

# **Course: Foundations of Economics**

## **Lecture 8: Money and Interest rates**

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Image source: Getty Images

# OUTLINE

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- The meaning and function of money
- The role of banks and central bank
- The supply and demand for money
- Equilibrium in the money market

# THE NATURE OF MONEY

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- 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

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- 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

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- 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

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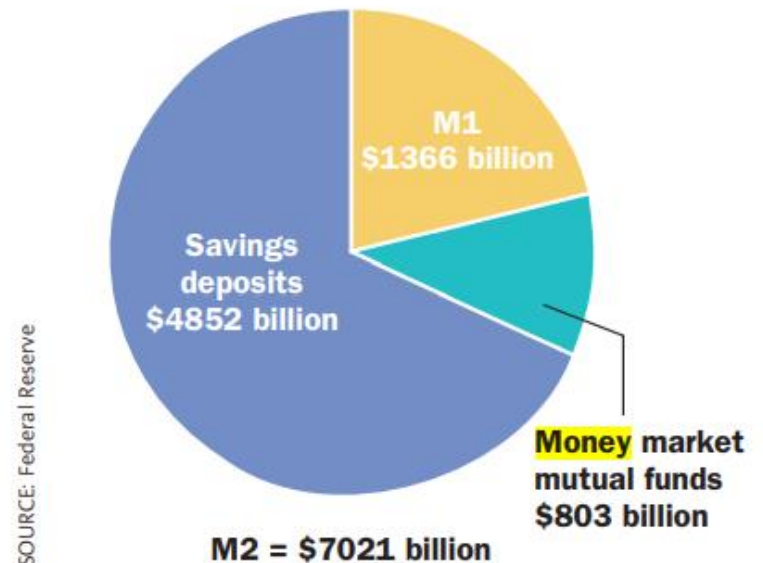
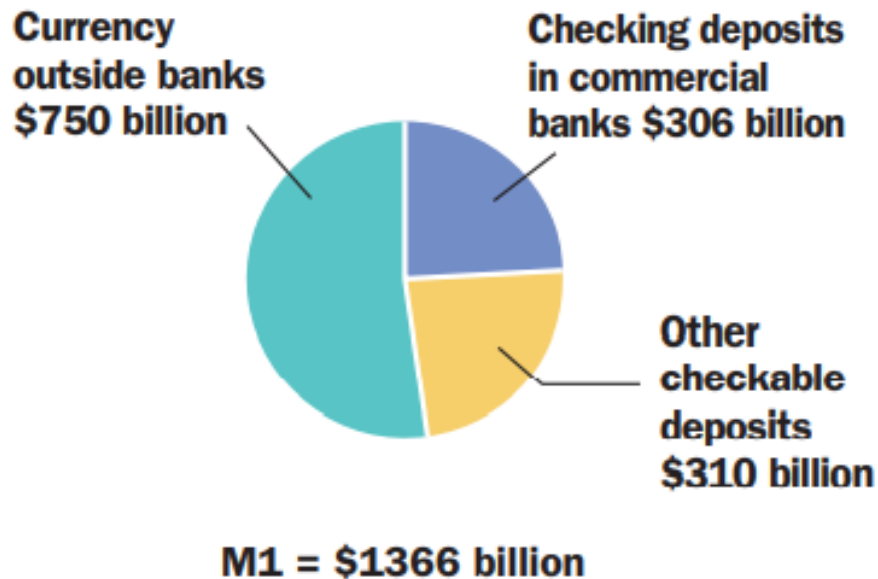
- Money supply M1
  - Narrowly defined money supply
  - Coins and paper money in circulation
  - Traveler's checks
  - Conventional checking accounts and other checkable deposit balances

# HOW THE QUANTITY OF MONEY IS MEASURED

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

# TWO DEFINITIONS OF THE MONEY SUPPLY



Source: Baumol & Blinder, (2009), MACROECONOMICS, 11th ed, Cengage Learning, page 306.

