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Chapter Name: Deciphering the Liquidity and Credit Crunch 2007-2008

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1 Introduction

- The financial market turmoil in 2007 and 2008 had led to the most severe financial crisis since the Great Depression and had large repercussions on the real economy.
- The bursting of the housing bubble forced banks to write down several hundred billion dollars in bad loans caused by mortgage delinquencies. At the same time, the stock market capitalization of the major banks declined by more than twice as much.
- While the overall mortgage losses are large on an absolute scale, they are still relatively modest compared to the \$8 trillion of U.S. stock market wealth lost between October 2007, when the stock market reached an all-time high, and October 2008.
- We try to understand the economic mechanisms that caused losses in the mortgage market to amplify into such large dislocations and turmoil in the financial markets, and describe common economic threads that explain the plethora of market declines, liquidity dry-ups, defaults, and bailouts that occurred after the crisis broke in summer 2007.

2 Banking Industry Trends Leading up to the Liquidity Squeeze

Trends

- Two trends in the banking industry contributed significantly to the lending boom and housing frenzy that laid the foundation for the crisis.
- First, instead of holding loans on banks' balance sheets, banks moved to an “originate and distribute” model. Banks repackaged loans and passed them on to various other financial investors, thereby off-loading risk.
- Second, banks increasingly financed their asset holdings with shorter maturity instruments. This change left banks particularly exposed to a dry-up in funding liquidity.

2 Banking Industry Trends Leading up to the Liquidity Squeeze

Background

- The U.S. economy was experiencing a low interest rate environment, both because of large capital inflows from abroad, especially from Asian countries, and because the Federal Reserve had adopted a lax interest rate policy. Asian countries bought U.S. securities both to peg the exchange rates at an export-friendly level and to hedge against a depreciation of their own currencies against the dollar, a lesson learned from the Southeast Asian crisis of the late 1990s.
- The Federal Reserve Bank feared a deflationary period after the bursting of the Internet bubble and thus did not counteract the buildup of the housing bubble.
- At the same time, the banking system underwent an important transformation. The traditional banking model, in which the issuing banks hold loans until they are repaid, was replaced by the “originate and distribute” banking model, in which loans are pooled, tranced, and then resold via securitization. The creation of new securities facilitated the large capital inflows from abroad.

3 Securitization: Credit Protection, Pooling and Tranching Risk

Overview

- To offload risk, banks typically create “structured” products often referred to as collateralized debt obligations (CDOs) or asset backed securities (ASBs).
- The first step is to form diversified portfolios of mortgages and other types of loans, corporate bonds, and other assets like credit card receivables.
- The next step is to slice these portfolios into different tranches. These tranches are then sold to investor groups with different appetites for risk.
- The safest tranche— known as the “super senior tranche”— offers investors a (relatively) low interest rate, but it is the first to be paid out of the cash flows of the portfolio.
- In contrast, the most junior tranche—referred to as the “equity tranche” or “toxic waste”—will be paid only after all other tranches have been paid. The mezzanine tranches are between these extremes.
- Buyers of these tranches or regular bonds can also protect themselves by purchasing credit default swaps (CDS), which are contracts insuring against the default of a particular bond or tranche. The buyer of these contracts pays a periodic fixed fee in exchange for a contingent payment in the event of credit default.

3 Securitization: Credit Protection, Pooling and Tranching Risk

Uses and Consequences

- Structured financial products can cater to the needs of different investor groups. Risk can be shifted to those who wish to bear it, and it can be widely spread among many market participants. This allows for lower mortgage rates and lower interest rates on corporate and other types of loans.
- Besides lower interest rates, securitization allows certain institutional investors to hold assets (indirectly) that they were previously prevented from holding by regulatory requirements. For example, certain money market and pension funds that were allowed to invest only in AAA-rated fixed-income securities could now also invest in a AAA-rated senior tranche of a portfolio constructed from BBB-rated securities.
- However, a large part of the credit risk never left the banking system, since banks, including sophisticated investment banks, were among the most active buyers of structured products (see for example, Duffie, 2008). This suggests that other, perhaps less worthy motives were also at work in encouraging the creation and purchase of these assets.

