Economics of Financial Markets – Lecture 9

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Learning Objectives

- Securitization and the Shadow Banking System (from Chapter 11)
- The Three players that Influence the Money Supply (from Chapter 15)
- Factors that Affect the Central Bank's Balance-Sheet (from Chapter 15)
- The Global Financial Crisis 2007 – 2009 (from Chapter 12)
  - Subprime Loan in US
  - European Sovereign Debt Crisis

Securitization and the Shadow Banking System

- Securitization is the process of bundling small and otherwise illiquid financial assets (such as residential mortgages, auto loans, and credit card receivables), which have typically been the bread and butter of banking institutions, into marketable capital market securities.
- Securitization is the fundamental building block of the shadow banking system.

How the Shadow Banking System Works

- Securitization is a process of asset transformation that involves a number of different financial institutions working together.
- These institutions comprise the shadow banking system.

The process of securitization

- A loan originator arranges for a residential mortgage loan to be made by a financial institution that will be then service the loan.
- Securitization is also characterized as an originate-to-distribute business model:

Loan origination → servicing → bundling → distribution

Three Players in the Money Supply Process

1. **The Central bank:** Federal Reserve System in US; Reserve Bank of Australia in Australia
2. **Banks**: depository institutions; financial intermediaries
3. **Depositors**: individuals and institutions

The Fed (central bank)'s Balance Sheet

Federal Reserve System	
Assets	Liabilities
Securities	Currency in circulation
Loans to Financial Institutions	Reserves

- **Liabilities**
  - Currency in circulation: in the hands of the public
  - Reserves: bank deposits at the Fed and vault cash
- **Assets**
  - Government securities: holdings by the Fed that affect money supply and earn interest
  - Discount loans: provide reserves to banks and earn the discount rate

Control of the Monetary Base

High-powered money

$$MB = C + R$$

C = currency in circulation

R = total reserves in the banking system

Open Market Purchase from a Bank

Banking System			
Assets		Liabilities	
Securities	-$100m		
Reserves	+$100m		

Federal Reserve System			
Assets		Liabilities	
Securities	+$100m	Reserves	+$100m

- Net result is that reserves have increased by $100
- No change in currency
- Monetary base has risen by $100

Open Market Purchase from the Nonbank Public

Banking System			
Assets		Liabilities	
Reserves	+$100m	Checkable Deposits	+$100m

Federal Reserve System			
Assets		Liabilities	
Securities	+$100m	Reserves	+$100m

- Person selling bonds to the Fed deposits the Fed's check in the bank
- Identical result as the purchase from a bank

Open Market Purchase from the Nonbank Public

Nonbank Public	
Assets	Liabilities
Securities -$100m	
Currency +$100m	

Federal Reserve System	
Assets	Liabilities
Securities +$100m	Currency in circulation +$100m

- The person selling the bonds cashes the Fed's check
- Reserves are unchanged
- Currency in circulation increases by the amount of the open market purchase
- Monetary base increases by the amount of the open market purchase

Open Market Purchase: Summary

- The effect of an open market purchase on reserves depends on whether the seller of the bonds keeps the proceeds from the sale in currency or in deposits.
- The effect of an open market purchase on the monetary base always increases the monetary base by the amount of the purchase.

Open Market Sale

Nonbank Public	
Assets	Liabilities
Securities +$100m	
Currency -$100m	

Federal Reserve System	
Assets	Liabilities
Securities -$100m	Currency in circulation -$100m

- Reduces the monetary base by the amount of the sale
- Reserves remain unchanged
- The effect of open market operations on the monetary base is much more certain than the effect on reserves.

