EC 202: Principles of Macroeconomics
Money and the Banking System

I. What is Money
II. Money in the US Economy
III. Money Creation
IV. Banking

The Nature of Money

- Barter
  - System of exchange in which people trade one good for another
  - Money is not used as an intermediate step
  - Requires the double coincidence of wants
- Money
  - Greases the wheels of exchange and makes the economy more productive

The Nature of Money

- Roles or functions of money
  - Medium of exchange - standard object used in exchanging goods and services
  - Unit of account - standard unit for quoting prices
  - Store of value - store wealth from one point in time to another
- Commodity money
  - An object in use as a medium of exchange that also has a substantial value in alternative uses

The Nature of Money

- Fiat money (Paper money)
  - Decreed as money by government
  - Little value as commodity
  - Maintains value as a medium of exchange
    - People have faith that the issuer will stand behind the pieces of printed paper and limit their production
- Evolution of money
  - Commodity money → Full-bodied paper money → Partially-bodies money → Fiat Money

How the Quantity of Money is Measured

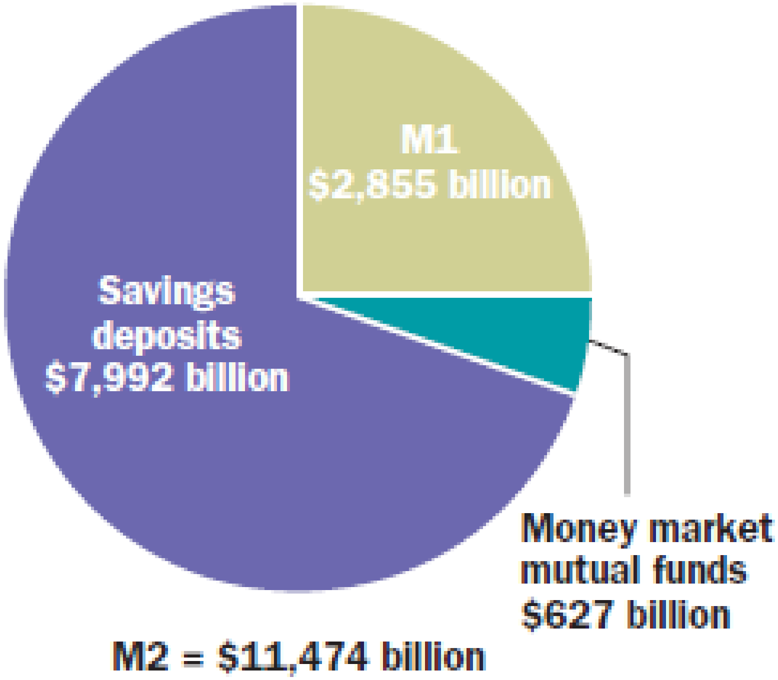
- Money supply M1
  - Narrowly defined money supply
  - Coins and paper money in circulation
  - Traveler’s checks
  - Conventional checking accounts and other checkable deposit balances

How the Quantity of Money is Measured

- Money supply M2
  - Broadly defined money supply
  - M1
  - Money market deposit accounts
  - Money market mutual funds
  - Savings accounts

