CHAPTER 14

Money Market and Interest Rate

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Summary

This chapter deals with the Keynesian theory of the money market, which is very different from the neoclassical theory of loanable funds market.

It introduces the Keynesian concepts of demand for money, supply of money and the equilibrium rate of interest.

It also examines how the Fed's policy can change the equilibrium rate of interest and influence equilibrium GDP.

Demand for Money

Why do we hold money?

The definition of money as the most liquid asset makes it clear.

We hold money to

1) Buy goods and services. This is called **transaction demand for money**.

2) Speculate in the **bond market**, according to Keynes. This is called **speculative demand for money** or "**liquidity preference**."

Let us deal with each separately.

Transaction Demand for Money

How much money, on the average, do you hold for day-to-day transaction?

Traditionally, the answer relies on the **quantity theory of money**.

Quantity Theory of Money (QTM)

Def. QTM (the simplest form): an increase in the supply of money raises the level of prices.

The origin of QTM is in 15-16th century Europe, when the flow of precious metals from the Americas seemed to cause inflation.

The theory then evolved.

In 1911 Irving Fisher (American economist) expressed QTM as:

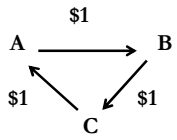
$$\mathbf{MV_T = PT}$$

Where:

M is the **supply of money**
T is the **number of transactions**
P is the **level of prices**
$\mathbf{V_T}$ is the **transaction velocity of money**

Example of $\mathbf{MV_T = PT}$

Suppose we have 3 transactions, each worth 1 dollar:



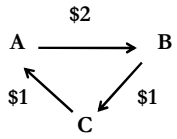
T = 3
M = $1
P = ($1 +$1 +$1) / 3 = $1
V_T = [$1 (1) +$1 (1) +$1 (1)] / $1 = 3

$MV_T = PT$

$1 (3) = $1 (3)

This is a tautology, it states that spending is equal to spending.

Another example
Again, we have 3 transactions:



T = 3
M = $2
P = ($2 + $1 + $1) / 3 = $4/3
V_T = [$2 (1) + $1 (1) + $1 (1)] / $2= $4/$2 = 2

Again, MV_T =PT: $2 (2) = ($4/3) 3

In 1917, the economists in Cambridge University (England) expressed QTM (called "Cambridge Cash Balance Approach") as:

$$\mathbf{MV_y = Py}$$

Where:
M is the **supply of money (M_s)**
y is **real income**
P is **the level of prices**
$\mathbf{V_y}$ is **the income velocity of money**

Q: If **y is real income** then **Py** must be what?

A: **nominal income**.

Q: Which V is larger, V_T or V_y and why?

A: $V_T > V_y$

The Cambridge approach led to the concept of **transaction demand** for money:

We can rewrite $MV_y = Py$ as

$$M = Py/V_y$$

Suppose money supply M (or M_s) is equal to money demand M_d:

$$M_d = M_s = Py/V_y$$

It was usually assumed in the early models of QTM that V_y is constant.

If this the case, then $1/V_y$ is constant as well.

So

$$M_d = Py/V_y = k\ (Py)$$

Where $k = 1/V_y$ is a constant.

The Transaction Demand for Money (M_d^T)

$$\mathbf{M_d^T = k\ (Py)}$$

This states that people keep a fixed portion of their nominal income for transaction.

For example,

if $k = 1/20$ (that is $V_y = 20$), and people receive $1000 in income, they keep, on the average, $50 to do shopping .

Note: $M_d^T = k\ (Py)$ means that transaction demand for money depends on two factors, P and y:

$$\mathbf{M_d^T = f\ (P, y)}$$

When

$$\mathbf{P} \uparrow\ ,\ \mathbf{M_d^T} \uparrow$$

and

$$\mathbf{y} \uparrow\ ,\ \mathbf{M_d^T} \uparrow$$

Speculative Demand for Money (M_d^S) or "liquidity preference"

Keynes assumed that people hold money for other reasons, particularly speculation in the bond market.

So people have a choice between holding **bonds** or holding **cash**.