Shifts from Deposits into Currency

Nonbank Public	
Assets	Liabilities
Checkable deposits -$100m	
Currency +$100m	

Banking System	
Assets	Liabilities
Reserves -$100m	Checkable deposits -$100m

Federal Reserve System	
Assets	Liabilities
	Currency in circulation +$100m
	Reserves -$100m

- Net effect on monetary liabilities is zero
- Reserves are changed by random fluctuations
- Monetary base is a relatively stable variable

Loans to Financial Institutions

Banking System			
Assets		Liabilities	
Reserves	+$100m	Loans	+$100m
		(borrowing from Fed)	

Federal Reserve System			
Assets		Liabilities	
Loans	+$100m	Reserves	+$100m
(borrowing from Fed)			

- Monetary liabilities of the Fed (central bank) have increased by $100
- Monetary base also increases by this amount

Other Factors that Affect the Monetary Base

- Float
- Treasury deposits at the Federal Reserve
- Interventions in the foreign exchange market

Overview of The Fed (central bank)'s Ability to Control the Monetary Base

- Open market operations are controlled by the Fed (central bank).
- The Fed (central bank) cannot determine the amount of borrowing by banks from the Fed (central bank).
- Split the monetary base into two components:

$$MB_n = MB - BR$$

- The money supply is positively related to both the non-borrowed monetary base MB_n and to the level of borrowed reserves, *BR,* from the Fed.

Multiple Deposit Creation: A Simple Model

Deposit Creation: Single Bank

First National Bank	
Assets	Liabilities
Securities -$100m	
Reserves +$100m	

First National Bank	
Assets	Liabilities
Securities -$100m	Checkable deposits +$100m
Reserves +$100m	
Loans +$100m	

- Excess reserves increase
- Bank loans out the excess reserves
- Creates a checking account
- Borrower makes purchases
- The Money supply has increased

First National Bank	
Assets	Liabilities
Securities -$100m	
Loans +$100m	

Multiple Deposit Creation: A Simple Model

Deposit Creation: The Banking System

Bank A		Bank A	
Assets	Liabilities	Assets	Liabilities
Reserves +$100 m	Checkable deposits +$100 m	Reserves +$10	Checkable deposits +$100 m
		Loans +$90	

Bank B		Bank B	
Assets	Liabilities	Assets	Liabilities
Reserves +$90	Checkable deposits +$90	Reserves +$9	Checkable deposits +$90
		Loans +$81	

Table 1 Creation of Deposits (assuming 10% reserve requirement and a $100 increase in reserves)

TABLE 1 Creation of Deposits (assuming 10% reserve requirement and a $100 million increase in reserves)

Bank	Increase in Deposits ($)	Increase in Loans ($)	Increase in Reserves ($)
First National	0.00	100.00 m	0.00
A	100.00 m	90.00 m	10.00 m
B	90.00 m	81.00 m	9.00 m
C	81.00 m	72.90 m	8.10 m
D	72.90 m	65.61 m	7.29 m
E	65.61 m	59.05 m	6.56 m
F	59.05 m	53.14 m	5.91 m
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
Total for all banks	1,000.00 m	1,000.00 m	100.00 m

Deriving The Formula for Multiple Deposit Creation

Assuming banks do not hold excess reserves

Required Reserves (RR) = Total Reserves (R)

RR = Required Reserve Ratio (r) times the total amount of checkable deposits (D)

Substituting

$$r \times D = R$$

Dividing both sides by r

$$D = \frac{1}{r} \times R$$

Taking the change in both sides yields

$$\Delta D = \frac{1}{r} \times \Delta R$$

Critique of the Simple Model

- Holding cash stops the process
  - Currency has no multiple deposit expansion
- Banks may not use all of their excess reserves to buy securities or make loans.
- Depositors' decisions (how much currency to hold) and bank's decisions (amount of excess reserves to hold) also cause the money supply to change.

The Global Financial Crisis of 2007-2009

- Causes of the 2007-2009 Financial Crisis:
  - Financial innovations emerge in the mortgage markets
    - Subprime mortgage
    - Mortgage-backed securities
    - Collateralized debt obligations (**CDOs**)
  - Housing price bubble forms
    - Increase in liquidity from cash flows surging to the United States
    - Development of subprime mortgage market fueled housing demand and housing prices

The Global Financial Crisis of 2007-2009

- Causes (cont'd):
  - Agency problems arise
    - "Originate-to-distribute" model is subject to principal-(investor) agent (mortgage broker) problem
    - Borrowers had little incentive to disclose information about their ability to pay
    - Commercial and investment banks (as well as rating agencies) had weak incentives to assess the quality of securities
  - Information problems surface
  - Housing price bubble bursts

FYI Collateralized Debt Obligations (CDOs)

- The creation of a collateralized debt obligation involves a corporate entity called a *special purpose vehicle (SPV)* that buys a collection of assets such as corporate bonds and loans, commercial real estate bonds, and mortgage-backed securities.
- The SPV separates the payment streams (cash flows) from these assets into buckets that are referred to as tranches.

