investment's risk profile is lower than if the investor purchased a single security.

In the case of default, the CDO issuer's assets would be sold to try to cover the losses of investors. However, the senior tranche has first priority in respect to payment, so no part of a claim can be paid to subordinate tranche holders unless senior and mezzanine tranche holders are fully paid. Senior and mezzanine tranches are typically rated by a rating agency and must receive an investment-grade rating (BBB- or higher from Standard & Pooors, Baa3 or higher from Moody's). Subordinated/equity tranches are typically not rated, and have the most **credit risk** exposure among the three tranches.

The growth in **leveraged buyouts** that preceded the credit crunch was accompanied by corresponding strong growth in CDO issuance as CDOs often are used to finance leveraged buyouts.

CDO Tranches



Commercial Mortgage-Backed Securities (CMBS)

Commercial mortgage-backed securities are a type of mortgage-backed security. CMBS are backed by commercial mortgages. One of the significant attributes of commercial mortgage-backed securities as opposed to residential mortgage-backed securities (RMBS) is the fact that most commercial mortgages have provisions that reduce prepayment risk (the risk that mortgage borrowers pay back the debt earlier than scheduled, which decreases the income generated by the mortgage-backed security, and therefore decreases the value of the security).

Convertible Preferred Stock

Convertible securities offer two benefits for the investors. First, convertible securities are senior to common stock, and thus they provide predictable and stable income. Second, they may be converted into common stock and thus afford an investor a chance at dramatic capital gains, a feature usually denied to a fixed income buyer. If the underlying stock does nothing remarkable pricewise, the investor merely holds the convertible and enjoys the income. When and if the common stock rises in price dramatically, the convertible preferred stock will rise along with it. However, there is a cost for this conversion feature, and this is reflected in the yield on the convertible instrument. A straight (nonconvertible) **preferred stock** will yield more than a convertible preferred stock of the same quality.

Corporate Commercial Paper

Corporate commercial paper is a type of debt issued by corporations to raise cash for their short term financing. Corporate commercial paper usually matures within one to 270 days, after which the principal and interest due is paid to holders of the commercial paper in a single lump sum. The proceeds from this type of financing can only be used on current assets (inventories) and are not allowed to be used on fixed assets, such as a new plant. Companies use corporate commercial paper as a cheaper alternative to borrowing from banks or issuing long-term corporate bonds. Unlike **asset-backed commercial paper**, corporate commercial paper's obligations are not guaranteed by any company assets so in

the event of default, individuals holding commercial paper do not have the right to claim any specific assets from the debt issuer. **Special purpose vehicles (SPVs)** are not needed to issue corporate commercial paper, but SPVs are often used for asset-backed commercial paper.

Corporate commercial paper is often offered to the public at a discount because of the risk that the debt issuers will fail to repay the debt holders (credit risk). Since commercial paper is not backed by any form of collateral, only firms with high quality debt ratings will find buyers without having to offer commercial paper at a significant discount.

Credit Default Swaps (CDS)

Credit default swaps provide insurance against credit default by a particular company or sovereign entity. Investors often use CDS as a way to shift security holders' credit risk exposure to credit protection sellers. The sellers provide certain protections in exchange for a fee or premium. In a credit default swap, the document will identify the reference entity or the reference obligation. The reference entity is the issuer of the debt instruments or securities. It could be a corporation, a sovereign government, or a bank.

The buyer of the CDS makes periodic payments to the CDS seller and in return obtains the right to sell a bond or security issued by the reference entity for its face value if the issuer defaults on the interest and principal payments. The payments made by the buyer of protection is called the premium, the contingent payment that might have to be made by the seller is called the protection. Unlike traditional insurance, the underlying debt issuer is not involved in the transaction and may be unaware that a credit default swap is in place. This means that buyers do not have to follow the consents from the administrative agent or the debt issuer.

Some investors and financial institutions buy these swaps to hedge their debt investments, but many others trade them to make bets on whether default risk is rising or falling. As a result the volume of the contracts now far exceeds the actual amount of debt on which they are based. In recent years CDS investors have replaced traditional bond insurers as the main party that prices the credit risk of structured financial products such as

CDOs. However, since investors do not agree on the level of credit risk inherent in the underlying assets of these structured financial products, the pricing of the CDS is highly uncertain and subject to market fluctuations.