Def. **Bond** is an **IOU** issued by a corporation or government. It has a **face value**, and when it matures it pays you the face value plus interest.

But you can sell a bond at a higher or lower price than its face value, depending on the demand for bonds.

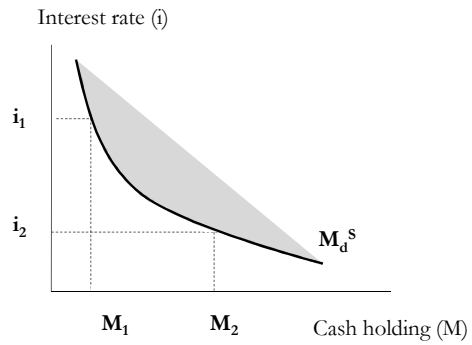
We assume, after Keynes, that there is an **inverse relation** between **interest rates** and **how much cash people hold for speculation in the bond market**.

That is, people hold less cash at higher interest rates and more cash at lower interest rates:

$M_d^S = f\ (i)$

When $i \uparrow$ $M_d^S \downarrow$

Speculative demand for money or "liquidity preference"



Total Demand for Money

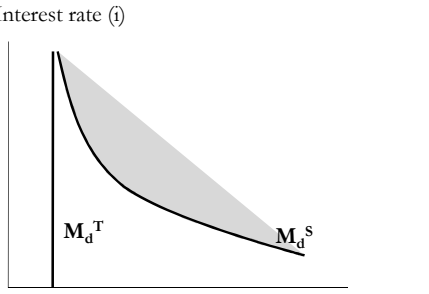
The total demand for money consists of transaction and speculative demands for money:

$$M_d = M_d^T + M_d^S$$

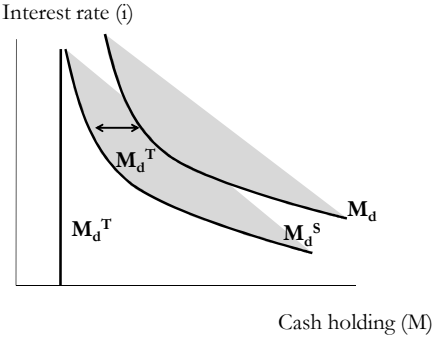
This means that:

$$M_d = f\ (i, P, y)$$

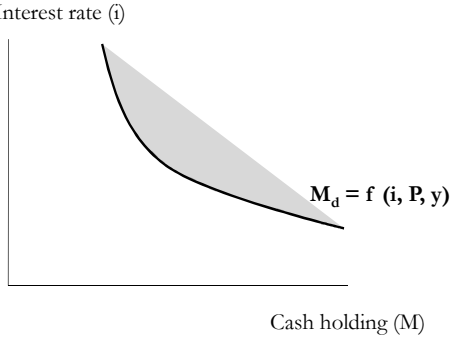
Total demand for money



Total demand for money



Total demand for money



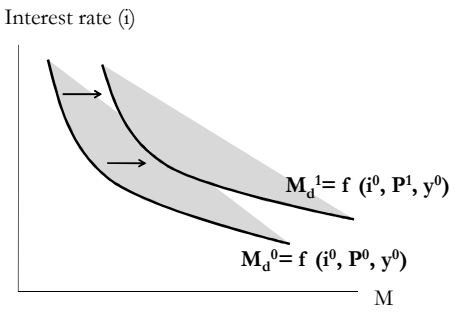
Shifts or Changes in Demand for Money

$M_d = f\ (i, P, y)$

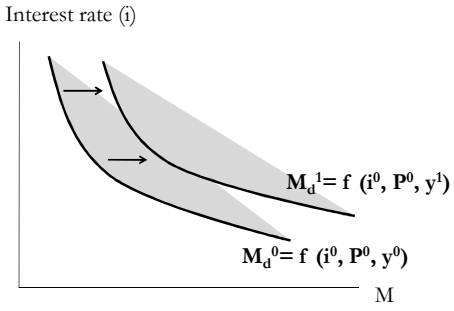
Q: What happens to demand for money if

- **Inflation rises?**
- **Real income increases?**

Demand for money: Inflation increases



Demand for money: Real income increases

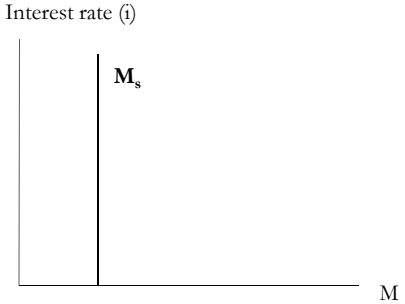


Supply of Money

In the Keynesian model, it is assumed that the central bank can target the money supply independently of the interest rate.

