Monetary Policy and the Economy

Required Reading

Chapter 13

Basic Questions

- What is the Fed?
- How does it conduct Monetary Policy?
- Procedure:
  - Discuss the Fed & Monetary Policy first under "Normal" circumstances
  - Later, discuss Fed & Monetary Policy in the last three years

Hint

- **Deposit Expansion Example**: Initiated by an Injection of Reserves into the Banking System via a Currency Deposit

- **More Common Procedure**: Fed Injects or Removes Reserves from the Banking System via Monetary Policy

- **How?**

Federal Reserve System

- Federal Reserve System, or the **“Fed”**, is U.S. Central Bank

- Established in 1914

- Consists of **12 Federal Reserve Banks**
  - Intent: Avoid concentration of financial power in NY
  - Not Government Agencies
  - Private Corporations owned by Member Banks

Fed Power Centers

- Board of Governors of the Federal Reserve System (**"The Board"**)
  - 7 Members appointed by President
  - 14 Year Terms
  - 4 Year Term for the Chairman

- **Federal Open Market Committee** (FOMC)
  - Board of Governors
  - Plus 5 Reserve Bank Presidents

Independence of Fed

- Formally **Independent** of the Government
- Subject to political pressure
- Central Bank Independence is crucial to controlling inflation

Instruments of Monetary Policy of the Fed

- **Open Market Operations**: Buys and sells Government Securities
- **Discount Policy**: Lends Reserves to Banks at the "Discount Rate"
- **Reserve Requirements Policy**: Sets Legal Reserve Requirement Ratio

Federal Reserve Balance Sheet

Fed

Government Securities (GS)	Reserve Deposits (RD)
Loans to Banks (LN-DW)	Other Liabilities
Other Assets	

- **Key Assets**
  - **Government Securities (GS):** To conduct Open Market Operations, Fed buys & sells Government Securities
  - **Loans to Banks (LN-DW):** Fed lends Reserves to Banks at the “Discount Window”. Interest Rate paid on Loans is the “Discount Rate”.
- **Key Liability**
  - **Reserve Deposits (RD):** Banks hold Reserve Deposits mainly to satisfy legal reserve requirements

Open Market Operations
Overview

- **Key Instrument** of Monetary policy

- **Broad Effects**
  - **Effects on Financial Markets**
    - Deposits and the Money Supply
    - Interest Rates
  - **Effects on Markets for Goods & Services**
    - Aggregate Expenditures
    - Output and the Price Level

Open Market Purchase

Fed

GovSec	+1000	RD-A	+1000

Bank A

R	+1000	DD	+1000

- Fed buys Government Securities from a dealer with a check drawn upon itself
- Dealer deposits check at Bank A
- Bank A receives an increase in RD at Fed
- NB: Position of Bank A is Identical to that of Bank A in Deposit of Currency example

- Bank A: Required Reserves (RR) = +100
  Excess Reserves (ER) = +900
- Bank A can acquire Earning Assets (EA)
- Sets off Deposit Expansion process and Increases the Money Supply

Principle
Open Market Purchase

- An **Open Market Purchase** of Government Securities by the Fed of $X **Injects** an **equivalent amount** of **Reserves** into the Banking System.

- **Expands** Demand Deposits and thus **increases** the Money Supply

Principle
Open Market Sale

- An **Open Market Sale** of Government Securities by the Fed of $X **Drains** an **equivalent amount** of **Reserves** from the Banking System.

- **Contracts** Demand Deposits and thus **reduces** the Money Supply

Interest Rates

- What is an Interest Rate?

- Some Interest Rates are Set by Financial Institutions

- Examples:

i_{SD} = Interest Rate on Saving Deposits

i_{Mort} = Interest Rate on Mortgages

i_{Bus} = Interest Rate on Business Loans

Other Interest Rates Must be **Calculated**

- An Example: Interest Rates on Bonds
  - Bond Contract Specifies:
    - InP = Interest Payment or Coupon Payment in $
    - P_M = Price of Bond at Maturity
    - Maturity Date: Assume One Year
  - Market Specifies:

    P_B = Current Price of the Bond
  - Calculate:

    i_B = Interest Rate or Yield to Maturity on the Bond

$$i_B = \underbrace{\frac{InP}{P_B}}_{\text{Interest Return}} + \underbrace{\frac{P_M - P_B}{P_B}}_{\text{Capital Gain}} = \frac{InP}{P_B} + \frac{P_M}{P_B} - 1$$

Numerical Example

- From Bond Contract, assume:
  - InP = Interest Payment or Coupon Payment = \$40 per year
  - P_M = Price of Bond at Maturity = \$1000
  - Maturity Date: One Year

