Chapter 8 Money and Monetary policy

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Content

I Overview of money

II Banking system and money supply

III Central bank and tools to control money supply

IV The theory of liquidity preference and monetary policy

I Overview of money

Definition

Money is any object or record that is generally accepted as payment for goods and services and repayment of debts in a given socio-economic context or country.

In other words, money is a set of assets in an economy that people regularly use to buy goods and services from other people

The functions of money

- Medium of exchange: Item that buyers give to sellers when they want to purchase goods and services
- Unit of account: Yardstick people use to post prices and record debt

I Overview of money

The kind of money

- Commodity money: money that takes the form of a commodity with intrinsic value (Item would have value even if it were not used as money)

- Fiat money: money without intrinsic value used as money because of government decree

Measuring money volume

M0: Currency - Paper bills and coins in the hands of the public

M1: M0 and demand deposit (depositors can access on demand by writing a check)

M2: M1 and timely deposit (depositors in principle can access to the money as maturity elapses)

The differentiation in measuring money volume bases on the gradual decrease of liquidity (liquidity is the ease with which an asset can be converted

II Banking system and money supply

Money creation: fractional reserve banking

After receiving money from clients, banks have to lend or invest the money to make profit so that it can primarily pay back interest rate. However to secure liquidity and system stability, banks have to reserve money from clients' deposit. Banks hold only a fraction of deposits as reserves

Desired reserve rate/ratio (rr) is the fraction of deposits that banks hold as reserves. It has two components

+ Required reserve rate (rrr): Bank must hold at the Minimum level set by country's central bank

+ Excess reserve rate (err): Bank may hold additional excess reserves

II Banking system and money supply

Money creation: fractional reserve banking

We examine an example to see how banking system create more money (money as definition) for the economy

The example has two assumption:

+ People don't hold money in hand but deposit all to the banks

+ Desired reserve rate of each bank is similar (rr%)

The evolution: there is 1 unit value of money deposited in bank1. Bank 1 reserves rr and lends (1- rr) to people. People as assumed don't hold money and deposit to bank 2. Bank 2 reserves (1-rr).rr and lends (1-rr)^2 to people. Then the process continues. The

II Banking system and money supply

Money creation: fractional reserve banking

Banking system	Deposits	Desired reserve rate (rr)	Lending
$Bank_1$	1	1.rr	(1-rr)
$Bank_2$	(1-rr)	(1-rr).rr	$(1-rr)^2$
$Bank_3$	$(1-rr)^2$	$(1-rr)^2$ .rr	$(1-rr)^3$
...	...	...	...
$Bank_{(n+1)}$	$(1-rr)^n$	$(1-rr)^n$ .rr	$(1-rr)^{n+1}$

$$D = 1 + (1-rr) + (1-rr)^2 + \ldots + (1-rr)^n = 1 \times \frac{1-(1-rr)^{n+1}}{1-(1-rr)} = 1 \times \frac{1-(1-rr)^{n+1}}{rr}$$

$$0 < rr < 1 \Rightarrow D = 1 \times \frac{1-0}{rr} = 1 \times \frac{1}{rr} = \frac{1}{0,1} = 10$$

II Banking system and money supply

Money supply model

+) ***Money supply***: money as the most wide scope of understanding (M2)

$$MS(M) = Cu + D$$

where Cu currency circulated outside banks and D deposits in bank

+) ***Monetary base*** (basic money, high powered money): money as cash printed by central bank (M0)

$$B\ (Ho) = Cu + R$$

where Cu currency circulated outside banks and R currency reserved by banks

II Banking system and money supply

$$m_M = \frac{MS}{B} = \frac{cr+1}{cr+rr} = \frac{cr+1}{cr+(err+rrr)}$$

Money supply model

Monetary multiplier (m_M) is the fraction between MS and B

$$\frac{MS}{B} = \frac{Cu+D}{Cu+R} \rightarrow \frac{MS}{B} = \frac{Cu/D + D/D}{Cu/D + R/D}$$