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Securitization: Credit Protection, Pooling and Tranching Risk

Uses and Consequences

- One distorting force leading to the popularity of structured investment vehicles was regulatory and ratings arbitrage. The Basel I accord (an international agreement that sets guidelines for bank regulation) required that banks hold capital of at least 8 percent of the loans on their balance sheets; this capital requirement (called a “capital charge”) was much lower for contractual credit lines.
- Moreover, there was no capital charge at all for “reputational” credit lines—noncontractual liquidity backstops that sponsoring banks provided to structured investment vehicles to maintain their reputation. Thus, moving a pool of loans into off-balance-sheet vehicles, and then granting a credit line to that pool to ensure a AAA-rating, allowed banks to reduce the amount of capital they needed to hold to conform with Basel I regulations while the risk for the bank remained essentially unchanged.
- Banks were able to reduce their capital charges by pooling loans in off-balance-sheet vehicles. Because of the reduction of idiosyncratic risk through diversification, assets issued by these vehicles received a better rating than did the individual securities in the pool. In addition, issuing short-term assets improved the overall rating even further, since banks sponsoring these structured investment vehicles were not sufficiently downgraded for granting liquidity backstops.

3 **Securitization: Credit Protection, Pooling and Tranching Risk**

Uses and Consequences

- The statistical models of many professional investors and credit-rating agencies provided overly optimistic forecasts about structured finance products.
- One reason is that these models were based on historically low mortgage default and delinquency rates. More importantly, past downturns in housing prices were primarily regional phenomena—the United States had not experienced a nationwide decline in housing prices in the period following World War II. The assumed low cross-regional correlation of house prices generated a perceived diversification benefit that especially boosted the valuations of AAA-rated tranches.
- Structured products may have received more favorable ratings compared to corporate bonds because rating agencies collected higher fees for structured products.
- “Rating at the edge” might also have contributed to favorable ratings of structured products versus corporate bonds; while a AAA-rated bond represents a band of risk ranging from a near-zero default risk to a risk that just makes it into the AAA-rated group, banks worked closely with the rating agencies to ensure that AAA tranches were always sliced in such a way that they just crossed the dividing line to reach the AAA rating.

3 **Securitization: Credit Protection, Pooling and Tranching Risk**

Uses and Consequences

- Fund managers, “searching for yield,” were attracted to buying structured products because they seemingly offered high expected returns with a small probability of catastrophic loss.
- Some fund managers may have favored the relatively illiquid junior tranches precisely because they trade so infrequently and were therefore hard to value. These managers could make their monthly returns appear attractively smooth over time because they had some flexibility with regard to when they could revalue their portfolios.

4 Shortening Maturity Structure & Demand from Money Market Funds

- Most investors prefer assets with short maturities, such as short-term money market funds. It allows them to withdraw funds at short notice to accommodate their own funding needs or it can serve as a commitment device to discipline banks with the threat of possible withdrawals.
- Funds might also opt for short-term financing to signal their confidence in their ability to perform. On the other hand, most investment projects and mortgages have maturities measured in years or even decades. In the traditional banking model, commercial banks financed these loans with deposits that could be withdrawn at short notice.
- The same maturity mismatch was transferred to a “shadow” banking system consisting of off-balance-sheet investment vehicles and conduits. These structured investment vehicles raise funds by selling short-term asset-backed commercial paper with an average maturity of 90 days and medium-term notes with an average maturity of just over one year, primarily to money market funds.
- The short-term assets are called “asset backed” because they are backed by a pool of mortgages or other loans as collateral. In the case of default, owners of the asset-backed commercial paper have the power to seize and sell the underlying collateral assets.