Two Definitions of the Money Supply

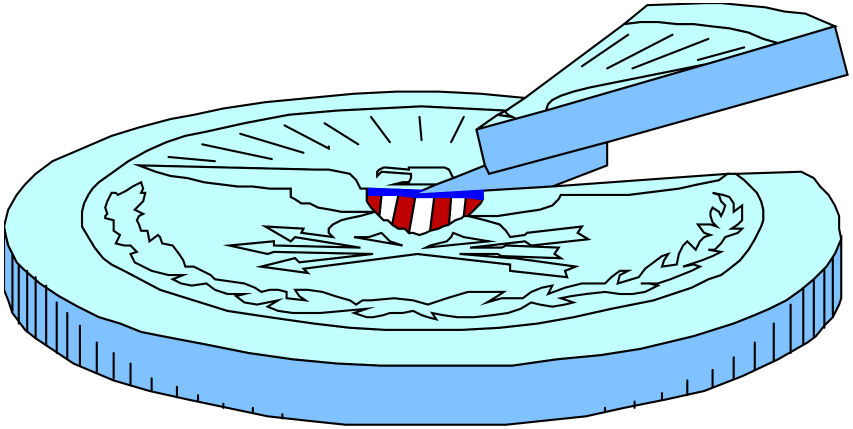
- December 2014



The Banking System

- How banking evolved
  - From using gold as commodity money
  - To goldsmiths who issued paper receipts backed by gold
  - Then clever goldsmiths started lending out "gold"
- Fractional reserve banking system
  - Bankers keep as reserves only a fraction of deposits

Banks and The Money Supply



Banks influence the quantity of demand deposits in the economy and the money supply.

The Origins of the Money Supply

- Bankers books
- Asset
  - An item of value owned
- Liability
  - Item of value owed; debts
- Balance sheet - accounting statement
  - Left side: values of all assets
  - Right side: values of all liabilities and net worth

Money Creation

- This T-Account shows a bank that…

…accepts deposits,

…Maintains reserves,

The $100 cash deposit is a liability for the bank, because the depositor will eventually want to withdraw his/her money.

In the meantime, the $100 cash goes into the bank vault as a bank asset.

First National Bank

Assets	Liabilities
Reserves $100.00	Deposits $100.00
Total Assets $100.00	Total Liabilities $100.00

Money Creation

- This T-Account shows a bank that…

…accepts deposits,

…keeps a *fraction* of outstanding deposits as reserves,

…and lends out the rest.

First National Bank

Assets	Liabilities
Reserves $10.00	Deposits $100.00
Loans $90.00	
Total Assets $100.00	Total Liabilities $100.00

Money Creation

Deposits are liabilities for a bank.

Reserves and Loans are assets.

- In a T-account, Total Assets must equal Total liabilities

First National Bank

Assets	Liabilities
Reserves $10.00	Deposits $100.00
Loans $90.00	
Total Assets $100.00	Total Liabilities $100.00

Money Creation

- The fraction of total deposits that a bank has to keep as reserves is called the reserve ratio.
- This is the amount of cash deemed sufficient to meet daily withdrawals.

Money Creation

- Loans
  - When one bank loans money, that money is generally deposited into another bank.
  - This creates more deposits and more reserves to be lent out.
  - When a bank makes a loan from its reserves, the money supply increases.

Money Creation

First National Bank

Assets	Liabilities
Reserves $10.00	Deposits $100.00
Loans $90.00	
Total Assets $100.00	Total Liabilities $100.00

Second National Bank

Assets	Liabilities
Reserves $9.00	Deposits $90.00
Loans $81.00	
Total Assets $90.00	Total Liabilities $90.00

Money Supply = $190.00!

The Money Multiplier

How much money is eventually created in this economy?

?

The Money Multiplier

- The money multiplier is the amount of money the banking system eventually generates with each dollar of reserves.

The Money Multiplier

How much money is eventually created in this economy?

Original deposit	= $ 100.00
First National lending	= $ 90.00 [=0.9 x $100.00]
Second National lending	= $ 81.00 [=0.9 x $90.00]
Third National lending	= $ 72.90 [=0.9 x $81.00]
↓	↓
↓	↓
Total money supply	**= $1,000**

Banks and Money Creation

- The process started with a $100 cash deposit.
  - At the starting point, the money supply = $100 in cash
  - At the end of the process, the money supply = $1,000 in deposits..
- So money supply increased from $100 to $1000.

The Money Multiplier

The money multiplier is the reciprocal of the reserve ratio (m):

- If the required reserve ratio = *m*

Multiplier = 1/m

- With a reserve requirement, *m = 10% or 1/10*
- The multiplier is 10.