Denote Cu/D = cr (currency over deposit ratio)

R/D = rr (reserve ratio) (see the example)

→

II Banking system and money supply

Money supply model

Conclusions

- Central bank cannot control entirely money supply due to cr (decided by payment behavior of people) and err (decided by each bank)
- Monetary multiplier has negative relationship with both rr (rrr) and cr

Period	1996-1997	2000-2001	2006-2007	2009-2010
m_M of Vietnam	1,6-1,7	2,3-2,5	3-3,5	5-5,2

Math problems

1) Data have given as follows cr = 20% rr = 10% MS = 2000. Find B ?

2) Data have given as follows rr = 15%, MS = 3000, B = 500. Find cr ?

3) Data have given as follows cr/rr = 4, MS = 2000, B = 200. Find cr, rr ?

4) Data have given as follows cr + rr = 40%, MS = 1500, B = 500. Find cr, rr ?

5) A person deposited cash of 200 in a bank, given that cr = 20% rr = 20%. How much money supply increase ?

6) State bank of Vietnam (SBV) printed more cash of 1000, given that cr = 0% rr = 10%. How much money supply increase ?

III Central bank and tools to control money supply

Central bank

Central bank is the institution designed to oversee the banking system and regulate the quantity of money in the economy by monopolistic ability of printing money (monetary policy). Central bank also regulates foreign reserve of a country and represents the country in international monetary organization or monetary agreement

Central bank could be a body of government but it could be independent from government. Each type of organizational

III Central bank and tools to control money supply

Tools to control money supply

1. Open-market operations: Purchase and sale of government bonds by central bank
   - To increase the money supply: central bank buys government bonds
   - To reduce the money supply: central bank sells government bonds
2. Reserve requirements: Regulations on minimum amount of reserves that banks must hold against deposits
   - An increase in reserve requirement: Decrease the money supply
   - A decrease in reserve requirement: Increase the money supply
3. The discount rate: Interest rate on the loans that central bank makes to commercial banks

IV The theory of liquidity preference and monetary policy

The theory of liquidity preference (money market)

This is Keynes's theory which indicates that interest rate will adjust to bring money supply and money demand into balance (we see nominal interest rate instead of real interest rate; moreover in short run due to fixed price nominal and real interest rate are not different)

Money supply

Controlled by central bank

Quantity of money supplied fixed by central bank therefore doesn't

Money demand

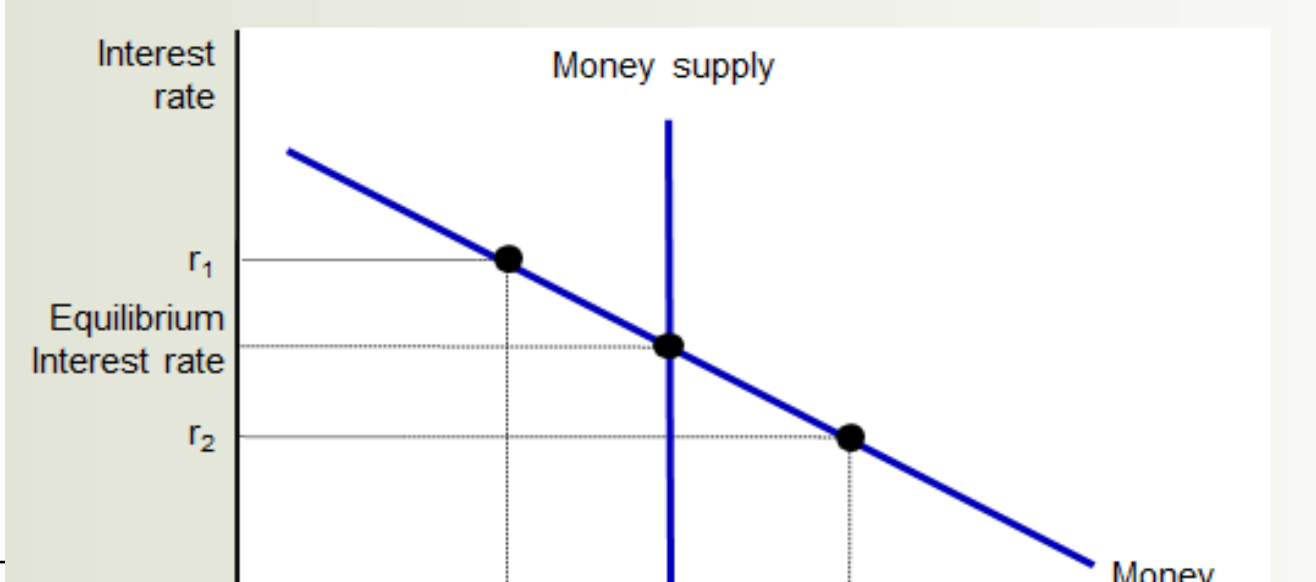
Money – most liquid asset (liquidity preference)

