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SUBPRIME-MORTGAGE CRISIS 2008
Subprime Mortgage Crisis - "Red September"

**September 14, 2008:**
Merrill Lynch sold to Bank of America amidst fears of a liquidity crisis and Lehman Brothers collapse.

**September 15, 2008:**
Lehman Brothers files for bankruptcy protection.

**September 19, 2008:**
Paulson financial rescue plan unveiled after a volatile week in stock and debt markets.

**September 25, 2008:**
Washington Mutual was seized by the Federal Deposit Insurance Corporation, and its banking assets were sold to JP Morgan Chase for $1.9bn.

**September 7, 2008:**
Federal takeover of Fannie Mae and Freddie Mac.

**September 16, 2008:**
Moody's and Standard and Poor's downgrade ratings on AIG's credit on concerns over continuing losses to mortgage-backed securities, sending the company into fears of insolvency.

**September 17, 2008:**
The US Federal Reserve loans $85 billion to American International Group (AIG) to avoid bankruptcy.

**September 29, 2008:**
The House rejected bail-out bill, DJIA down 7%.

**October 3, 2008:**
The House pass the bail out bill.
What caused the financial industry crisis?

- **Congress**: for overzealously pushing homeownership
- **Fed**: for keeping interest rate so low
- **Predatory lenders**: for taking advantage of unqualified and vulnerable home buyers
- **Home buyers**: for getting over the heads
- **White House**: for letting banking regulations become too loose
- **Finance executives**: for selling products they didn’t understand while enjoying outsized profits
- **Mark-to-market accounting**: for accelerating downturn
- **Rating agencies**: for mischaracterizing paper
- **Short-selling hedge funds**: for betting on doomsday
- **The transformation of investment banks** from private partnerships into publicly traded companies

**Source**: Jack, Suzy Welch (2008, September 25). *BusinessWeek*
The Debt Trap = Individual Leverage

The American Way of Debt  By Amy Schoenfeld and Matthew Bloch

An average household's debt and annual savings, in today's dollars

Roll across the chart to see details for each decade

2000s

Debts soar with rising house prices, historically low rates and increased access to credit. Only a quarter of households have no debts. But in 2008, debts are down slightly.

- MORTGAGES: Homeownership rises to nearly 70 percent. Thirty-one percent of homeowners have no mortgage debt.
- INSTALLMENT: Two-thirds of college students have student loan debt, up from half in the 1990s.
- CREDIT CARDS: Forty percent of households carry a credit card balance, up from 6 percent in 1970. The average household has 13 cards.

Source: The New York Times
Financial Ratio = Corporate Leverage

Leverage ratio (Debt/Equity)

[Bar chart showing data for various companies over different years]
Macroeconomic Analysis

Created by Robin Thieu, 2008 Fall
Housing growth faster than GDP...

Source: The Federal Reserve
...because of low Mortgage Rates and Fed rate ...

Source: Federal Home Loan Mortgage Corporation's (Freddie Mac)
...then Home Price moves south...

Source: Standard & Poor’s
Total Subprime Mortgage Originations Growth

Figure 1. Total Subprime Originations

Homeowners Equity vs. Mortgage

Source: The Federal Reserve
Unemployment Rate

Sample Housing Data
- Housing price index (1980=100)
- Unemployment rate
- Population (thousands)
- Percent subprime loans

Source: State of the USA and BBC
US Homeownership Rate

Source: State of the USA
Macroeconomic Analysis

- **Observations**

  - Housing bubble is pushed much higher than the GDP growth

  - From year 2000 to 2006, when the mortgage rate is low, housing price keeps going up

  - Subprime borrowing was a major contributor to an increase in home ownership rates and the demand for housing
Macroeconomic Analysis

▪ Observations
  - The growth of subprime mortgage results in homeowners’ mortgage is greater than their equity
  - Homeownership and housing price keep growing from year 1994 to 2005 even though unemployment rate goes up and down

▪ Conclusion
  Subprime mortgage is the main contributor for “housing bubble”
Mortgage Lenders & Banks

\[ V(A) + V(E) > V(D) \]

- House
- Income
- Mortgage Subprime

Credit Crunch

MBSs

- Mortgage Lenders (Countrywide, Indy Mac, Fannie & Freddie)
- Banks (Citibank, BOA)
- Investment Banks (Bear Stearns, Lehman, Merrill Lynch)

V(A) + V(E) > V(D)

- Insurers (AIG)
- Rating

Investors (Banks, Funds, Insurance)

SPV
Making MBS

Step 1
The creator of a subprime residential mortgage-backed security -- or RMBS -- buys loans from all over the country, often from several different lenders. Several thousand loans go into one mortgage-backed security. Because the security combines the specific risks of all the individual loans into a single pool, its investors as a whole are less exposed to the potential problems of any one borrower.