Reserves & Excess Reserves

- When banks have no excess reserves, they can't make any loans.
- To make another loan, this bank must get more excess reserves

First National Bank

Assets	Liabilities
Total Reserves $10.00	Deposits $100.00
Required: $10.00	
Excess: $0	
Loans: $90.00	
Total Assets $100.00	Total Liabilities $100.00

Excess Reserves

- Where do banks get more reserves to make more loans?
- To answer this question, we first need to understand the Federal Reserve System.

The Federal Reserve System

- The Structure of the Federal Reserve System:

    1) The Board of Governors

    2) The Regional Federal Reserve Banks

    3) The Federal Open Market Committee

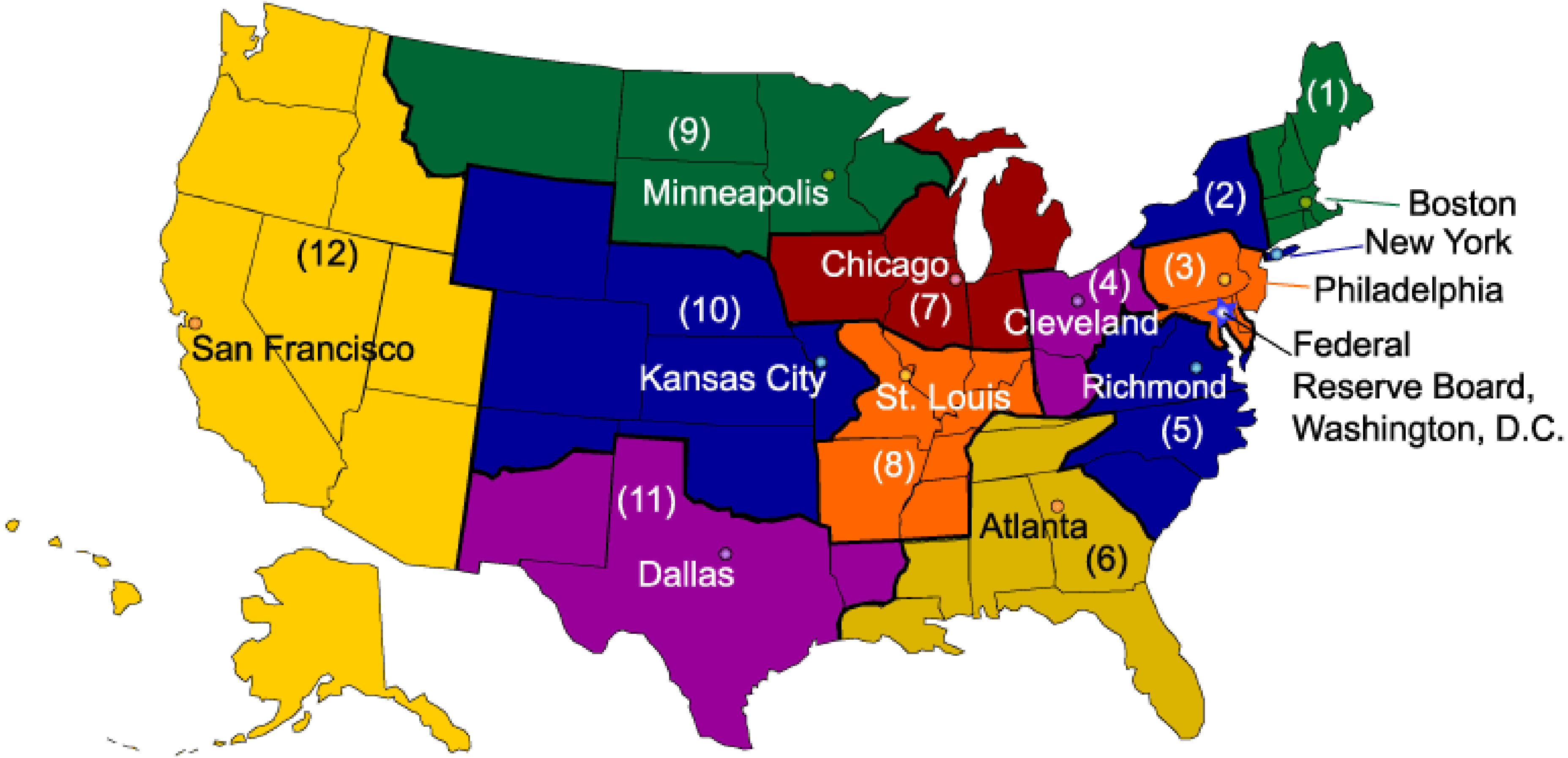
The Fed's Organization

- The Board of Governors
  - Seven members
  - Appointed by the President
  - Confirmed by the Senate
  - Serve staggered 14-year terms so that one comes vacant every two years.

The Fed’s Organization

- The Federal Reserve Banks
  - 12 District banks
  - Each has nine directors
  - President of each bank is appointed by the 9 directors and approved by the Board of Governors.

The Federal Reserve System



The Fed's Organization

- The Federal Open Market Committee (FOMC) :
  - The Board of Governors.
  - The president of the NY Federal Reserve Bank.
  - The presidents of the other Federal Reserve banks (4 vote on a yearly rotating basis).

Three Primary Functions of the Fed

Regulates banks to ensure sound banking practices.

Acts as a banker's bank, making loans to banks and as a lender of last resort.

Conducts monetary policy by controlling the money supply.

The Federal Reserve & the Money Supply

- The Fed affects the money supply by affecting the amount of reserves in the banking system.
  - The more reserves…the more banks can make loans.

Reserves & Excess Reserves

- Banks must keep required reserves (reserve ratio).
- Banks may loan out their excess reserves.