- From the Market, assume:
  - P_B = Current Price of the Bond = \$975

- i_B = Interest Rate or Yield on a One-Year Bond

$$= \underbrace{\frac{40}{975}}_{\text{Interest Return}} + \underbrace{\frac{1000-975}{975}}_{\text{Capital Gain}} = \frac{40}{975} + \frac{25}{975}$$

$$= 0.041 + 0.026 = 0.067 \quad \text{or} \quad 6.7\%$$

Principle

- Inverse Relationship between Interest Rates and Bond Prices

- Given InP & P_M, $\uparrow P_B \Rightarrow \downarrow i_B$ and vice-versa

Extensions

- Formula for Interest Rates on Bonds of Higher Maturity
  - More Complicated
  - But same Principle emerges

- Formula can be applied to Stock
  - Replace Interest Payment by Dividend
  - Replace Price at Maturity by Expected Price When Stock is sold

Market for Federal Funds

- Recent Headline: Fed lowers Federal Funds Rate by ¼%!
- How does the Fed do this?
- What are “Federal Funds”?
- What are the implications for financial markets and the economy?

Federal Funds

- Federal Funds are the **Excess Reserves** of Banks
- Banks with Excess Reserves can lend Reserves to Banks who are “Reserve Deficient”
- “Reserve Deficient” Banks need Reserves to satisfy Legal Reserve Requirements
- **Federal Funds Rate**, i_{FF} , is the Interest Rate Banks charge each other to borrow Reserves

An Example

Bank A

R		$20	DD		$400
	RR	$40			
	Res Def	$20			

Bank B

R		$90	DD		$500
	RR	$50			
	ER	$40			

- $\varepsilon = 10\% =$ Legal Reserve Requirement Percentage

- RR = Required Reserves
  ER = Excess Reserves
  Res Def = Reserve Deficiency

- Bank A is "Reserve Deficient"

- Bank B has "Excess Reserves"

- Bank B can lend Reserves to Bank A
  at the Fed Funds Rate

Characteristics: Market for Federal Funds

Definitions:

FF = Quantity of Federal Funds

i_{FF} = Federal Funds Interest Rate

Demand for Federal Funds--D^{FF}

$$D^{FF} = D(\underbrace{i_{FF}}_{\text{Slope}}, \underbrace{\varepsilon, \ldots}_{\text{Position}})$$

$$OTE, \downarrow i_{FF} \Rightarrow \uparrow D^{FF}$$

$$OTE, \uparrow \varepsilon \Rightarrow \uparrow D^{FF}$$

Supply of Federal Funds--S^{FF}

$$S^{FF} = S(\underbrace{i_{FF}}_{\text{Slope}}, \underbrace{OMO, \ldots}_{\text{Position}})$$