FYI Collateralized Debt Obligations (CDOs)

- The highest rated tranches, referred to as super senior tranches are the ones that are paid off first and so have the least risk.
- The lowest tranche of the CDO is the equity tranche and this is the first set of cash flows that are not paid out if the underlying assets go into default and stop making payments. This tranche has the highest risk and is often not traded.

The Global Financial Crisis of 2007-2009

- Effects of the 2007-2009 Financial Crisis
  - After a sustained boom, housing prices began a long decline beginning in 2006.
  - The decline in housing prices contributed to a rise in defaults on mortgages and a deterioration in the balance sheet of financial institutions.
  - This development in turn caused a run on the shadow banking system.

The Global Financial Crisis of 2007-2009

- Crisis spreads globally
  - Sign of the globalization of financial markets
  - TED spread (3 months interest rate on Eurodollar minus 3 months Treasury bills interest rate) increased from 40 basis points to almost 240 in August 2007.

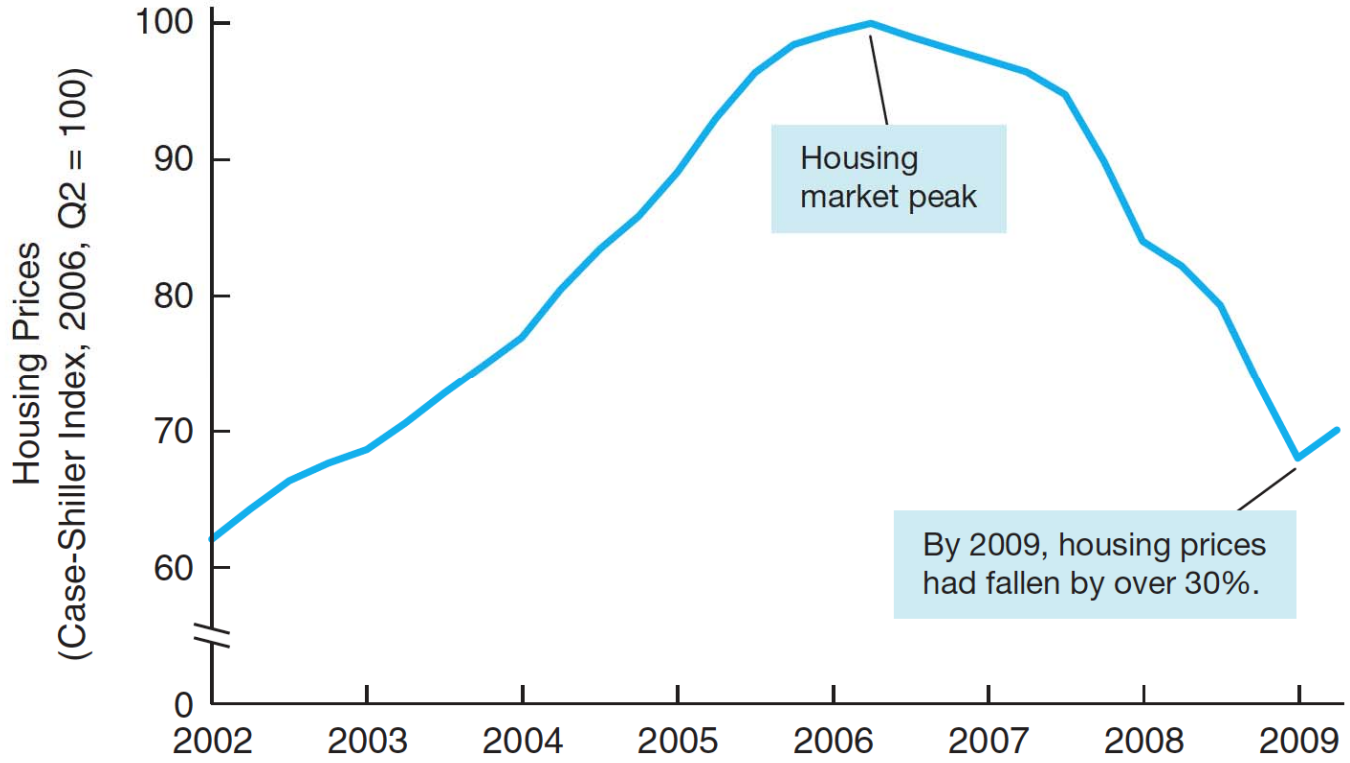
The Global Financial Crisis of 2007-2009