This means the supply of money, M_s, is vertical.

The supply of money



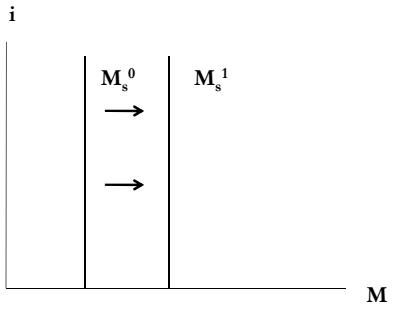
Shifts or Changes in Supply of Money

Fed can use monetary policy to increase or decrease the money supply.

Suppose Fed wants to increase the supply of money. What should it do?

1) Buy government securities
2) Reduce the required reserve ratio
3) Reduce the discount rate

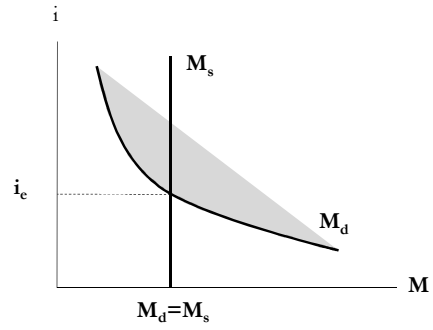
Supply of money increases



Equilibrium in the Money Market

In the Keynesian model, the equilibrium rate of interest, i_e, is reached when the supply of money is willingly held by people.

Equilibrium rate of interest

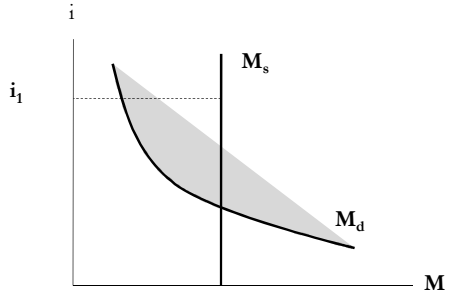


Disequilibrium in the Money Market

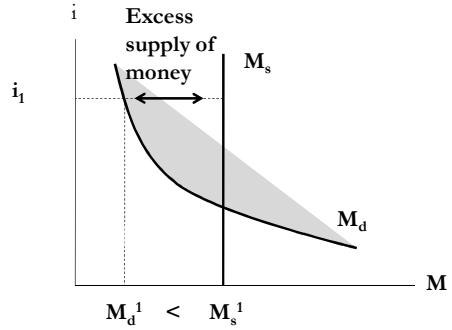
Suppose the rate of interest is higher than the equilibrium rate.

What is happening in the money market?

Interest rate above the equilibrium



Interest rate above the equilibrium



Excess supply of money ⇒

Excess demand for bonds ⇒

Bond prices ↑ ⇒

Interest rate on bonds ↓

Why would the interest rate fall?

The Inverse Relation between Bond Prices and Interest Rates on Bond

The inverse relation between bond prices and interest rates can be shown mathematically.

But it can also be shown using a "**discount bond**," such as a Treasury bill (T. bill).

Def. A discount bond pays no interest, but can be purchased at a discount, below its face value. When it matures, you get the face value. The difference between what is paid for and the face value is the interest.

Example,

A bond has a face value of **$100**. You buy it at **$80**.