$$OTE, \uparrow i_{FF} \Rightarrow \uparrow S^{FF}$$

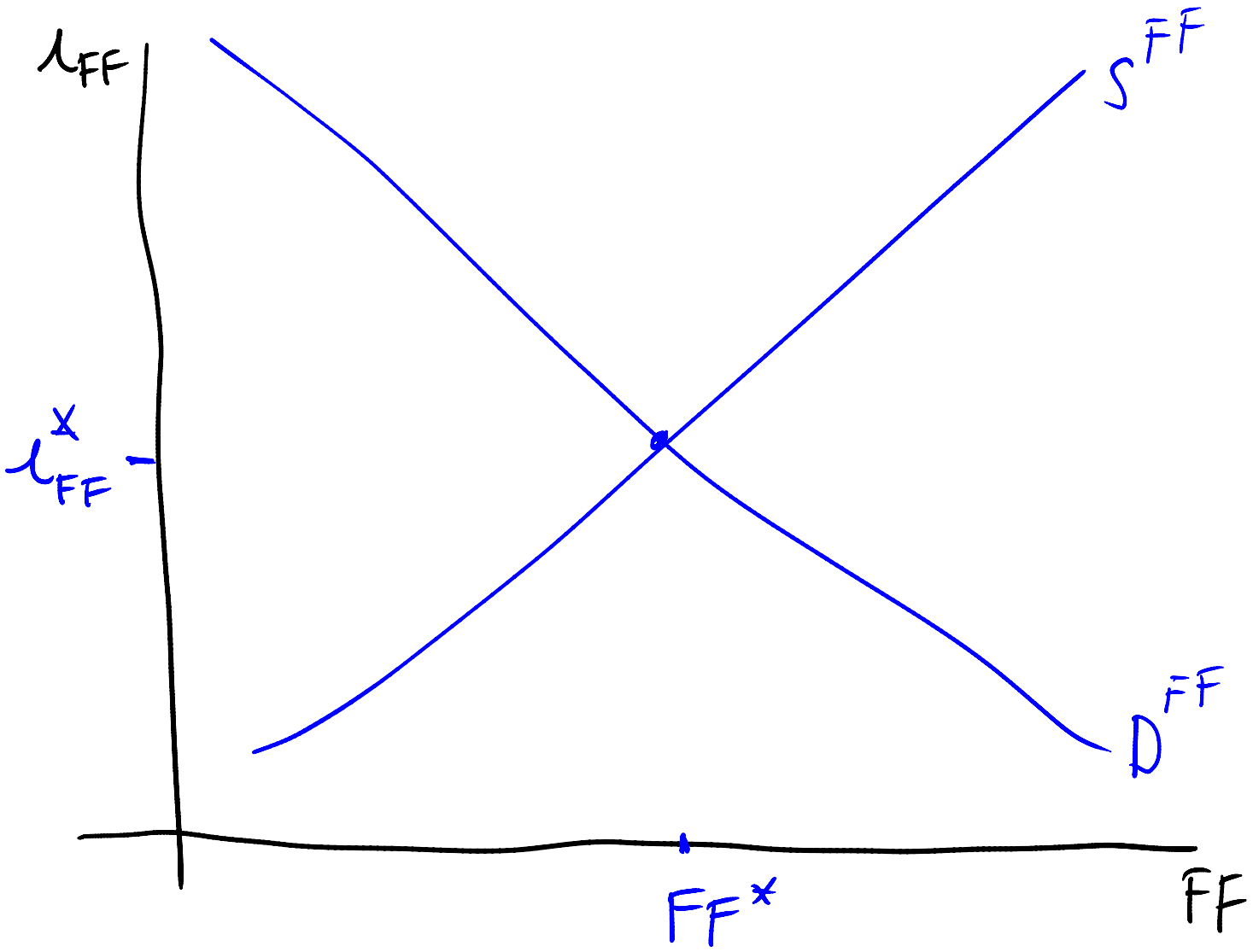
$$OTE, \uparrow OMO \Rightarrow OMPur \Rightarrow \uparrow S^{FF}$$