Credit Derivatives

Derivatives are financial instruments designed to transfer some form of risk between two or more parties. Credit derivatives are specifically used to transfer credit risk between two parties. Some entities are constantly searching for ways to assume, reduce, or manage credit exposure. These entities include banks, insurance companies, hedge funds, securities companies, pension funds, government agencies and corporations. The ability to buy and sell credit risk is a tool for asset managers to enhance returns. Corporate treasurers can also use credit derivatives to transfer the risk associated with an increase in credit spreads of the issued bonds or securities.

Credit derivatives include credit default swaps, asset swaps, total return swaps, credit-linked notes, credit spread options, and credit spread forwards. By far the most popular credit derivative is the credit default swap.

Credit Enhancement

The most common form of credit enhancement is subordination. A pool of loans could be segmented into different tranches that reflect the risk and reward of each tranche. The subordinated tranches support the senior tranches. Holders of the senior debt tranches have priority of payment over the holders of any junior debt tranche. Therefore, junior debt tranches are rated lower than the senior debt. However, the junior debt carries a higher interest rate. In the case of default the senior tranche holders will have priority to claim the collaterals before the subordinate tranche holders.

Another method of credit enhancement is to insure the rated securities with a financial insurance policy or by hedging the risk. This process transfers the credit risks associated with the underlying assets from the holders of the rated securities to the insurance company.

Credit Risk

Credit risk, also known as default risk, is the risk that a loan borrower or a bond issuer will default by failing to repay principal and interest in a timely manner. For example, bonds issued by the federal government are less likely to default than bonds issued by corporations, and therefore have lower credit risk.

Credit risk can be very difficult to assess in the case of complex securitized financial instruments. Rating agencies are often responsible for assessing credit risk and assigning credit ratings to financial instruments.

Credit Spread

Credit spreads are a measure of the market's valuation of credit risk.

The credit spread reflects the additional percentage of return investors have to be compensated by taking on additional credit risk of a security or bond. The higher the credit risk (lower credit rating), the bigger the credit spread. Credit spreads are quoted in basis points (hundredths of a percentage point) relative to a risk-free benchmark such as a U.S. Treasury Bond.

For example, if a corporate bond rated AAA by Standard & Poor's has a credit spread of 100 basis points over Treasury Bills (considered the lowest risk investment), then a corporate bond rated BBB by Standard & Poor's, i.e. a bond with higher risk of default on payment, must offer a wider credit spread (above 100 basis points) to attract investors. If credit risk increases (e.g. due to a drop in the earnings of the company that issued the corporate bond) then the credit spread will widen further.

Credit spread risk is the risk of financial loss resulting from changes in the level of credit spreads used in the **mark to market** of a product (security or bond).

Debt Covenants

Debt covenants are the agreed upon conditions of borrowing between companies and their creditors. In general, debt covenants are designed to prevent the borrower from taking actions that increase the risk level of outstanding debt and to enable recovery of the principal amount in cases where the

borrower is under-performing. Breaching of debt covenants will make the loan repayable immediately. Bond covenants often carry restrictions that require all new debt to be subordinated (that is, have a lower priority claim in the case of bankruptcy) and prohibit the creation of new debt with a superior claim.

In the case of corporate borrowers, debt covenants often require that the corporate borrower maintain a maximum **Debt-to-EBITDA ratio** or minimum **Interest Coverage ratio**. Companies that undergo leveraged buyouts typically need to have stable sources of cash flow to ensure that they do not breach the ratio requirements of their debt covenants.

Debt-to-EBITDA Ratio

The Debt-to-EBITDA ratio is widely used by lenders and other investors as an indicator measuring credit risk, or the ability of a company to service its debt and make its interest payments. EBITDA (Earnings before Interest, Taxes, Depreciation and Amortization) is a measure of a company's fundamental earnings power that excludes the effects of interest payment, taxes and capital expenditures.

Note that Debt-to-EBITDA is only one of many indicators that can be used to evaluate credit risk for a company

Debt-to-Equity Ratio

The Debt-to-Equity ratio, also known as the leverage or gearing ratio, analyzes the financial structure of a business. Long-term debt (excluding current liabilities or debt with maturities shorter than one year) is expressed as a percentage of the company's equity. A company with a high debt-to-equity ratio relative to industry peers would be considered highly leveraged. Note that high leverage (high levels of debt) is not necessarily an indication that the company is troubled or at risk. In financial theory, maintaining a capital structure with an optimal level of debt is beneficial to companies due to the lower cost of debt relative to equity. In addition, certain industries generally have higher Debt-to-Equity ratios than others, due to greater need for debt financing.