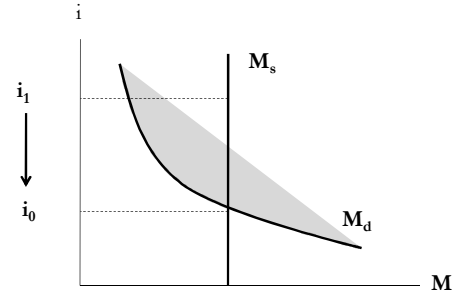
Interest rate = ($100 − $80)/ $80 = $20/$80 = **25%**

Suppose the **price of the bond rises to $90**. Joe buys it at $90.

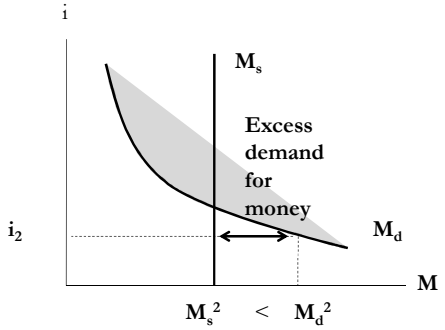
Interest rate = ($100 -$90)/ $90 = $10/$90 = **11.1%**

Bond price rose and interest rate fell!

Interest rate above the equilibrium



Interest rate below equilibrium



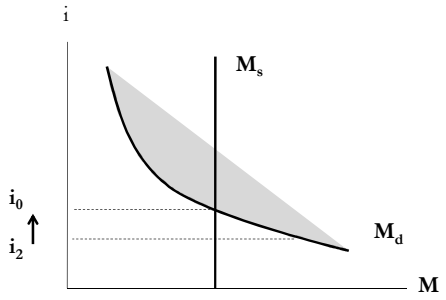
Excess demand for money ⇒

Excess supply of bonds ⇒

Bond prices ↓ ⇒

Interest rate on bonds ↑

Interest rate below equilibrium



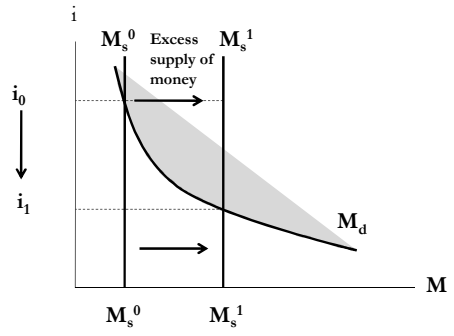
The Effect of Fed's Monetary Policy on the Rate of Interest

Fed can change the short term interest rate by increasing or decreasing the money supply.

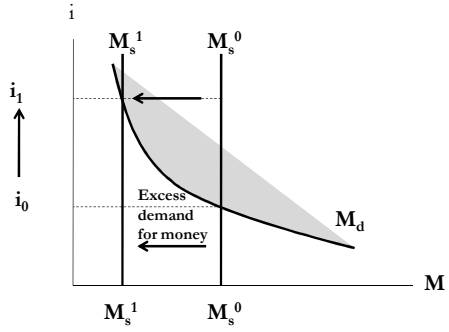
Def. Easy money policy: increasing the money supply.

Def. Tight money policy: decreasing the money supply.

Easy money policy: Increase M_S



Tight money policy: Decrease M_S



Monetary Policy, Changes in the Interest Rate and Equilibrium Output

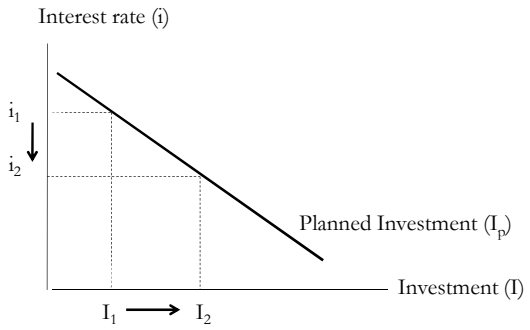
How can the action of the Fed influence output and income?

Investment and Interest Rate

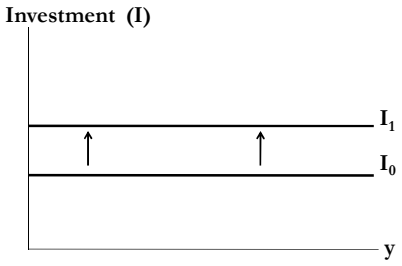
Keynesian economics assumes that there is an inverse relation between interest rate and investment.

