The 2007-2009 Recession

1. Origins in the Housing Market
2. Financial Crisis
3. Recession and Liquidity Trap
4. Policy Responses and the Zero Lower Bound
Housing Market

- A sharp decline in house prices
  - Offers to sell accelerate and home buying slows
  - Inventory of unsold homes and new construction declines
- Declines in housing construction were a precursor to 8 of the past 10 recessions.
- Only twice were drops in construction not followed by recession: Vietnam and Korean War
- Home price deflation is unique to the situation
Real House Prices 1998-2008 (Source: Hall and Woodward)

were disproportionately distress sales from foreclosures, a big mix effect depresses the index if foreclosure transactions are treated just like any other house sale.

The S&P Case-Shiller house price index includes foreclosed houses and shows a tremendous decline in national average prices—see Figure 3. The FHFA index in Figure 2 excludes foreclosed houses and shows a smaller decline, 12 percent for the nationwide index from its peak in April 2007 to October 2008.

Another important difference between the Case-Shiller index and the FHFB index is that FHFB includes transactions on all houses with values under the conforming loan limit (except for foreclosure transactions), while Case-Shiller tracks prices on all houses in 20 cities (those with more volatile than average prices). The truth lies somewhere between the two indexes.

An index computed by Fannie Mae shows nationwide house prices down 10 percent from their high in 2006 as of September 2008, and forecasts that the entire decline, including the 10 percent so far, before house prices stabilize will be 15 to 19 percent. (source)

Despite the problems in measuring house prices, the basic picture is clear. House prices rose gently from 1990 to 2003, then rapidly until 2006 or 2007, and then turned downward. National house prices had not fallen in any significant or prolonged way in the previous 40 years. The belief that average prices tended upward became deeply ingrained in common thinking about the economics of housing and mortgages. Homeowners made decisions about how much house to buy and how large a mortgage to carry on the presumption of appreciation. Lenders evaluated borrowers and offered them interest rates based on the belief that nationwide housing price declines were unlikely but not impossible.

Subprime

Prior to 1980 there were no subprime mortgages because usury laws precluded charging enough interest to cover default losses on them. Even after the law was changed, subprime lending was

Figure 3: S&P-Case-Shiller Index of Home Prices, 2000-2008. Source
Real House Prices 1890-2008 (Source: Robert Shiller)
Housing Financial Crisis Recession Policy at the ZLB

Homebuilding 1998-2008 (Source: Hall and Woodward)

Negligible until lenders began analyzing credit scores in the 1990s. From 1993 through 2003, new subprime loans averaged less than 10 percent of all new loans. In 2004, subprime loans were 28 percent of new loans, then 36 percent in 2005, and 40 percent in 2006. Subprime lenders, based on their experience in the previous decade, assumed that borrowers would take a new mortgage within two or three years, based on a lower loan-to-value ratio as the home appreciated and borrowers' credit improved or that the borrower would sell the house.

Homebuilding

Construction of new houses boomed during the years from 2003 to 2006. Low interest rates, rising incomes, the expectation of capital gains from ownership, and cheap mortgages increased the demand for new houses. Builders responded accordingly. Figure 4 shows the volume of construction of new houses, condominiums, and rental units over the decade.

Figure 4. Index of Residential Construction from the National Income and Product Accounts, 2000-2008. Source
Construction employment 1998-2008 (Source: FRED)

Shaded areas indicate US recessions as determined by the NBER.
2009 Federal Reserve Bank of St. Louis: research.stlouisfed.org
The house market boom of the 2000s

Possible contributing factors:

1. Irrational house price expectations
2. Easy credit and the subprime market
   - 1977: Community Reinvestment Act
   - Early 1980s: Deregulation, no more usury laws
   - Since 1990s: Securitization lowers lending standards
     ('Originate to distribute'- model )
   - Since 1990s: Credit scoring
   - Since 1990s: Mortgage brokers instead of banks and thrifts
   - Fed Policy after 2001 recession: commitment to low interest rates leads to low mortgage rates (teaser rates).
   - Fannie Mae, Freddie Mac and other housing agencies
The house market collapse of the 2000s

- **Subprime mortgages**: Mortgage loans to high risk borrowers with low or uncertain incomes, high ratios of debt to income, and poor credit histories.
  - Generally floating rate mortgages, frequently with high loan-to-value ratios and very low initial teaser rates
  - Underpricing of risk, bundled in CDO’s with different tranches
  - Jump in subprime defaults, foreclosures, house price declines

- House price decline triggers defaults on all types of residential mortgages:
  - Mortgage balance exceeds value of the house, homeowners default
  - Mortgages are **non-recourse debt**: borrower is not personally liable
Dynamics of the financial crisis

1. Decline in the value of mortgage-related instruments reduces net worth of the institutions that hold them.  
   i.e. Commercial banks and S&Ls, but also investment banks, and the GSEs (Fannie Mae and Freddie Mac)

2. This exacerbates problems of asymmetric information, leading to increase in risk premia and tightening of lending standards for those institutions.

3. As sources of short-term borrowings dry up, institutions are forced to sell assets to decrease leverage in order to meet short-term obligations.

4. They are forced to sell assets, sometimes at fire-sale prices or are forced to recapitalize, which erodes shareholder value.