Debt-to-Income Ratio

The Debt-to-Income ratio measures the amount of income earned versus the amount of money owed to creditors. A low Debt-to-Income ratio indicates less income will be used to pay off periodic interest and principal payment obligations. Debt-to-Income ratio is often used by mortgage agencies as an indicator of an individual's financial health.

Fair Value Accounting

Fair value accounting is an accounting procedure for assigning true market values to the company's assets and liabilities. This is in contrast to the book, or cost, method, where the value of assets are based on the original cost of the asset less periodic reductions for depreciation or amortization based on a schedule. The fair value of an asset is the amount at which that asset could be bought or sold in a current transaction between willing parties. The fair value of a liability is the amount at which that liability could be incurred or settled in a current transaction between willing parties.

If available, a quoted market price in an active market is the best evidence of fair value and should be used as the basis for the measurement. If a quoted market price is not available, an estimate of fair value using the best information available in the circumstances is made. In many circumstances, quoted market prices are unavailable. As a result, difficulties occur when making estimates of fair value. Methods that can be used to value assets when market prices are unavailable include **mark to model** and mark to management projections.

Federal Funds Rate

The federal funds rate is the rate charged by banks with excess reserves at a Federal Reserve district bank to banks needing overnight loans to meet reserve requirements (the portion of deposits that a bank must hold as vault cash or on deposit at the Federal Reserve). The federal funds rate is also known as the overnight rate. In recent years, the Fed has used the federal funds rate as its short-term policy instrument. When the Federal Open Market Committee meets every six weeks to set monetary policy, it votes on a target for this interest rate that will apply until the next meeting. The

federal funds rate is the main interest rate indicator for interest rates in general. When economy is slowing down, The Fed decreases the federal funds rate to encourage lending for new investments. In the case of an over-heating economy, The Fed increases the federal funds rate to discourage new lending.

Foreclosure

Foreclosure is the legal process by which an owner's right to a property is terminated due to default in loan payment on the mortgage. Foreclosure allows a lender to recover the amount owed on a defaulted loan by selling or taking ownership (repossession) of the property that is security for the loan.

When a borrower/owner defaults on loan payments (usually mortgage payments) and the lender files a public default notice, called a Notice of Default (NOD) or Lis Pendens (LIS), the loan is officially in the foreclosure process. There are three stages in the foreclosure process: pre-foreclosure (NOD, LIS), auction (NTS - Notice of Trustee's Sale, NFS - Notice of Foreclosure Sale) and bank-owned (Real Estate Owned or REO)

- Pre-foreclosure (NOD, LIS): The mortgage borrower is given a grace period to sell the property to a third party to pay off the loan in full and avoid having a foreclosure on borrowers' credit history.
- Auction (NTS, NFS): If the property is not sold during the pre-foreclosure process, potential buyers can bid on the property at a public auction.
- Bank-owned (REO): If the lender takes ownership of the property, either through an agreement with the owner during pre-foreclosure or because there are no satisfactory opening bids at the public auction. The lender will eventually re-sell the property to recover the unpaid loan amount.

High Yield Bond (Junk Bond)

High yield bonds, also known as junk bonds, have a high level of credit risk (that is, the probability that issuers of these bonds will default on their payments is comparatively high). Investors in these bonds must be compensated with a higher return on investment (a higher yield) than on lower-risk bonds. By definition, high yield bonds have a credit rating assigned by a

rating agency of speculative or below investment grade (BB+ or lower from Standard & Poor's or Ba1 or lower from Moody's).

Interest Coverage Ratio

The Interest Coverage ratio, also called times interest earned, is defined as net income before interest and taxes, divided by interest payments due. The Interest Coverage ratio is a measure of how safely the company is able to make interest payments based on the company's current earnings power.

Leveraged Buyout (LBO)

A leveraged buyout is a corporate finance technique in which a controlling interest in a company is acquired by a person or entity using the value of the company's assets to secure debt financing for the acquisition. LBOs are commonly used by private equity firms (also are known as financial sponsors). Private equity firms are investment partnerships that specialize in buying, increasing the value and ultimately selling companies. Typically, attractive candidates for LBOs are companies with low existing debt, reliable and consistent cash flows that can be used to pay down new debt, significant tangible assets that can be used as collateral for new debt and potential for operational or other improvements to boost cash flow.