This is similar to the neoclassical assumption, but the reasoning is very different.

Investment: interest rate falls



Planned investment: Interest rate falls



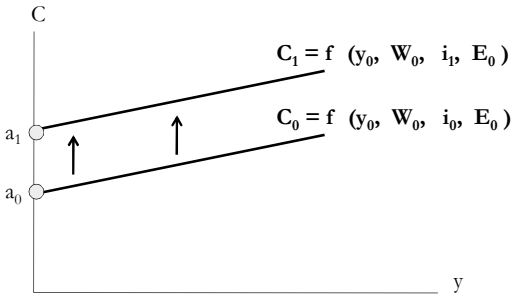
Consumption and Interest Rate

Consumption, too, depends on the interest rate:

$$C = f\ (y,\ W,\ i,\ E)$$

What would happen to the consumption function when the interest rate falls?

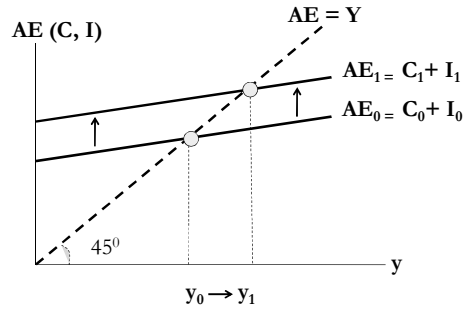
Consumption: Interest rates fall



Equilibrium Output and Interest Rate

Changes in the interest rates therefore influence interest rate sensitive expenditures I and C.

Aggregate expenditure: interest rate falls



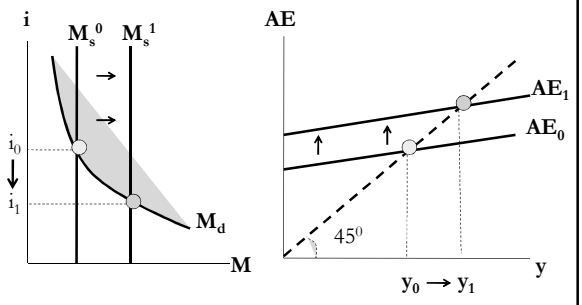
Monetary Policy and Changes In Equilibrium Output

If the Fed changes the money supply and interest rate, interest sensitive expenditures will change, changing the level output or income.

Example: **Easy money policy**:

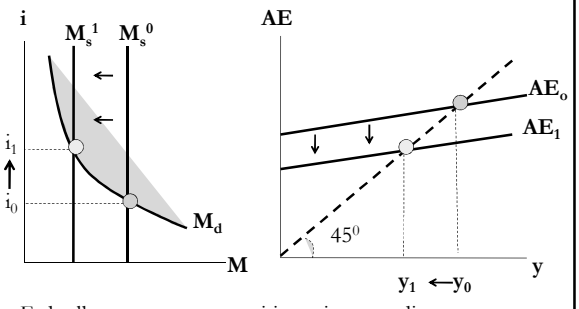
$M_s \uparrow \Rightarrow$ $i \downarrow \Rightarrow$ $C, I \uparrow \Rightarrow$ $y \uparrow$

Easy money policy and aggregate expenditure



Fed buys government securities, lowers r or discount rate

Tight money policy and aggregate expenditure



Fed sells government securities, raises r or discount rate

Some complications in the argument!

Changes in the real national income (y) must have a feedback effect on the demand for money, since we assumed:

$$M_d = f\ (i, P, y)$$

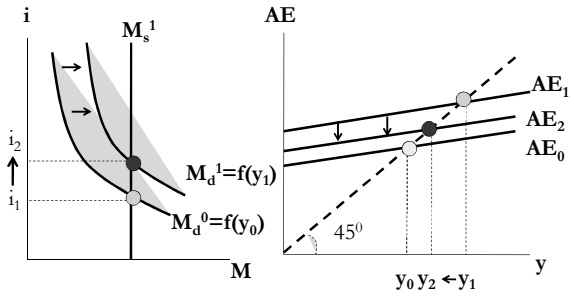
In other words, if the Fed engages in easy or tight money policy, it must change money demand.