First National Bank

Assets	Liabilities
Total Reserves **$100.00**	**Deposits** **$100.00**
***Required*: $10.00**	
***Excess*: $90.00**	
Loans: $0	
Total Assets **$100.00**	**Total Liabilities** **$100.00**

Reserves & Excess Reserves

- When banks have no excess reserves, they can't make any loans.
- To make another loan, this bank must get more excess reserves

First National Bank

Assets	Liabilities
Total Reserves $10.00	Deposits $100.00
Required: $10.00	
Excess: $0	
Loans: $90.00	
Total Assets $100.00	Total Liabilities $100.00

Reserves and Excess Reserves

- How do banks obtain more excess reserves?
- Borrowing
    - From the Fed
    - From other banks.
- Open Market Operations of the Fed

Borrowing Reserves

- From the Fed
  - The Fed will loan member banks more reserves.
  - The Fed charges interest for these loans.
  - This interest rate is called

“the discount rate”

Borrowing Reserves

- From other banks
  - Banks borrow reserves from other banks.
  - These loans are very, short term.
  - This interest rate is called "the federal funds rate"

Borrowing Reserves

- The discount rate:
  - Determined by the FOMC
- The federal funds rate:
  - A market rate determined by supply and demand.

Open-Market Operations

- The primary way in which the Fed changes the money supply is through open-market operations.

Open-Market Operations

- The Fed conducts open-market operations when it buys government bonds from or sells government bonds to the public:
- Note: These are "previously issued" government bonds. Actions by the Fed do not constitute "borrowing" by the Federal government.

An Open Market Purchase

- When the Fed buys bonds…
  - Bank cash reserves rise, encouraging banks to lend out the excess.
  - The money supply rises.

An Open Market Sale

- When the Fed sells bonds.
  - In return for the bond, the Fed receives a check drawn against a bank.
  - The bank's reserve assets are reduced and money supply falls.