Liquidity Risk

Liquidity risk is the risk of receiving less than the potential market value (fair value) of an investment if it must be sold for cash quickly. An example would be a security holder trying to exchange securities for cash in a **secondary market**. If other investors at the time are not interested in the securities offered by the holder, the seller will have to offer the securities at lower than market value in order to exchange the securities for cash immediately.

Loan-to-Value Ratio (LTV)

The Loan-to-Value ratio (LTV) reflects the percentage of the total value of property being financed. For example, assume a property is worth \$100,000. If the mortgage on the property is \$70,000, then the loan to value ratio is 70 percent. Higher loan-to-value ratios represent higher risks for the lender.

London Interbank Offered Rate (LIBOR)

LIBOR is the interest rate that the most creditworthy international banks dealing in Euro dollars charge each other for large loans. The duration of LIBOR can refer to loans ranging from one-month to one-year. LIBOR is an important rate indicator for banks to issue loans to corporations and consumers. Often times LIBOR is the main interest rate indicator for adjustable rate loans including mortgages and credit card debts.

Mark to Market

Mark to market is the accounting method of assigning a value to a financial instrument based on the current market price for that instrument. Mark to market can only be used as a valuation mechanism when a well established market exists for financial instruments such as public traded stock, government bond, and etc. For new financial instruments where there are very few transactions, mark to market is not a practical valuation system.

Mark to Model

Mark to model is an accounting method of determining the value of a security by using a financial model to interpolate among the market prices readily available. A mark to model is less reliable than a mark to market, because it depends on hypotheses and assumptions in the model and may attribute a degree of liquidity to the instruments being priced that may not be present. With many complex financial instruments, where no ready market is available, a mark to model is the only practical valuation technique.

Many subprime related CDOs are priced using mark to model technique because there is no historical market data available for alternative pricing techniques.

Mezzanine Debt

Mezzanine debt is debt that incorporates equity-based options such as stock call options, right and warrants with lower priority debt. Mezzanine debt is often used in acquisitions because new owners can be prioritized ahead of existing

equity holders in the event of bankruptcy. This level of debt is referred to as “mezzanine” because it falls below the senior debt layer and above the equity layer of financing.

Mortgage-Backed Security (MBS)

Mortgage-backed securities are securities backed by pools of mortgage loans. Mortgage loans are the largest asset group used to back up securities. In most cases, a mortgage-backed security (MBS) can be backed by conforming or non-conforming mortgage loans. The pool of mortgages will go through the securitization process and be repackaged as an MBS. During the securitization process, the actual loans are sold to government sponsored entities such as Fannie Mae or Freddie Mac, or private entities such as investment banks or hedge funds, depending on the characteristic of each loan (that is, conforming or non-conforming). Conforming loans are usually sold to government-sponsored entities such as Fannie Mae or Freddie Mac. Non-conforming loans are usually sold to private entities with underwriting capabilities because they do not conform to the standards of Fannie Mae or Freddie Mac. Once the loan is sold, the GSE or private entity will repackage it into securities to be sold to investors in the general market, transforming illiquid mortgage loans into marketable securities. All principal and interest payments from the pool of mortgages are paid to investors on a periodic basis.

Mortgage-backed securities (MBS) can be further divided into residential mortgage-backed securities (RMBS) and commercial mortgage-backed securities (CMBS). Once purchased by the investor, the investor will collect on the periodic interest and principal payments made by the borrower. Like any other securitized assets, MBS are rated by credit agencies. If deemed to be a risky investment, credit enhancements must be utilized to make them more marketable to potential investors.

Preferred Stock

Preferred stocks have a fixed dividend rate. In this respect they are very similar to bonds. Bonds and preferred stocks are collectively referred to as fixed income securities. A preferred stock's fixed dividend rate is announced at the time the stock

Securitization

Securitization has changed the way money is raised for the borrowing needs of consumers and businesses. Historically, the only option for financial intermediaries such as commercial banks to lend money was to gather deposits. Securitization bypasses traditional financial intermediaries and connects borrowers directly to institutional and individual investors. These investors seek investment vehicles that provide periodic interest and principal payments. These investment vehicles are also backed by collateral in the case of default (though as we have seen in this paper, the questions of whether the collateral was sufficient, whether investors fully understood the credit quality of the collateral, and other issues remain unclear). The funds raised through securitization can be used by consumers and businesses to purchase property, invest in capital, pay tuition, etc.