- Deterioration of financial institutions' balance sheets:
  - Write downs
  - Sell of assets and credit restriction
- High-profile firms fail
  - Bear Stearns (March 2008)
  - Fannie Mae and Freddie Mac (July 2008)
  - Lehman Brothers, Merrill Lynch, AIG, Reserve Primary Fund (mutual fund) and Washington Mutual (September 2008)

The Global Financial Crisis of 2007-2009

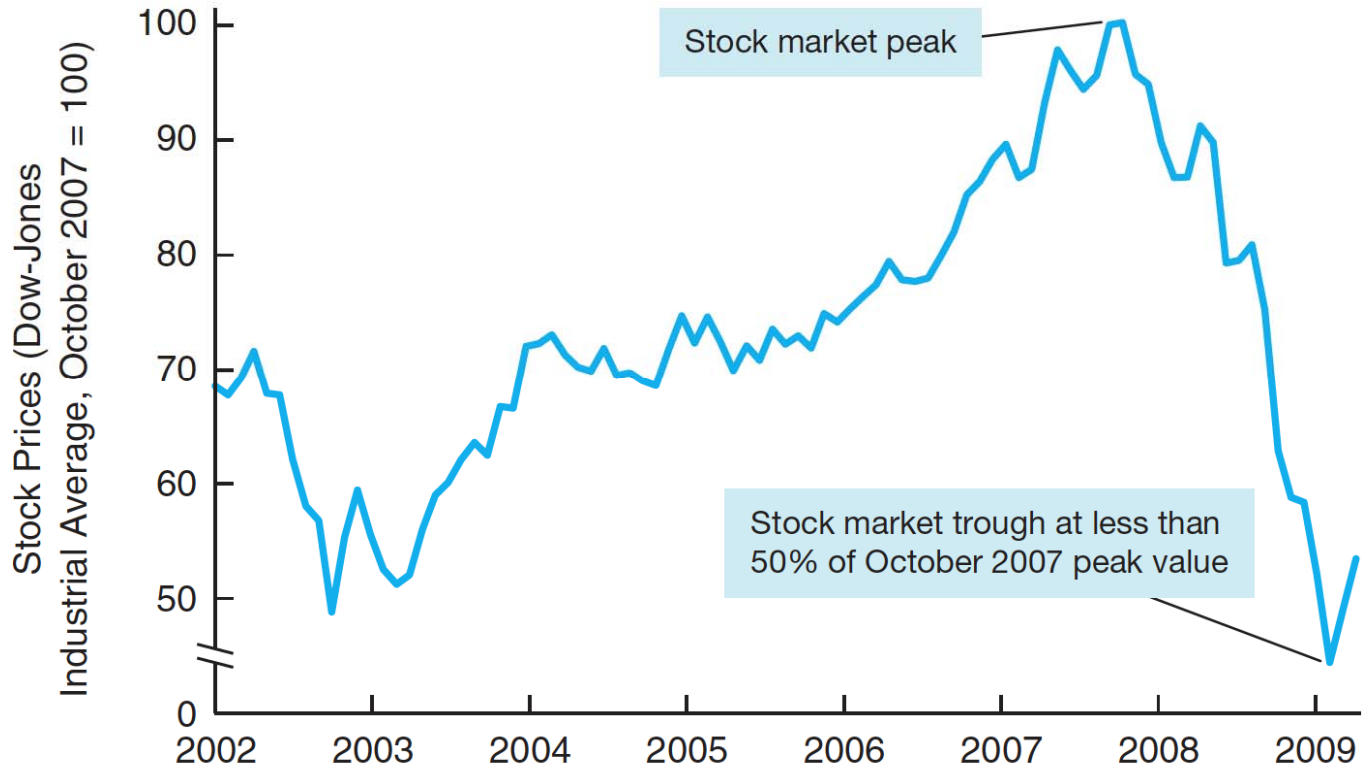
- Bailout package debated
  - House of Representatives voted down the $700 billion bailout package on September 29, 2008.
  - It passed on October 3, 2008.
  - Congress approved a $787 billion economic stimulus plan on February 13, 2009.