The Federal Reserve & Interest Rates

The Fed conducts Open Market Operations to increase or lower interest rates.

Lowering interest rates.

Encourages firms to borrow funds for investment spending on new capital goods.	Encourages consumer spending (autonomous consumption).	The Fed lowers interest rates when it wants to "stimulate" economic activity.

Bond Prices and Interest Rates

Open Market Purchases

- The Fed increases demand for bonds when it buys bonds.
- Bond prices rise and interest rates fall.

Open Market Sales

- The Fed increases supply of bonds when it sells bonds.
- Bond prices fall and interest rates rise.

Bond Prices and Interest Rates

Corporate Bond

$1000

10%

2050

- Face Value of bond is $1,000.
- Coupon is amount bond pays per year = $100
- Yield is current market rate of return.
- Yield = coupon/Price of Bond.

Bond Prices and Interest Rates

Corporate Bond

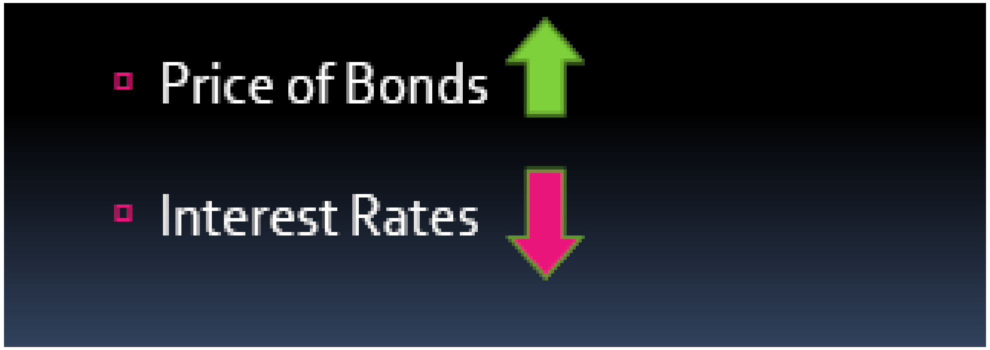
$1000

10%

2050

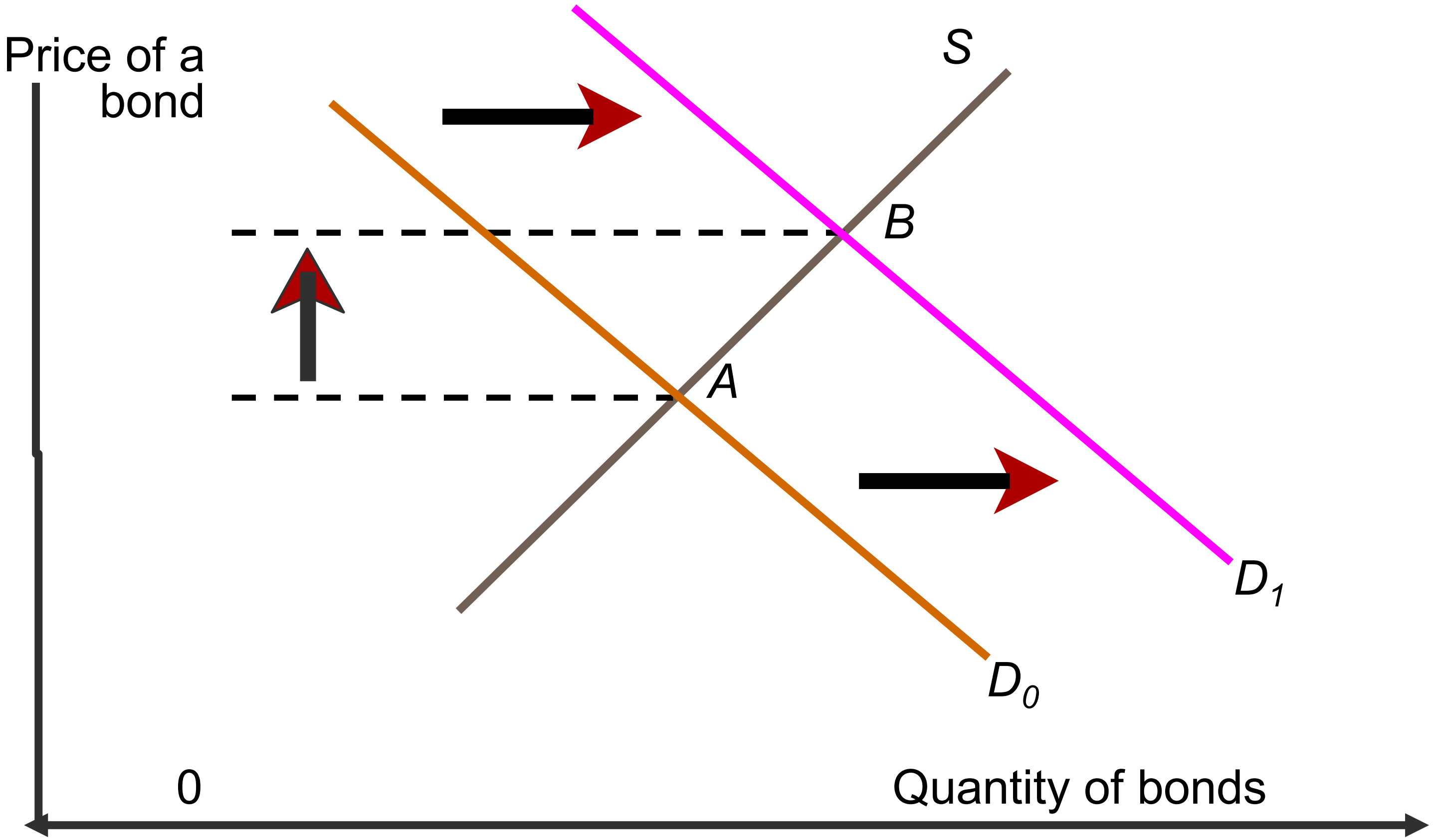
- What if market interest rates fall to 5%?
- Our $100 per year coupon is a "good" deal in comparison.
- Price will rise until yield on this bond is also 5%
- Yield = coupon/Price of bond.
- $5\% = \$100/P_b$
- $P_b = \$2,000$