There are three main objectives for securitization:

- *Balance sheet management:* Loans, account receivables, or other types of debts are considered assets by the originator or lender, but these assets are not as liquid (easy to buy and sell) as assets traded in an active secondary market. The securitization process enables holders of these assets to repackage the assets into securities that are tradable in a secondary market. These securities are held by an SPV, and thus are not maintained on the balance sheet of the originator.
- *Financing:* through the process of securitizing assets, the original holder is able to secure cash for financing other projects.
- *Lower cost of funds:* Securitization is also a cheaper alternative for companies to raise funds than borrowing from banks or issuing long-term bonds.

In essence, securitization is the process of repackaging otherwise illiquid individual loans and converting them into liquid, marketable securities. The individual loan borrowers make their interest and principal payments to the firms issuing the securities who, in turn, funnel these profits to their investors.

Special Purpose Vehicle/Entity (SPV/SPE)

Special purpose vehicles (SPV), also referred to as special purpose entities (SPE) or special purpose companies (SPC), are separate legal entities set up for a specific purpose. In the context of securitization, SPVs are utilized as a separate entity by both originators of loans and investors in securitized loan assets. For example, the originator of loans or other assets (accounts receivable, royalty payments) would transfer those loans or other assets to an SPV, and then the SPV would sell those assets to a second SPV created by a government institution or a private sector financial institution that specializes in securitization. The second SPV would repackage assets into securities and offer them to potential investors in exchange for cash.

Structured Investment Vehicle (SIV)

A SIV is a pool of investment assets that profits from the credit spreads between short and long term debt. A SIV issues short-term debt instruments such as commercial papers at low interest rates. The SIV will then use the fund raised by short-term debt instruments to purchase medium or long-term fixed income assets that pays at a higher interest rate than short-term debt instruments. SIVs will try to gain profit from the interest rate difference between short-term and long-term debt instruments and at the same time minimizing the risk exposure.

Subprime Mortgage

A subprime mortgage is granted to borrowers whose credit history is not sufficient to qualify for a traditional conforming loan at **prime rate**. Subprime mortgage borrowers are often charged with a higher interest rate than prime rate to reflect the risk of default on the mortgage associated to poor credit histories.

Conforming loans include conventional loans with or without private mortgage insurance sold to Fannie Mae or Freddie Mac, the two largest suppliers of mortgage funds to the marketplace, as well as FHA and VA loans. A subprime mortgage is often referred to as a "non-conforming" loan issue by private entities such as banks and mortgage agencies. Sub-prime mortgages may have expanded loan-to-value limits or more flexible credit requirements.

Tranche

The objective of tranches is to repackage risky assets such as subprime loans into a broader package of investment-grade and non-investment grade securities, each with a different risk and reward profile. Investors can then select the tranche that fits their investment objectives based on the amount of risk they are willing to bear in return for higher levels of interest income.

Tranches are categorized as senior, mezzanine, and subordinated/equity, according to their degree of credit risk. Senior and mezzanine tranches are typically rated by a rating agency and must receive an investment-grade rating (BBB- or higher from Standard & Poors, Baa3 or higher from Moody's). Subordinated/equity tranches are typically not rated, and have the most credit risk exposure among the three tranches.

Warehousing

Warehousing is a process that facilitates the issuance of financial instruments such as mortgage-backed securities by gathering individual mortgages into a large pool. This gives it ability to develop a primary market with standardization and efficiency of underwriting and documentation.

Mortgage bankers need to keep sold loans in warehouse until they find a suitable secondary market investor. Mortgage bankers obtain most of the funds needed for loan production from loans called warehouse loans (provided by warehouse lenders). Typically, a mortgage banker's loan production capabilities depends upon their borrowings from warehouse lenders. Most of the time warehouse lenders offer short term loans (90 to 180 days) on a revolving basis to mortgage lenders (mortgage bankers). Mortgage bankers earn a spread between the short term interest rate they pay to the warehouse lender and the long term interest rate they receive from the borrower.

While the mortgage banker has the loan in warehouse, the mortgage collateral is transferred to the warehouse lender. The warehouse lenders transfer their portfolio of mortgage collaterals into SPVs. SPVs will then issue mortgage-backed securities and offer them to the public in exchange for cash. The funds raised by the mortgage-backed securities can then be used to make new loans.

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