4 Shortening Maturity Structure & Demand from Money Market Funds

- The strategy of off-balance-sheet vehicles—investing in long-term assets and borrowing with short-term paper—exposes the banks to funding liquidity risk: investors might suddenly stop buying asset-backed commercial paper, preventing these vehicles from rolling over their short-term debt.
- To ensure funding liquidity for the vehicle, the sponsoring bank grants a credit line to the vehicle, called a “liquidity backstop.”
- As a result, the banking system still bears the liquidity risk from holding long-term assets and making short-term loans even though it does not appear on the banks’ balance sheets.
- There was an increase in the maturity mismatch on the balance sheet of investment banks. This change was the result of a move towards financing balance sheets with short-term repurchase agreements, or “repos.”
- In a repo contract, a firm borrows funds by selling a collateral asset today and promising to repurchase it at a later date. The growth in repo financing as a fraction of investment banks’ total assets is mostly due to an increase in overnight repos. The fraction of total investment bank assets financed by overnight repos roughly doubled from 2000 to 2007. Term repos with a maturity of up to three months had stayed roughly constant at as a fraction of total assets.
- This greater reliance on overnight financing required investment banks to roll over a large part of their funding on a daily basis.

5 Lending Frenzy & Housing Boom

- The rise in popularity of securitized products ultimately led to a flood of cheap credit, and lending standards fell. Because a substantial part of the risk will be borne by other financial institutions, banks essentially faced only the “pipeline risk” of holding a loan for some months until the risks were passed on, so they had little incentive to take particular care in approving loan applications and monitoring loans.
- Empirical evidence suggests that increased securitization led to a decline in credit quality. Mortgage brokers offered teaser rates, no-documentation mortgages, piggyback mortgages (a combination of two mortgages that eliminates the need for a down payment), and NINJA (“no income, no job or assets”) loans. All these mortgages were granted under the premise that background checks are unnecessary because house prices could only rise, and a borrower could thus always refinance a loan using the increased value of the house.
- This combination of cheap credit and low lending standards resulted in the housing frenzy that laid the foundations for the crisis. By early 2007, many observers were concerned about the risk of a “liquidity bubble” or “credit bubble”. However, they were reluctant to bet against the bubble.
- It was perceived to be more profitable to ride the wave than to lean against it. Nevertheless, there was a widespread feeling that the day of reckoning would eventually come.

6 Subprime Mortgages

- In about the year 2000, house prices started to rise much faster than they had in the previous decade. The very low level of interest rates between 2002 and 2005 was an important contributory factor, but the bubble in house prices was largely fueled by mortgage lending practices.
- The 2000 to 2006 period was characterized by a huge increase in what is termed subprime mortgage lending. Subprime mortgages are mortgages that are considered to be significantly more risky than average.
- Before 2000, most mortgages classified as subprime were second mortgages. After 2000, this changed as financial institutions became more comfortable with the notion of a subprime first mortgage.

7 Relaxation of Lending Standards

- Mortgage lenders in the United States started to relax their lending standards in about 2000. This made house purchases possible for many families that had previously been considered to be not sufficiently creditworthy to qualify for a mortgage. These families increased the demand for real estate and prices rose.
- To mortgage brokers and mortgage lenders, the combination of more lending and rising house prices was attractive. More lending meant bigger profits. Rising house prices meant that the lending was well covered by the underlying collateral. If the borrower defaulted, the resulting foreclosure would lead to little or no loss.
- As house prices rose, it was more difficult for first-time buyers to afford a house. In order to continue to attract new entrants to the housing market, brokers and lenders had to find ways to relax their lending standards even more—and this is exactly what they did. The amount lent as a percentage of the house price increased.
- Adjustable rate mortgages (ARMs) were developed where there was a low teaser rate of interest that would last for two or three years and be followed by a rate that was liable to be much higher. Lenders also became more cavalier in the way they reviewed mortgage applications. Indeed, the applicant's income and other information reported on the application were frequently not checked.

7 Relaxation of Lending Standards

- The U.S. government had, since the 1990s, been trying to expand home ownership, and had been applying pressure to mortgage lenders to increase loans to low and moderate-income households. Some state legislators (such as those in Ohio and Georgia) were concerned about what was going on and wanted to curtail predatory lending. However, the courts decided that national standards should prevail.
- Therefore the government was not strictly regulating the behavior of mortgage lenders.