Figure 4 Housing Prices and the Financial Crisis of 2007–2009



Source: Case-Shiller U.S. National Composite House Price Index from Federal Reserve Bank of St. Louis FRED database: http://research.stlouisfed.org/fred2/.

Figure 5 Stock Prices and the Financial Crisis of 2007–2009



Source: Dow-Jones Industrial Average (DJIA). Global Financial Data: http://www.globalfinancialdata.com/index_tabs.php?action=detailedinfo&id=1165.

Inside the Fed: Was the Fed to Blame for the Housing Price Bubble?

- Some economists have argued that the low rate interest policies of the Federal Reserve in the 2003–2006 period caused the housing price bubble.
- Taylor argues that the low federal funds rate led to low mortgage rates that stimulated housing demand and encouraged the issuance of subprime mortgages, both of which led to rising housing prices and a bubble.

Inside the Fed: Was the Fed to Blame for the Housing Price Bubble?

- Federal Reserve Chairman Ben Bernanke countered this argument, saying the culprits were the proliferation of new mortgage products that lowered mortgage payments, a relaxation of lending standards that brought more buyers into the housing market, and capital inflows from emerging market countries.
- The debate over whether monetary policy was to blame for the housing price bubble continues to this day.

- Although the subprime mortgage market problem began in the United States, the first indication of the seriousness of the crisis began in Europe.

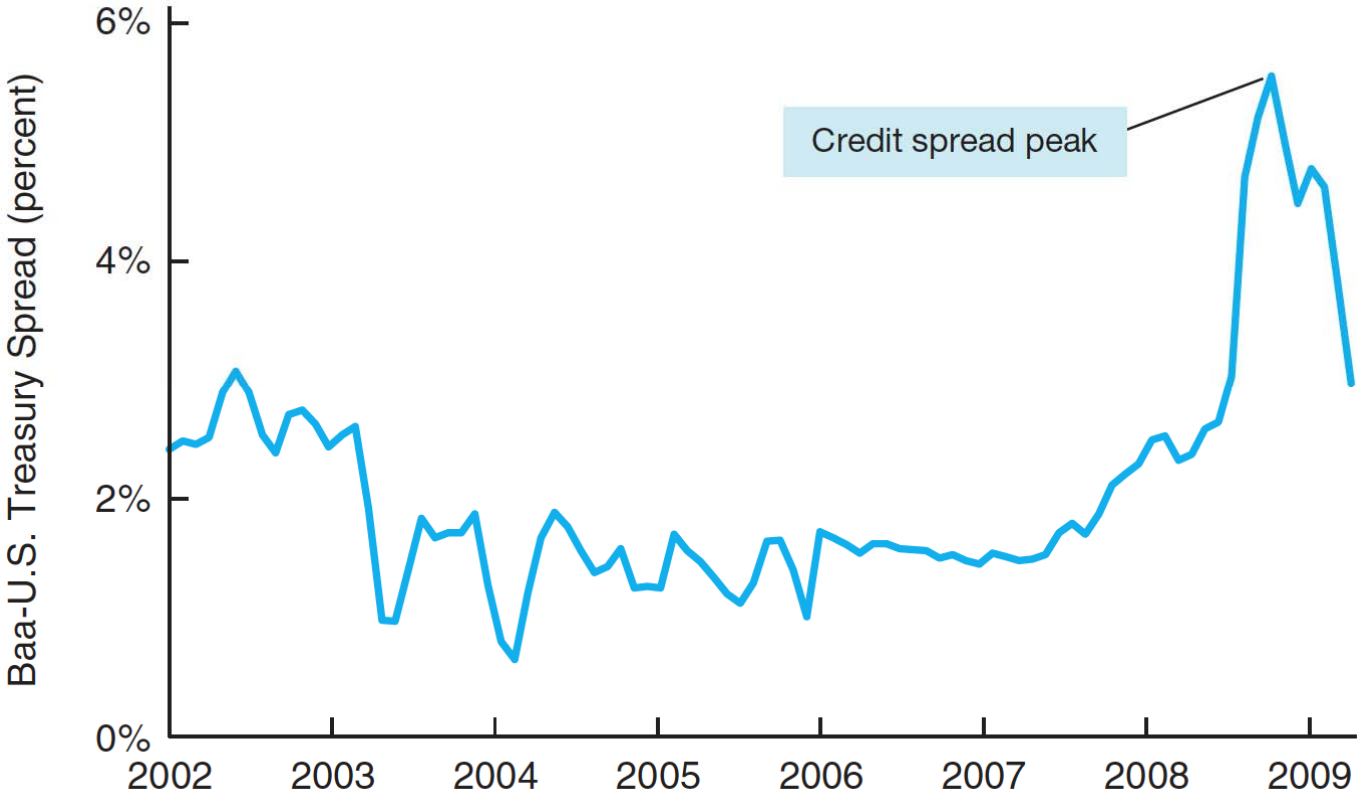
Global: The European Sovereign Debt Crisis