$$OTE, \downarrow OMO \Rightarrow OMSale \Rightarrow \downarrow S^{FF}$$

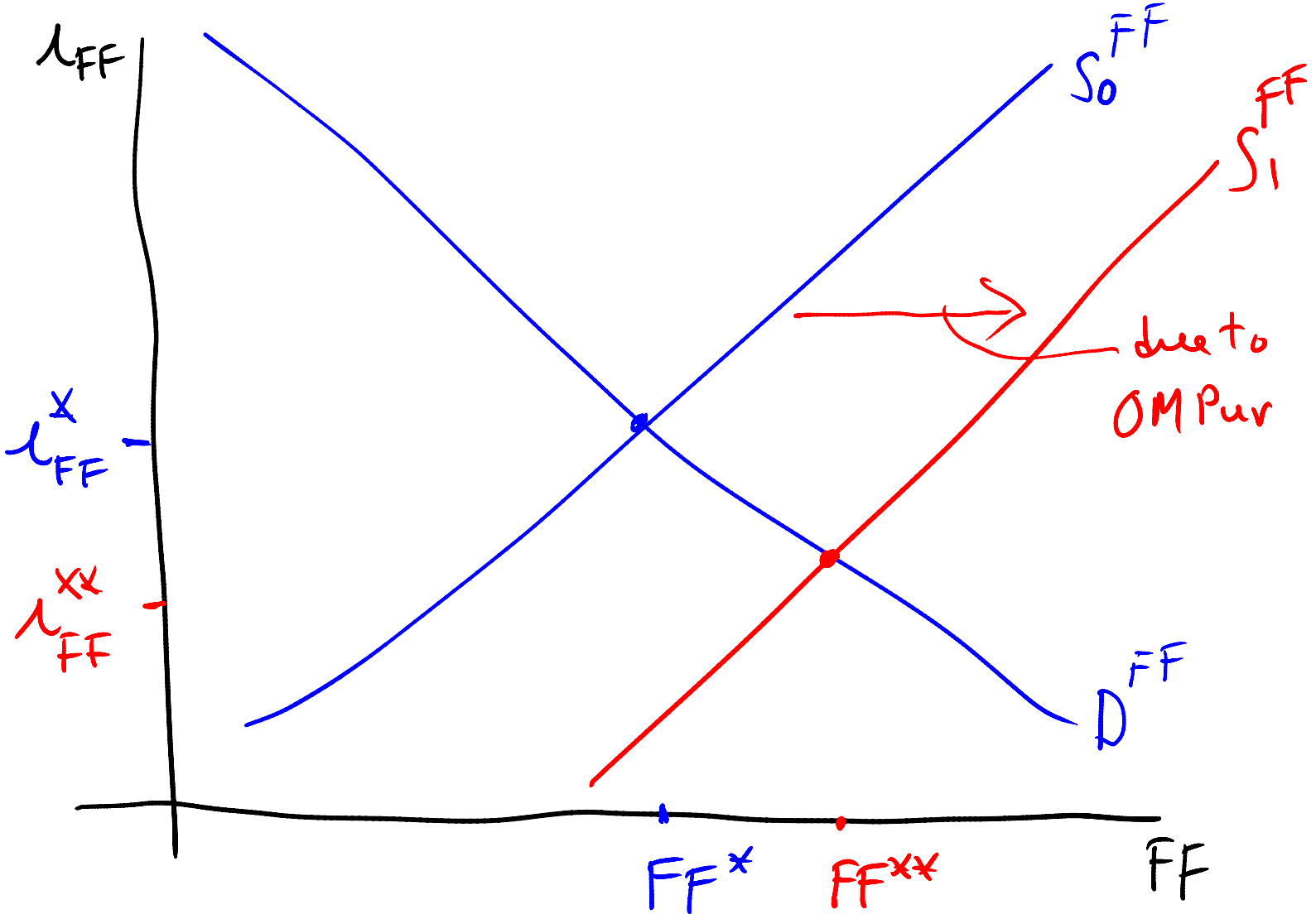
Equilibrium Condition

$$D^{FF} = S^{FF}$$

Federal Funds Market



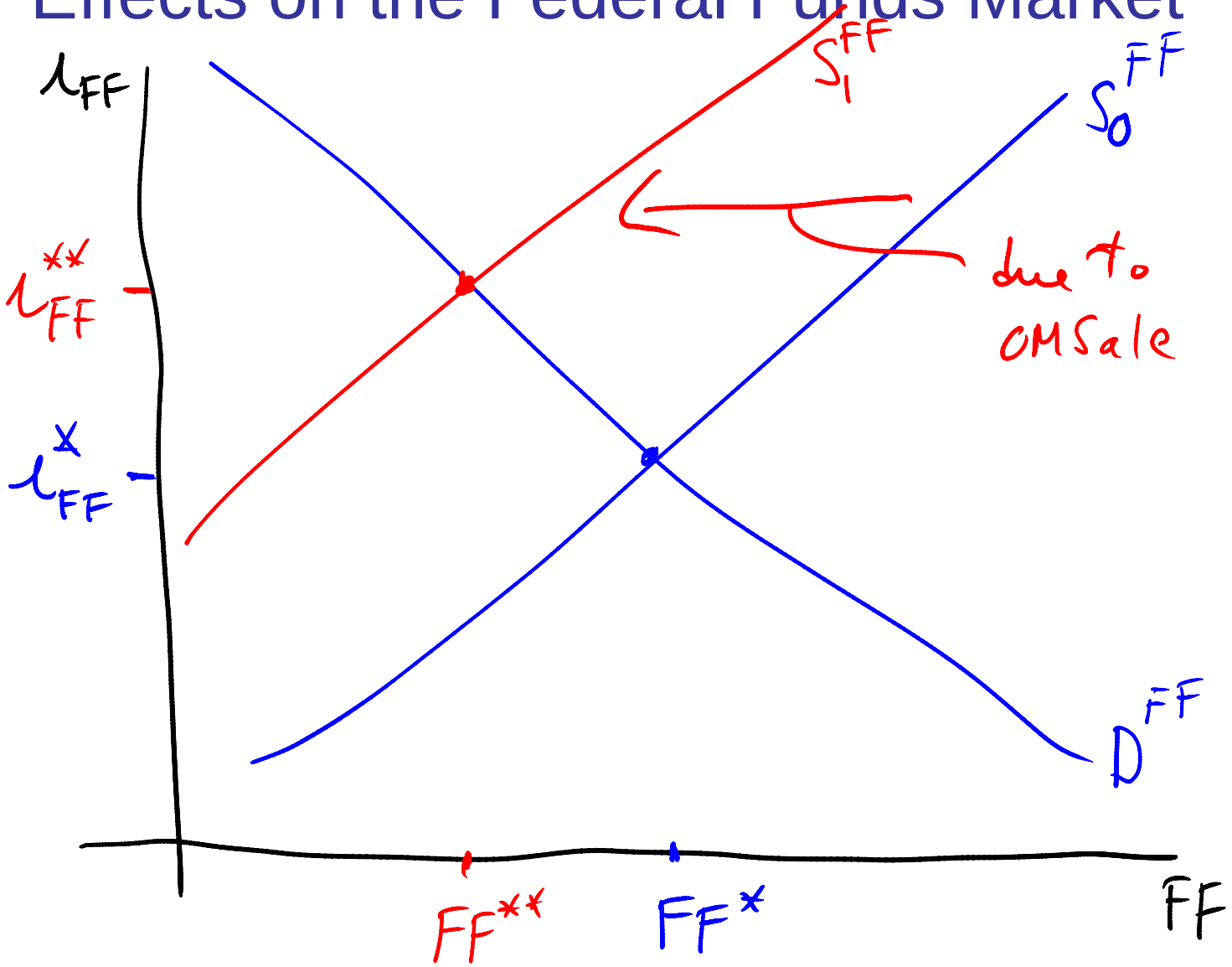
Open Market Purchase
Effects on the Federal Funds Market