Example: **Easy money policy**:

$M_s \uparrow \Rightarrow$ $i \downarrow \Rightarrow$ C, I $\uparrow \Rightarrow$ $y \uparrow \Rightarrow$

$M_d \uparrow \Rightarrow$ $i \uparrow \Rightarrow$ C, I $\downarrow \Rightarrow$ $y \downarrow$

Easy money policy: y increases

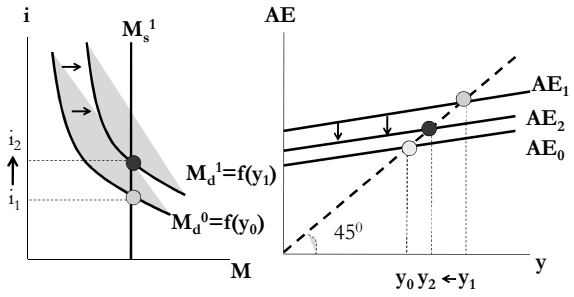


How far will y fall?
Will it go back to its original level?
Will it be in between the two levels?

The answer depends on theoretical perspective:

1) Keynesians: y will ultimately fall somewhere in between y_0 and y_1.

Keynesian view



2) Monetarists (modern neoclassicals who use Keynesian tools of economic analysis):

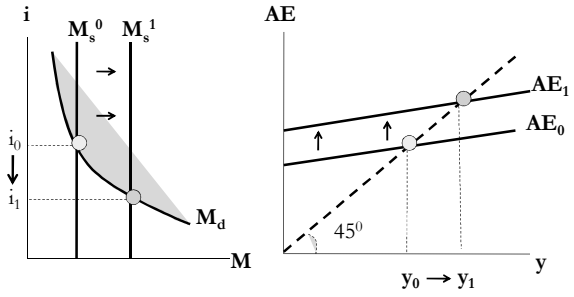
y will expand in the short-run.

But in the long-run y returns to its original position.

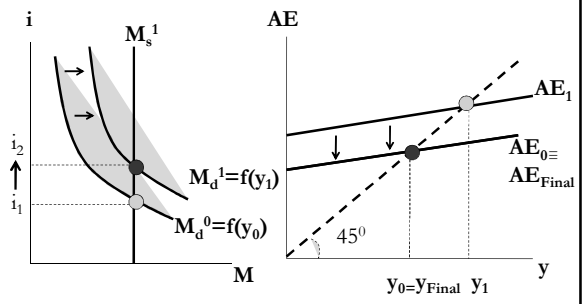
Thus in the long-run there is "**complete crowding out**," i.e., no increase in output.

Monetary policy is ineffective in increasing output and employment in the long-run.

Monetarist view: Short run



Monetarist view: Long-run

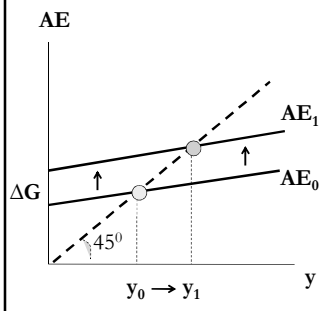


The same arguments are used in the case of fiscal policy

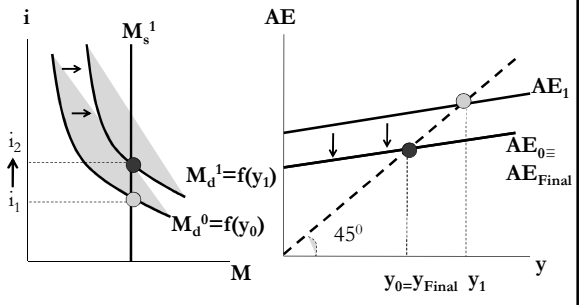
1) **Keynesians**: fiscal policy is effective in changing output and employment even if we assume money demand changes.

2) **Monetarists**: fiscal policy is ineffective, particularly in the long-run.

Monetarists on fiscal policy: Short-run



Monetarists on Fiscal Policy: Long-run



Next stop: Chapter 15!