# HOW THE QUANTITY OF MONEY IS MEASURED

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- Near moneys
  - Liquid assets that are close substitutes for money
  - Liquidity refers to the ease with which it can be converted into cash
  - What about credit cards?
- Will assume that money consists of coins, paper money, and checkable deposits (almost M1)

# THE BANKING SYSTEM

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- 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

# THE BANKING SYSTEM

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- Three features of fractional reserve banking
- Bank profitability
  - Banks are in business to earn profits
    - Interest on loans – interest on deposits
  - Bank discretion over money supply
    - Loans create new money
    - Banks decisions on how much to hold in reserves influences the supply of money
- Exposure to bank runs
  - Keep prudent reserves and lend out money carefully

# THE BANKING SYSTEM

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- Principles of bank management: Profit vs. Safety
- How do banks maintain a reputation for prudence?
  - Maintain a sufficiently level of reserves to minimize vulnerability to runs
  - Be cautious in making loans and investments since large losses undermine confidence

# THE BANKING SYSTEM

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- Banking - inherently risky business
  - Safe only by cautious and prudent management
  - But caution not the way to high profits
  - High profits come from
    - Low reserves and more loans
    - Loans to borrowers with questionable credit standing at higher interest rate

# THE BANKING SYSTEM

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- Bank regulations
  - Designed to ensure depositors' safety and to control the money supply
- Deposit insurance
  - Guarantees that depositors will not lose money even if their bank goes bankrupt
  - Deposit Insurance programs
  - Moral hazard problem
    - If insured against consequences of risk people engage in riskier behavior

# THE BANKING SYSTEM

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- Other laws and regulations
  - Limit the kinds and quantities of assets in which banks may invest
  - Restrictions on banks' ability to engage in “proprietary trading”
- Reserve requirements
  - Minimum amount of reserves required by law
  - Proportional to the volume of deposits

# THE ORIGINS OF THE MONEY SUPPLY

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- 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

# BANK ASSETS

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- Cash and operational balances in the central bank
- Short-term loans
  - Market loans
  - Bills of exchange
  - Reverse repos
- Long-term loans
- Investments

# BANK LIABILITIES = DEPOSITS

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- Sight deposits
- Time deposits
- Certificates of deposit (CDs)
- Sale and repurchase agreements ('repos')

# BALANCE SHEET OF UK MFIS (END OF APRIL 2015)

<b>Sterling liabilities</b>	<b>£bn</b>	<b>%</b>	<b>Sterling assets</b>	<b>£bn</b>	<b>%</b>
Sight deposits		42.9	Notes and coins	9.7	0.3
UK MFIs	126.4		Balances with UK central bank		9.4
UK public sector	15.3		Reserve balances	312.0	
UK private sector	1163.2		Cash ratio deposits	4.1	
Non-residents	144.0		Loans		11.0
Time deposits		31.2	UK MFIs	258.1	
UK MFIs	131.9		UK MFIs' CDs, etc.	4.5	
UK public sector	18.3		Non-residents	109.4	
UK private sector	708.7		Bills and acceptances	6.9	0.2
Non-residents	195.2		Reverse repos	261.1	7.7
Repos	250.9	7.4	Investments	438.8	13.0
CDs and other short-term papers	161.2	4.8	Advances	1901.2	56.3
Capital and other internal funds	414.0	12.3	Other assets	74.1	2.2
Other liabilities	45.7	1.4			
<b>Total sterling liabilities</b>	<b>3374.8</b>	<b>100.0</b>	<b>Total sterling assets</b>	<b>3379.9</b>	<b>100.0</b>
Foreign currency liabilities	3890.5		Total foreign currency assets	3885.4	
<b>Total liabilities</b>	<b>7265.3</b>		<b>Total assets</b>	<b>7265.3</b>	

Note: Data are not seasonally adjusted

Source: Based on data in *Bankstats (Monetary and Financial Statistics)*, (Bank of England), June 2015