Fitch Ratings scale

Making MBS

Step 2
The residential mortgage-backed security repackages and redistributes the income from the loans among different classes of bonds. Highly rated bonds are the first to receive income and the last to suffer any losses, but they also offer the lowest return. Low-rated bonds pay a better return, but are also among the first to take any losses if borrowers renege on the loans in the pool.

Making MBS

As many as 150 mortgage-backed bonds -- or other mortgage-linked investments -- are packaged into a single CDO. In the case of a mezzanine CDO, these investments are mostly linked to pieces of mortgage-backed securities that carry a rating of triple-B, just above junk. This boosts the yield the CDO can offer, but also makes its investors more vulnerable to losses.

Fannie Mae

A Small Cushion for a Potentially Big Fall

Fannie Mae and Freddie Mac purchase mortgages from other institutions and either hold them in their own portfolios or sell them to investors. Here are some of Fannie Mae’s financial positions that relate to its core capital — or its cushion against losses. If the core capital falls below a government-mandated threshold, taxpayers could become responsible for trillions of dollars of commitments.

Fannie Mae financial positions
As of the end of 2007

- One cube represents $1 billion
- Guaranteed mortgages: $2.1 trillion
- Core capital: $46 billion
- Outstanding debt: $796 billion
- Mortgages held as investment: $724 billion

Note: Freddie Mac’s situation is similar with $38 billion in core capital, $710 billion of mortgages held as investments, $739 billion of outstanding debt and $1.4 trillion of mortgages guaranteed.

Source: Office of Federal Housing Enterprise Oversight

Source: Analyticalwealth.com
Mortgage Default

Unresolved Issues
A bailout of financial firms is being negotiated, but problems afflicting the U.S housing market remain.

Inventory of unsold previously owned homes
In months of sales at the current pace

2000  '01  '02  '03  '04  '05  '06  '07  '08
12
9
6
3

Median sales price
Change from a year earlier
20%
10%
0%
-10%

2000  '01  '02  '03  '04  '05  '06  '07  '08

Delinquencies and defaults on first mortgages
Delinquency rate

5%
4%
3%
2%
1%

Notes: Delinquency and default rates are seasonally adjusted U.S. averages measured as a percentage of loan value outstanding. A loan is considered delinquent if the payment is late by 30 days or more.
Sources: National Association of Realtors; Moody's Economy.com

Source: The New York Times
Stock price of FNM

\[ V(A) + V(E) > V(D) \]

Troubled Federal Mortgagers

Mortgage finance companies Fannie Mae and Freddie Mac’s stock shares sank sharply Friday and are trading at levels last seen in the early 1990s. Since Monday, shares of Fannie Mae and Freddie Mac have fallen nearly 35 percent.

March 14: Treasury coordinates: JPMorgan Chase & Co.’s acquisition of Bear Stearns, with $29 billion backing from Federal Reserve.

May 6: Fannie Mae reports $2.2 billion quarterly loss due to increasing home foreclosures. Company slashes its dividend and says it will raise $6 billion in new capital.

May 14: Freddie Mac reports $151 million loss and says it will raise $5.5 billion in new capital.

June 24: Two indices show home prices fell by record amounts in April.

July 3: Freddie Mac shares fall 9 percent to $14.50 as Freddie postpones plans to raise $5.5 billion.

July 7: Fannie and Freddie shares plunge after Lehman Brothers analyst says an accounting change could leave both companies short of capital and a Federal Reserve official says the housing slump could last until next year.

July 10: Companies’ shares drop further as investors worry about a potential government takeover, which could render the shares worthless.

July 11: Drop continues amid reports the Bush administration is considering a government takeover of both mortgage giants.

Source: Thomson Financial
FNM’s net losses in holding MBS

<table>
<thead>
<tr>
<th>Mortgages-related securities:</th>
<th>As of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>June 30, 2008</td>
</tr>
<tr>
<td>Fannie Mae single-class MBS</td>
<td>$42,908</td>
</tr>
<tr>
<td>Fannie Mae structured MBS</td>
<td>10,945</td>
</tr>
<tr>
<td>Non-Fannie Mae structured mortgage-related securities</td>
<td>18,338</td>
</tr>
<tr>
<td>Non-Fannie Mae single-class mortgage-related securities</td>
<td>1,123</td>
</tr>
<tr>
<td>Mortgage revenue bonds</td>
<td>717</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$74,031</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Non-mortgages-related securities:(1)</th>
<th>As of</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>June 30, 2008</td>
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<tr>
<td>Asset-backed securities</td>
<td>$12,843</td>
</tr>
<tr>
<td>Corporate debt securities</td>
<td>10,049</td>
</tr>
<tr>
<td>Other</td>
<td>2,639</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$25,531</strong></td>
</tr>
</tbody>
</table>