Price of Bonds & Interest Rates



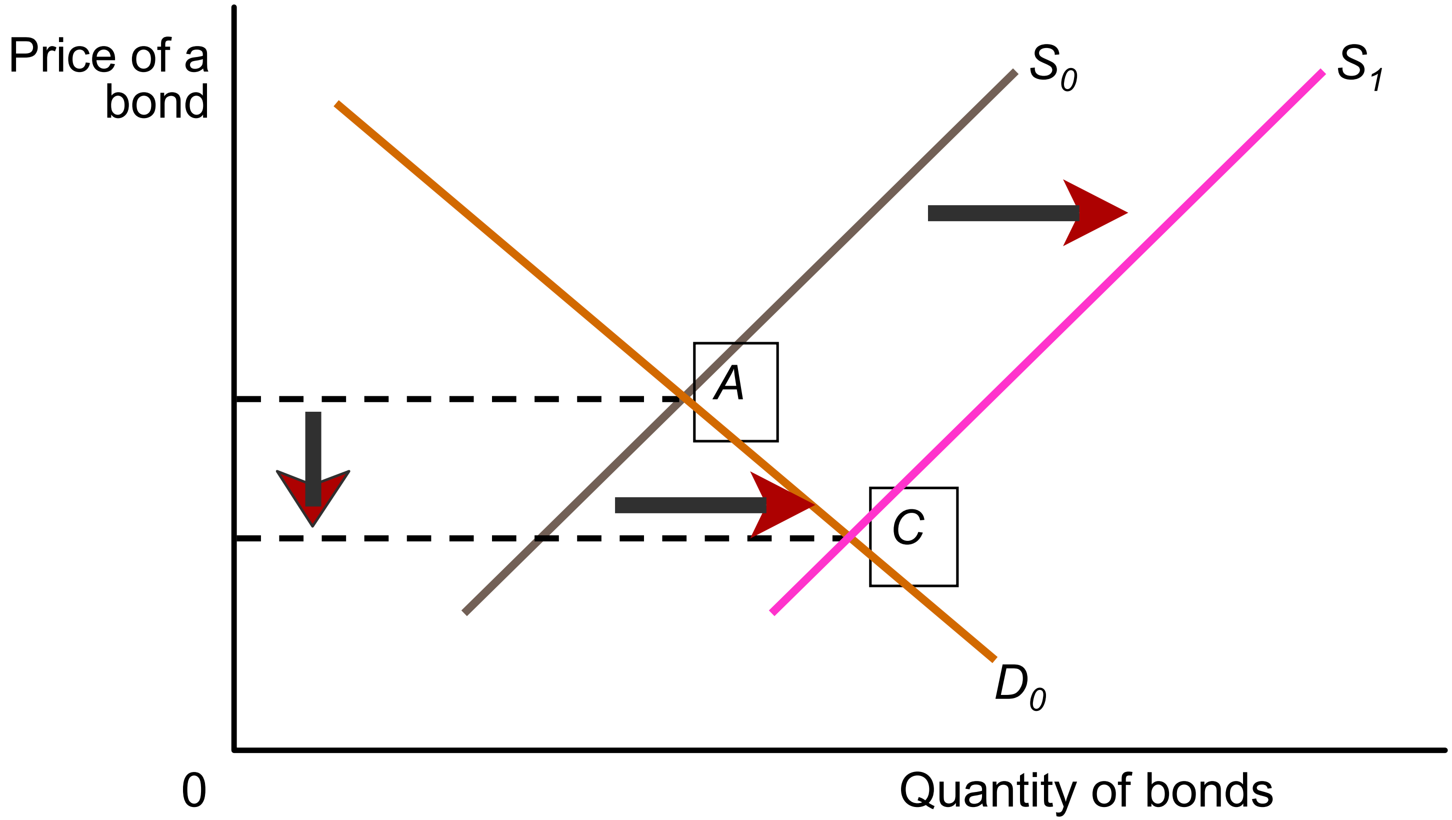
- Since market interest rates and Bond prices are related, the Federal Reserve can change interest rates by affecting Bond Price.

Open Market Purchase



Open Market Purchase increases demand for bonds.

Open Market Sale



Open Market sale increases supply of bonds.

Summary: The Fed's three tools

- Open Market Operations
  - Targeting the Federal Funds rate.
- The Reserve Requirement
- The Discount Rate

Problems in Controlling the Money Supply

- The Fed's control of the money supply is not precise.
  - The Fed does not control the amount of money that households choose to hold as deposits in banks.
  - The Fed does not control the amount of money that bankers choose to lend.

Money-Creation Formula is Oversimplified

- The money multiplier is accurate under two circumstances
  1. Every recipient of cash must redeposit cash to another bank rather than hold it
  2. Every bank must hold reserves no larger than the legal minimum
- If individuals and business firms hold more cash
  - Fewer dollars of cash available for use as reserves
  - Limits the multiple expansion of bank deposits
  - Smaller money supply

Money-Creation Formula is Oversimplified

- Banks holding on to excess reserves was a key over during the financial crisis.
- U.S. after September 2008
  - Collapse of Lehman Brothers set off a financial panic
  - Banks clung to reserves
- Excess reserves, U.S.
  - \$2 billion (just before Lehman) to over \$2.6 *trillion* (September 2014)

Excess Reserves in the U.S. Banking System, 2008–2014