Interest rate (i) – opportunity cost of holding money

IV The theory of liquidity preference and monetary policy

The theory of liquidity preference (money market)

Equilibrium in the money market: Equilibrium interest rate will bring Quantity of money demanded = quantity of money supplied



IV The theory of liquidity preference and monetary policy

The theory of liquidity preference (money market)

- If interest rate > equilibrium: Quantity of money people want to hold less than quantity supplied → People holding the surplus buy interest-bearing assets → Lowers the interest rate → People - more willing to hold money until equilibrium

- If interest rate < equilibrium: Quantity of money people want to hold more than quantity supplied → People - increase their holdings of money by selling interest-

IV The theory of liquidity preference and monetary policy

The theory of liquidity preference (money market)

Change in money supply derived from

+ monetary policy of central bank: increase or decrease money supply

+ change in price level (with real money supply)

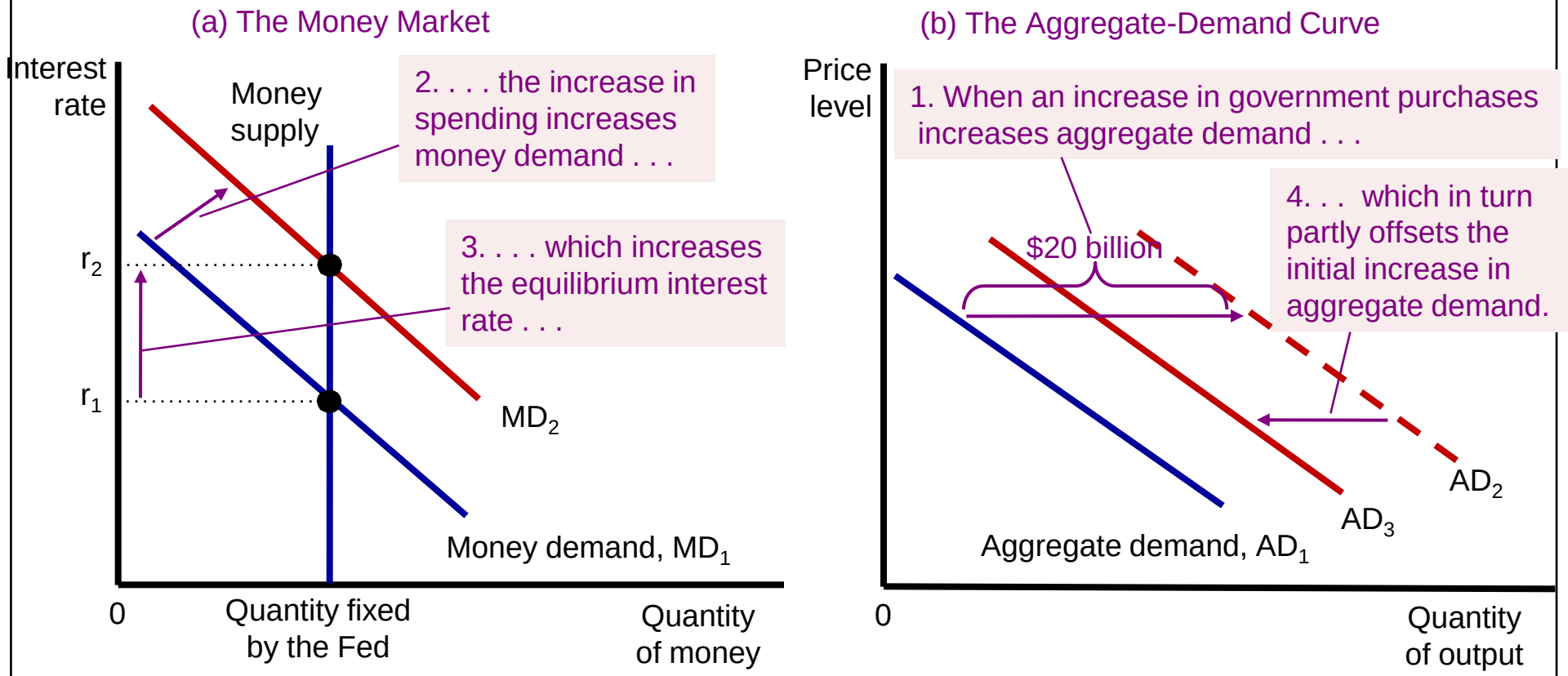
Change in money demand derived from

+ change in national income

+ change in price level (with nominal money demand)

+ financial market stability

IV The theory of liquidity preference and monetary policy



Panel (a) shows the money market. When the government increases its purchases of goods and services, the resulting increase in income raises the demand for money from MD_1 to MD_2, and this causes the equilibrium interest rate to rise from r_1 to r_2. Panel (b) shows the effects on aggregate demand. The initial impact of the increase in government purchases shifts the aggregate-demand curve from AD_1 to AD_2. Yet because the interest rate is the cost of borrowing, the increase in the interest rate tends to reduce the quantity of goods and services demanded, particularly for investment goods. This crowding out of investment partially offsets the impact of the fiscal expansion on aggregate demand. In the end, the aggregate-demand curve shifts only to AD_3.