# BANKS AND MONEY CREATION

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- Suppose someone deposits \$100,000 into a bank. How does that lead to a multiple expansion of the money supply?
- Deposit creation
  - Process by which a fractional reserve banking system turns \$1 of bank reserves into several dollars of bank deposits
- Excess reserves
  - Reserves held in excess of legal minimum

# BANKS AND MONEY CREATION

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- Each column forms a geometric progression

- Each entry is 80% of the previous entry

$$1 + R + R^2 + R^3 + \dots = \frac{1}{1 - R}$$

- \$100,000 + \$80,000 + \$64,000 + \$51,200 + ...
    - = \$100,000 × (1 + 0.80 + 0.80<sup>2</sup> + 0.80<sup>3</sup> + ...)
    - = \$100,000 × 1/(1 - 0.80)
    - = \$500,000 in new deposits

# BANKS AND MONEY CREATION

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- In general
  - If the required reserve ratio =  $m$
  - Money multiplier =  $1/m$
  - Banking system can convert each \$1 of reserves into  $\$1/m$  in new money
- Money multiplier
  - Ratio of newly created bank deposits to new reserves
- Change in money supply  
=  $(1/m) \times$  Change in reserves

# BANKS AND MONEY CREATION

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- Be careful here
  - The money supply does *not* increase by \$500,000.  
Why?
  - Deposits increase by \$500,000
  - But the process started with a \$100,000 cash deposit
  - So money supply increases by \$400,000

# BANKS AND MONEY CREATION

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- Multiple contractions of money supply
  - Entire process is just the reverse from before
  - Deposits down by \$500,000
  - Loans down by \$400,000
  - Reserves down by \$100,000
  - Money supply down by \$400,000

# MONEY-CREATION FORMULA IS OVERSIMPLIFIED

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- Our money multiplier 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

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- Banks holding on to excess reserves has been key over the last 7-8 years
- 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)

# THE NEED FOR MONETARY POLICY

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- Government regulates money supply to maintain stability
- During a recession
  - Banks prone to reduce money supply
    - Increase excess reserves
    - Decrease lending to less creditworthy applicants
  - Without government intervention contraction in money supply would aggravate recession

# THE CENTRAL BANK

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## Functions:

- Issue notes
- Bank to the government
- Bank to banks
- Bank to overseas central banks
- Provides liquidity to banks
- Operates the government's monetary and exchange rate policy

# THE NEED FOR MONETARY POLICY

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- During an economic boom
  - Banks expand money supply
  - Undesirable momentum to economy
  - Without government intervention rapid money growth could lead to inflation

# MONEY SUPPLY

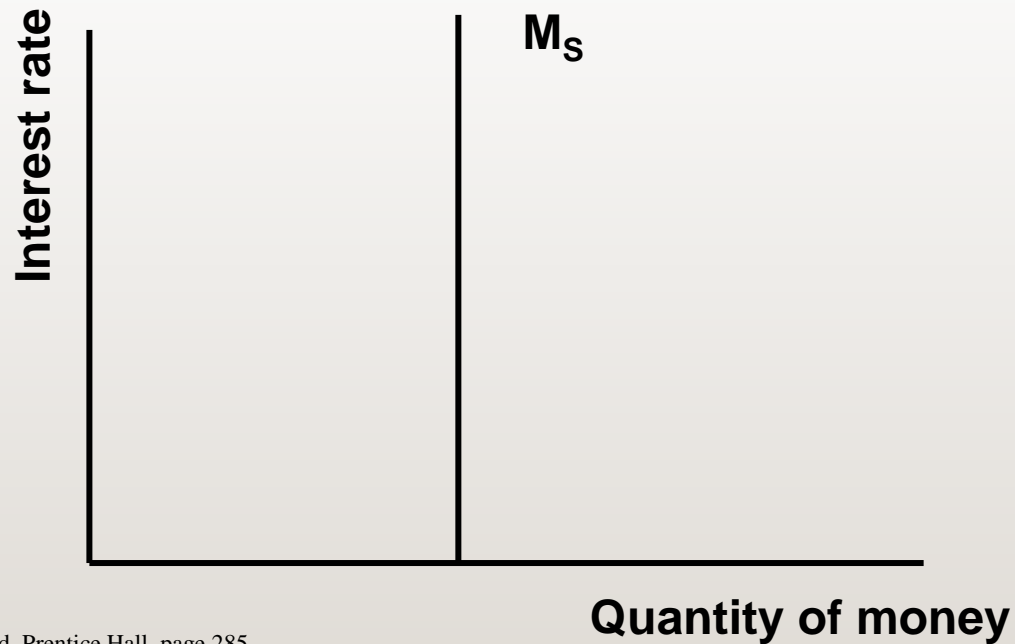
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- The **money supply** is money in circulation (cash not in bank vaults) plus bank deposits on which cheques can be written.