Open Market Purchase
Effects on the Federal Funds Market

- **OMPur Injects** Reserves into the Banking System
- **Shifts Supply Curve** for Federal Funds, to the **Right**
- **Lowers** the Federal Funds Rate, i_{FF}
- **Intuition**:
  - More Banks now have Excess Reserves to Lend
  - Fewer Banks are now "Reserve Deficient", i.e., fewer banks need Reserves to satisfy Legal Requirements
  - Puts downward pressure on i_{FF}

Open Market Sale
Effects on the Federal Funds Market



Open Market Sale
Effects on the Federal Funds Market

- **OMSale Drains** Reserves from the Banking System
- **Shifts Supply Curve** for Federal Funds, to the **Left**
- **Raises** the Federal Funds Rate, i_{FF}
- **Intuition**:
  - Fewer Banks now have Excess Reserves to lend
  - More Banks are now “Reserve Deficient”, i.e., need Reserves to satisfy Legal Requirements
  - Puts upward pressure on i_{FF}

Chain Reaction in Financial Markets

Financial Instruments	Interest Rates
Federal Funds	i_{FF}
US Gov. Bonds	i_{GB}
Corporate Bonds	i_{CB}
Loans to Bus Firms	i_{LN}
Mortgages	i_{MORT}
Etc.	Etc.
Average Interest Rate	i

Open Market Purchase
Effects on Interest Rates

Effects of Fed Actions:

* Injects Reserves into Banking System: $\uparrow$ R $\Rightarrow$ $\downarrow i_{FF}$

* Buys GovSec: $\uparrow P_{GB} \Rightarrow \downarrow i_{GB}$

Effects of Bank Actions

* Make Loans: $\downarrow i_{LN}$ & $\downarrow i_{Mort}$

* Purchase Bonds: $\downarrow i_{GB}$ & $\downarrow i_{Corp}$

Over-all Effects

* Define $i =$ Average Interest Rate

* OMPur $\Rightarrow \downarrow i$

Principle: Open Market Purchase
Effects on Financial Markets

Open Market Purchase of Gov Sec by the Fed

- Injects Reserves into the Banking System

$$\Rightarrow \uparrow \mathrm{R} \ \ \& \ \ \downarrow i_{FF}$$

- Banks lend and invest the newly created Reserves

  * Expands Deposits and Creates Money

$$\Rightarrow \uparrow DD \ \ \& \ \ \uparrow M$$

  * Lowers the Over-all or Average Level of Interest Rates

$$\Rightarrow \downarrow i$$

Principle: Open Market Sale
Effects on Financial Markets

Open Market Sale of Gov Sec by the Fed

- Drains Reserves from the Banking System

$$\Rightarrow \downarrow \text{R} \ \ \& \ \uparrow i_{FF}$$

- Banks call in loans and sell-off bonds to acquire Reserves

  * Contracts Deposits and Destroys Money

$$\Rightarrow \downarrow DD \ \ \& \ \downarrow M$$

  * Raises the Over-all or Average Level of Interest Rates

$$\Rightarrow \uparrow i$$

Open Market Operations

- **Key Tool** of Monetary Policy for the Fed

- **Decomposition of Effects:**
  - ➢Effects on Financial Markets
  - ➢ Effects on Expenditure & Output Markets

- **Connecting Link:** Mainly Changes in Interest Rates