IV The theory of liquidity preference and monetary policy

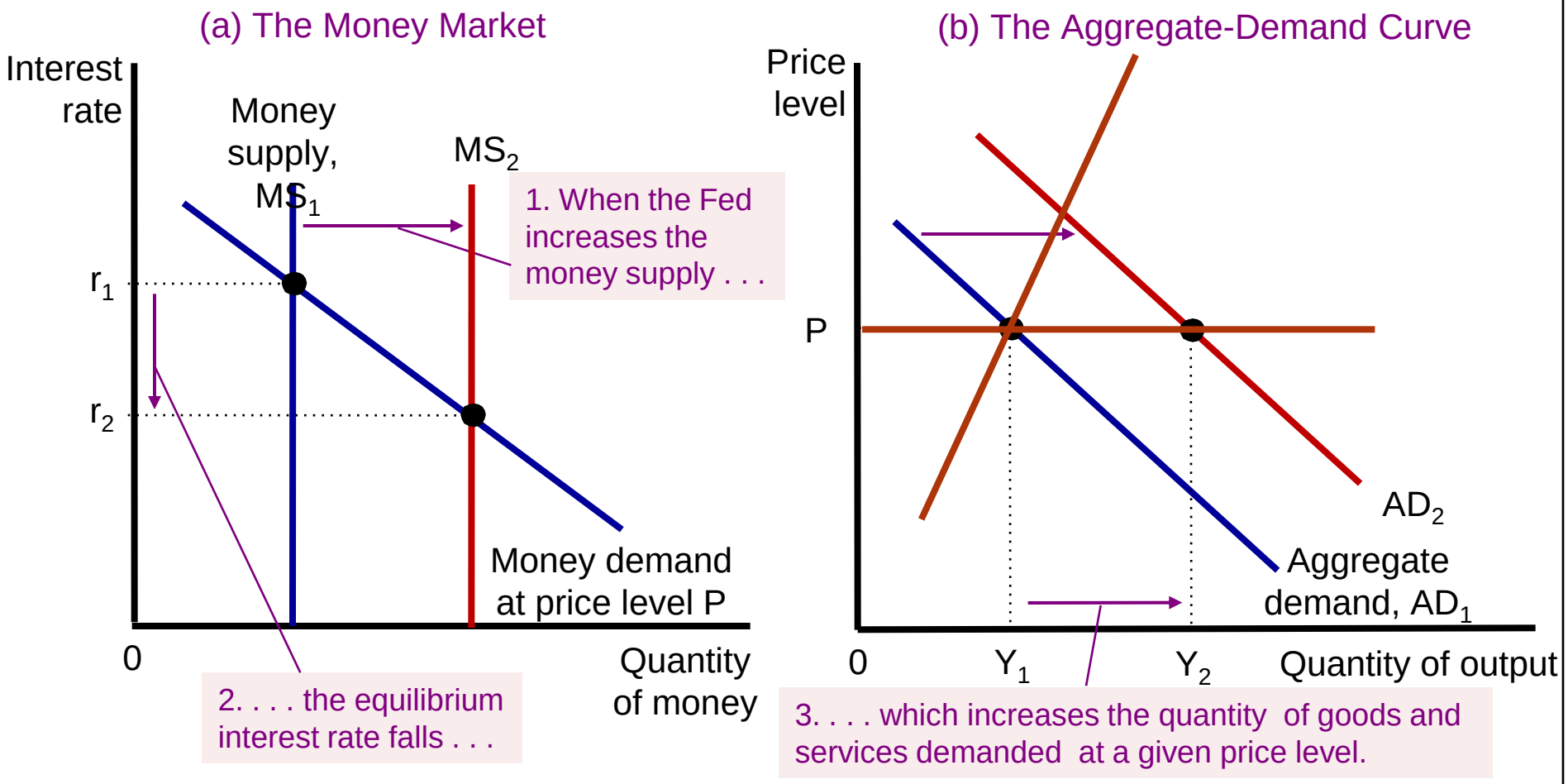
Monetary policy

+ ***Expansionary monetary policy***: central bank increases the money supply → Money-supply curve shifts right → Interest rate falls → At any given price level increase in quantity demanded of goods and services → Aggregate-demand curve shifts right → output rises (unemployment rate decreases), price increases

Using expansionary monetary policy when economy is in ***crisis***

+ ***Contractionary monetary policy***: central bank decreases the money supply → Money-supply curve shifts left → Interest rate increases → At any given price level decrease in quantity demanded of goods and services → Aggregate-demand curve

Expansionary monetary policy



In panel (a), an increase in the money supply from MS_1 to MS_2 reduces the equilibrium interest rate from r_1 to r_2. Because the interest rate is the cost of borrowing, the fall in the interest rate raises the quantity of goods and services demanded at a given price level from Y_1 to Y_2. Thus, in panel (b), the aggregate-demand curve shifts to the right from AD_1 to AD_2.

Monetary policy vs fiscal policy

1. Monetary policy focuses on investment (I) in GDP, fiscal policy focuses on government spending (G) in GDP
2. More open the economy is, more influence monetary policy is. More severe economic downturn is, more influence fiscal policy is
3. Inside lag of monetary policy is smaller than fiscal policy but outside lag of monetary policy is larger than fiscal policy

Key concepts

- Money, fiat money, commodity money
- Liquidity
- Monetary multiplier
- Required reserve rate, excess reserve rate, desired reserve rate
- Money supply
- Money demand
- The theory of liquidity preference
- Central bank
- Open market operation, reserve rate requirement, discount rate
- Expansionary monetary policy,