# MONEY SUPPLY AND THE INTEREST RATE

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The supply of money is to be determined by the government (exogenous).  
Therefore money supply is independent of interest rate.



# MONEY DEMAND

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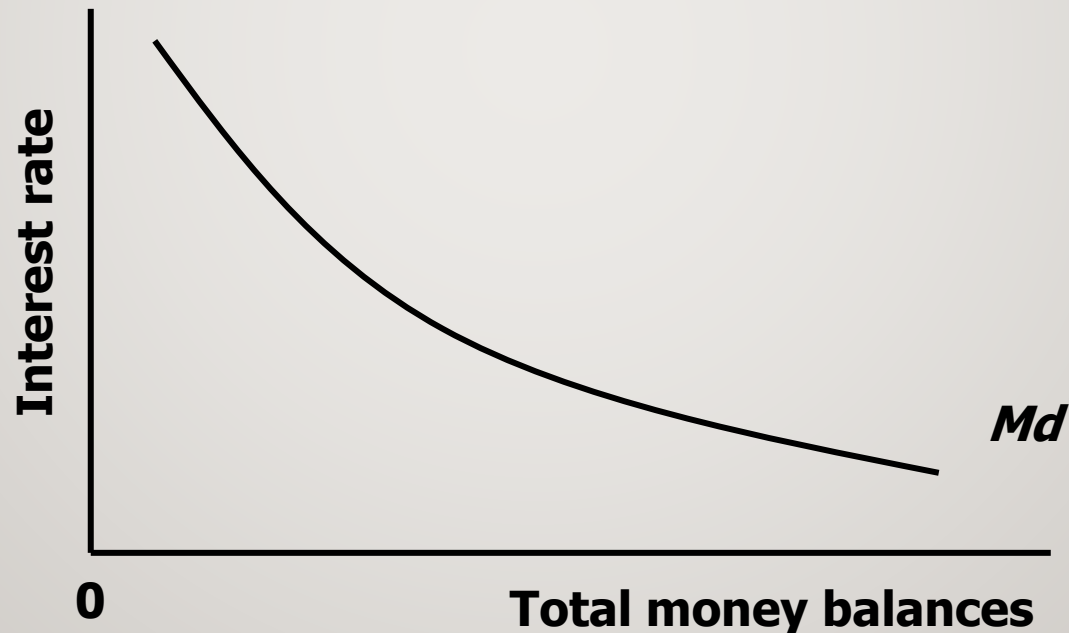
- Quantity of money demanded is the amount of wealth that the individuals choose to hold as money, rather than as other assets.
- How much money an individual will decide to hold is determined by:
  - The price level
  - Real income
  - The interest rate