5. Both result in price declines for all risky assets, which further reduces net worth (back to 1)

⇒ Downward spiral of deleveraging and declining asset prices.
Commercial Paper (Source: Fed)
Commercial Paper (Source: Fed)
Interbank Market: Federal Funds Rate (Source: FRED)
Important Contributing Factors:

1. **Credit ratings** are suspect: General uncertainty about how to value complex risky assets.
2. Many institutions (e.g. AIG) had sold **risk insurance** through credit derivatives, further increasing losses.
3. Many institutions (investment banks and hedge funds) were extremely highly leveraged.
4. Most institutions have strong maturity mismatch, making them vulnerable to **runs**.
   ⇒ Fairly limited (so far) for depository institutions, thanks FDIC!
5. **Government Housing Finance Policies**: Fannie Mae and Freddie Mac
How does this lead to an economy wide recession?

Possible Channels

1. **Intersectoral linkages and comovement**: construction and financial to remaining sectors
2. **Wealth effects**: on consumer spending from home and financial asset price declines.
3. **Monetary Contraction**: Depression-style collapse of the monetary aggregates
4. **Credit Channel**: drying up of credit curtails consumption and investment
5. **International Transmission**: flight to quality, rising dollar, lower net exports
6. **(Prospective) Fiscal Policies**: costly bailouts and fiscal stimuli
Unemployment Rate (Source: Fred)
Real GDP (Source: Fred)
CPI inflation (Source: Fred)
Consumer Spending on Nondurable Goods

- **Real Personal Consumption Expenditures: Nondurable Goods**

Source: US Bureau of Economic Analysis
Consumer Spending on Durable Goods

Real Personal Consumption Expenditures: Durable Goods

Source: US. Bureau of Economic Analysis

(Billions of Chained 2009 Dollars)
Residential Investment

Source: US. Bureau of Economic Analysis

Real Private Residential Fixed Investment
(Billions of Chained 2009 Dollars)
Government Expenditures

Real Government Consumption Expenditures & Gross Investment

(Billions of Chained 2009 Dollars)

Source: US. Bureau of Economic Analysis
Net Exports

Source: US. Bureau of Economic Analysis

Real Net Exports of Goods & Services (Billions of Chained 2009 Dollars)
Policy Responses

**Fiscal Policy:**

- Economic Stimulus Act of 2008: $152 billion in tax rebates and investment tax credits
- Payroll Tax Cut in 2011-2012
- Extended Unemployment Benefits
- Subsequent Fiscal Contraction (Fiscal cliff and Budget Sequester, Tax Increases under Affordable Care Act)
Policy Responses

Monetary Policy:

- Zero Interest Rate Policy
- Unconventional Instruments
- Quantitative Easing Programs
- Forward Guidance
Monetary Policy since 2007
Monetary Policy since 2007
New Monetary Tools after 2007

Active:
- Term Deposit Facility
- Term Asset-Backed Securities Loan Facility
- Interest on Required Reserve Balances and Excess Balances

Expired:
- Money Market Investor Funding Facility
- ABCP MMMF Liquidity Facility
- Commercial Paper Funding Facility
- Primary Dealer Credit Facility
- Term Securities Lending Facility
- Term Auction Facility
- Maturity Extension Program and Reinvestment Policy

See Boards’ website (click Policy Tools)
Fed Balance Sheet

Quantitative Easing

Precedent: Japan

In the US:

- **QE1** started November 2008: $600 billion in MBS
- **QE2** started November 2010: $600 billion in Long Term Treasuries
- **Operation Twist**, November 2011: purchase $400 billion of long term bonds, sell $400 billion of short term bonds
- **QE3** started November 2012: open-ended purchasing program: $85 billion monthly in agency and treasury debt.
The Zero Lower Bound Problem

IS-MP-AS Model:

\[ Y = \frac{1}{1 - MPC} \left( C^a(r) - MPC \times T + I(r) + G \right) \]  

(IS)

\[ r = (\bar{r} + \pi^*) - \pi^e + \phi_\pi (\pi - \pi^*) + \phi_y (Y - \bar{Y}) \]  

(MP/Taylor)

\[ \pi = \pi^e + b(Y - \bar{Y}) \]  

(Phillips Curve/AS)

Zero Lower Bound (ZLB) constraint on monetary policy:

\[ i \geq 0 \]

\[ \Rightarrow r + \pi^e \geq 0 \]

\[ \Rightarrow r \geq -\pi^e \]
The Zero Lower Bound Problem

\[ \text{MPS} \left( \pi^*, \pi^e, \bar{\pi} \right) \]

\[ \text{IS} \left( \bar{T}, \bar{G} \right) \]
AD Curve with the ZLB (fixed $\pi^e$)
In practice inflation expectations will not be fixed.

Assume for instance

$$\pi^e = f(\pi)$$

where $f(\cdot)$ is an increasing function.
AD Curve with the ZLB ($\pi^e$ adjusts)
The Great Recession and the Liquidity Trap
AD stimulus at the ZLB
AD stimulus at the ZLB

AD stimulus can be traditional fiscal policies (lowering $T$, increasing $G$)

AD stimulus can also be done using unconventional monetary policies:
- Unconventional instruments to ease credit
- Quantitative Easing (QE) programs to ease credit
- Forward Guidance

AD stimulus at the ZLB leads lowers inflation (expectations) and lower real interest rates increase private spending!

Large AD stimulus can lead to an exit from the Liquidity Trap.
Forward Guidance at the ZLB
A Positive Supply Shock at the ZLB
An Expectations Driven Liquidity Trap