- The increase in budget deficits that followed the financial crash of 2007-2009 led to fears of government defaults and a surge in interest rates.
- The sovereign debt debt, which began in Greece, moved on to Ireland, Portugal, Spain and Italy.
- The stresses created by this and related events continue to threaten the viability of the Euro.

The Global Financial Crisis of 2007-2009

- Height of the 2007-2009 Financial Crisis
  - The stock market crash gathered pace in the fall of 2008, with the week beginning October 6, 2008, showing the worst weekly decline in U.S. history.
  - Surging interest rates faced by borrowers led to sharp declines in consumer spending and investment.
  - The unemployment rate shot up, going over the 10% level in late 2009 in the midst of the “Great Recession, the worst economic contraction in the United States since World War II.

Figure 6 Credit Spreads and the 2007–2009 Financial Crisis



Source: Dow-Jones Industrial Average (DJIA). Global Financial Data: http://www.globalfinancialdata.com/index_tabs.php?action=detailedinfo&id=1165.

Government Intervention and the Recovery

- Short-term Responses and Recovery
  - Financial Bailouts: In order to save their financial sectors and to avoid contagion, financial support was provided by many governments to bail out banks, other financial institutions, and even the so-called “too-big-to-fail” firms that were severely affected by the financial crisis.
  - Fiscal Stimulus Spending: To boost their individual economies, most governments used fiscal stimulus packages that combined government expenditure and tax cuts.

Government Intervention and the Recovery (*contd.*)

- Short-term Responses and Recovery
  - Japan's consecutive stimulus packages, totaling $568 billion, were among the highest during the crisis, but these proved largely ineffective
  - European nations showed moderate success.

Long-Term Responses

- With the individual emergency national bailouts to rescue national economies and financial sectors, global leaders looked to building a more stable and robust global financial system. Steps taken by governments included
  - Implement sound macroeconomic policies
  - enhance their financial infrastructure
  - develop financial education and consumer protection rules
  - enact macro and microprudential regulations.

Long-Term Responses (*contd.*)

- At the international level
  - proactive globally-binding supervision was designed
  - financial market discipline enforced
  - systemic risk managed
- To avoid collective action problems and to ensure that policy actions are mutually consistent with national growth objectives, aggregate plans began to be drafted simultaneously. The first ever of these is the Mutual Assessment Process launched in 2009 by the G20.