# DEMAND FOR MONEY

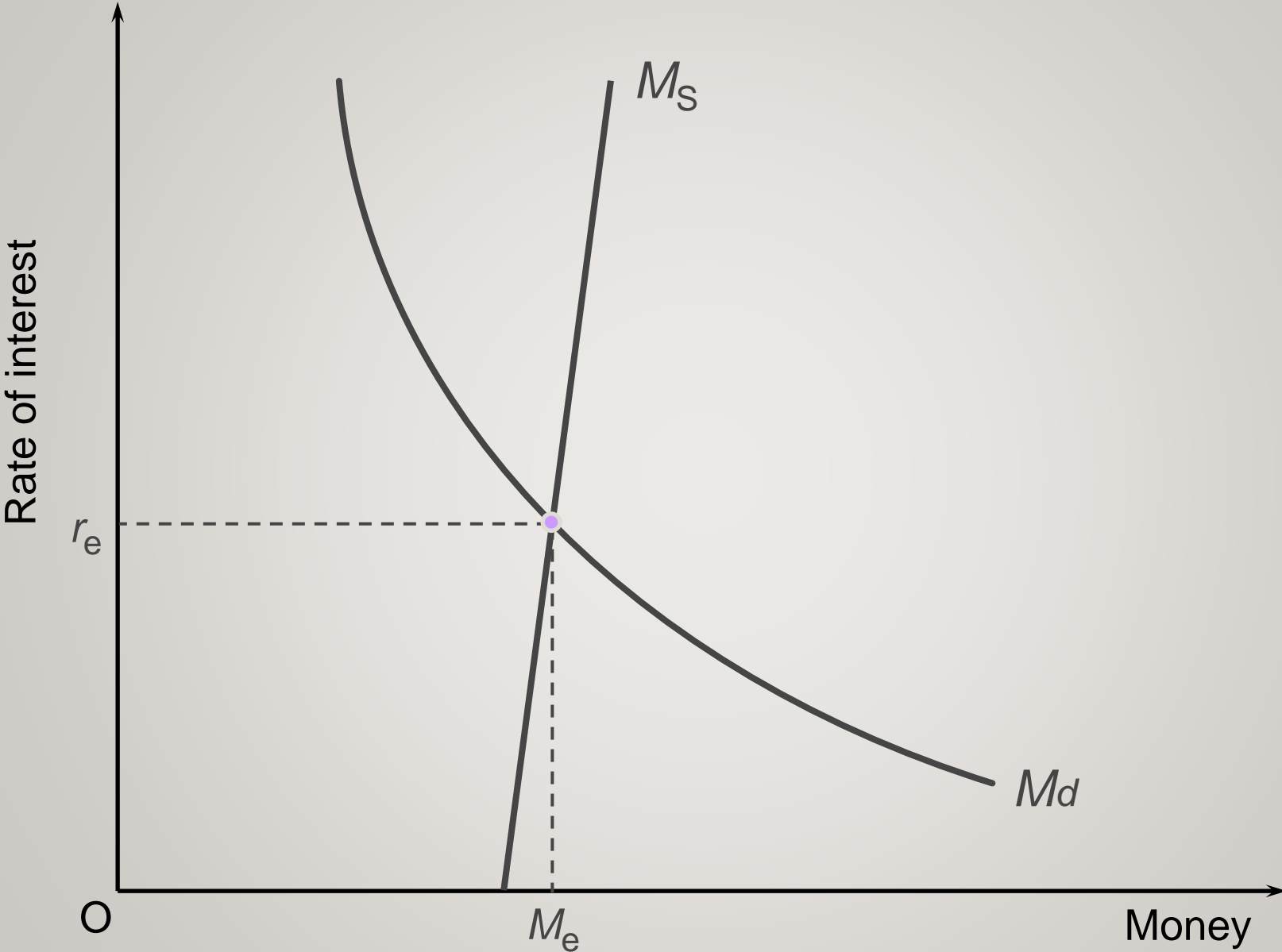
The motives for holding money: liquidity preference

Transactions and precautionary demand for money

Speculative demand for money



# EQUILIBRIUM IN THE MONEY MARKET



Source: Sloman (2016), Essentials of Economics, 7th ed, Prentice Hall, page 287.

# REFERENCES

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- Irvin B. Tucker, (2018), Survey of Economics, 10th ed, Cengage learning.
- Karl Case, Ray Fair, (2004), Principles of Economics, 7/e, Prentice Hall Business Publishing.
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