**Losses in trading securities held in our portfolio, net**

<table>
<thead>
<tr>
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<th>As of</th>
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<tr>
<td></td>
<td>June 30, 2008</td>
</tr>
<tr>
<td><strong>$2,635</strong></td>
<td><strong>$633</strong></td>
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</tbody>
</table>
Citigroup

- 11.7 billion wrote-off, in Q2 2008
- 55.1 billion write down in total asset
Where AIG went wrong

Exposed to the U.S housing bubble:
- Mortgage insurance
- ABS, MBS, CDO investment
- Derivative contracts: CDS

Investments in RMBS, CMBS, CDOs and ABS

As part of its strategy to diversify its investments, AIG invests in various types of securities, including RMBS, CMBS, CDOs and ABS.

The amortized cost, gross unrealized gains (losses) and fair value of AIG’s investments in RMBS, CMBS, CDOs and ABS were as follows:

<table>
<thead>
<tr>
<th>(in millions)</th>
<th>Amortized Cost</th>
<th>Gross Unrealized Gains</th>
<th>Gross Unrealized Losses</th>
<th>Fair Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonds — available for sale: AIG, excluding AIGFP:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RMBS</td>
<td>$77,531</td>
<td>$506</td>
<td>$10,139</td>
<td>$67,898</td>
</tr>
<tr>
<td>CMBS</td>
<td>22,925</td>
<td>210</td>
<td>1,942</td>
<td>21,203</td>
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<tr>
<td>CDO/ABS</td>
<td>11,212</td>
<td>124</td>
<td>1,460</td>
<td>9,876</td>
</tr>
<tr>
<td>Subtotal, excluding AIGFP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIGFP</td>
<td>111,678</td>
<td>840</td>
<td>13,541</td>
<td>98,977</td>
</tr>
<tr>
<td>AIGFP*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$111,678</td>
<td>$840</td>
<td>$13,541</td>
<td>$98,977</td>
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</table>

* Represents total AIGFP investments in mortgage-backed, asset-backed and collateralized securities for which AIGFP has elected the fair value option effective January 1, 2008. At June 30, 2008, the fair value of these securities were $20.3 billion. An additional $1.8 billion related to insurance company investments is included in Bonds — trading.
Investment Banks

- Business Model
- The Process of Making CDOs
- Risk Factors and Risk Exposure
- The Future of Investment Banks
Investment Banks

\[ V(A) + V(E) > V(D) \]

- House
- Income
- Mortgage Subprime
  - Mortgage Lenders
    - Countrywide, Indy Mac, Fannie & Freddie
  - Banks
    - Citibank, BOA
- Insurers (AIG)
  - Rating
- Investors
  - Investment Banks
    - Bear Stearns, Lehman, Merrill Lynch
- SPV

Created by Robin Thieu, 2008 Fall
Investment Banks

- The Process of Making CDOs – Create CDOs based on MBS

Investment Banks

- The Process of Making CDOs – Cut it slices and then issue bonds

Investment Banks

- The Process of Making CDOs – the relationship between Slices Rating and interest payments

Investment Banks

- The Process of Making CDOs – the Impact of Downgrade

Credit-rating firms initially gave their highest triple-A ratings to three-quarters of the securities Norma issued. But as house prices plummeted and defaults rose across the country, investors and analysts expectations of losses rose well into the range that would hit the triple-B investments that Norma contained. As a result, the value of investments in Norma plummeted, and rating companies downgraded bonds issued by Norma to junk.

Investment Banks

- **Risk Factors**
  - Fare Value of Subprime Mortgage Loan
  - The Cost of Short-term Borrowing

- **Risk Exposure**
  - Market Price of CDOs
Investment Banks

- The Future of Investment Banks

- **In the Short – term**:
  
  the example of Goldman Sachs & Morgan Stanley

- **In the Long- term**: Performance Matter!
Credit Crunch

- less funds available
- more expensive cost of capital

"If companies around the globe are unable to borrow, they'll begin to cut jobs, cease investment, and default on their debt in larger numbers."

Created by Robin Thieu, 2008 Fall
Credit Manipulation

- Bailout plan $700 billion
- Fed injected $683 billion
- ECB, BOJ added $ billions to the financial system
- Bernanke signals possible rate cut
- Fed to purchase commercial paper = Fed invoke “easy money policy”
Thank you very much.