

The Behavior of Interest Rates

This lecture examines how the nominal interest rate is determined and what factors influence it.

Factors that Affect the Demand for a Particular Asset (The Theory of Portfolio Choice)

A. Wealth

1. Wealth is the total resources (assets – liabilities) owned by households.
2. An increase in wealth raises the quantity demanded of an asset.

B. Expected return relative to other assets

1. This is the difference between the rate of return on one asset to that of an alternative asset.
2. An increase in a particular asset's rate of return relative to another asset raises the quantity demanded of that asset.

C. Risk

1. Risk is the degree of uncertainty related to an asset's rate of return.
2. An increase in an asset's risk relative to another asset reduces the quantity demanded of the first asset.

D. Liquidity

1. Liquidity is how fast an asset can be converted into cash.
2. The more liquid an asset is relative to another asset means the quantity demanded of the first asset will be greater.

Demand and Supply in the Bond Market

A. The demand curve

1. Bonds are demanded by savers.
2. As the price of bonds rises (interest rate falls), the quantity demanded of bonds declines.
3. Consider the case of a 1-year discount bond
 - a. Yield to maturity (interest rate)

$$i = \left(\frac{F}{P} \right) - 1$$

i = yield to maturity (interest rate)

F = face value

P = price of the bond

- b. Recall, the price of the bond is negatively related to the interest rate.

c. Example: $F = \$1,000$.

$$i = \left(\frac{1,000}{P} \right) - 1$$

Price	Interest rate
1,000	0%
950	5.3%
900	11.1%
850	17.6%
800	25.0%
750	33.0%

d. Demand curve:

$$B^D = 2,000 - 2 \times P$$

B. The supply curve

1. Bonds are supplied by corporations and governments needing to borrow funds.
2. As the price of bonds rises (interest rate falls), the quantity supplied of bonds increases.
3. Supply curve:

$$B^S = 2 \times P - 1,400$$

C. Equilibrium in the bond market (point A)

$$B^D = B^S = B$$

$$2,000 - 2 \times P = 2 \times P - 1,400$$

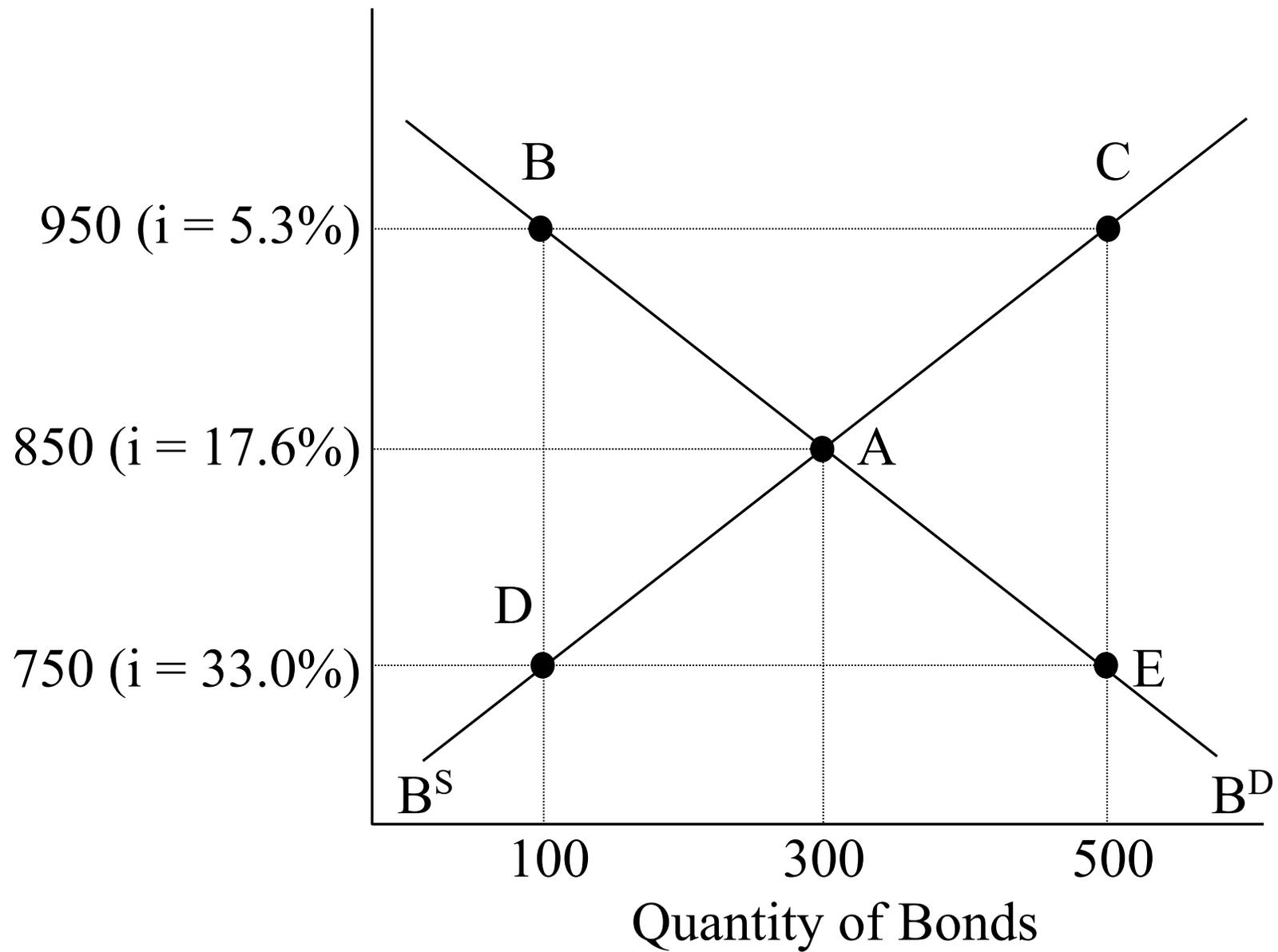
$$4 \times P = 3,400$$

$$P = 850$$

$$B = 2 \times 850 - 1,400 = 300$$

$$i = 17.6\%$$

Price of Bonds



D. Excess demand and excess supply

1. Excess demand (price is below the equilibrium price)

a. Excess demand occurs when $B^D > B^S$.

b. Example: $P = \$750$.

$$B^D = 2,000 - 2 \times 750 = 500 \text{ (point E)}$$

$$B^S = 2 \times 750 - 1,400 = 100 \text{ (point D)}$$

$$B = 100$$

2. Excess supply (price is above the equilibrium price)

a. Excess supply occurs when $B^S > B^D$.

b. Example: $P = \$950$.

$$B^D = 2,000 - 2 \times 950 = 100 \text{ (point B)}$$

$$B^S = 2 \times 950 - 1,400 = 500 \text{ (point C)}$$

$$B = 100$$

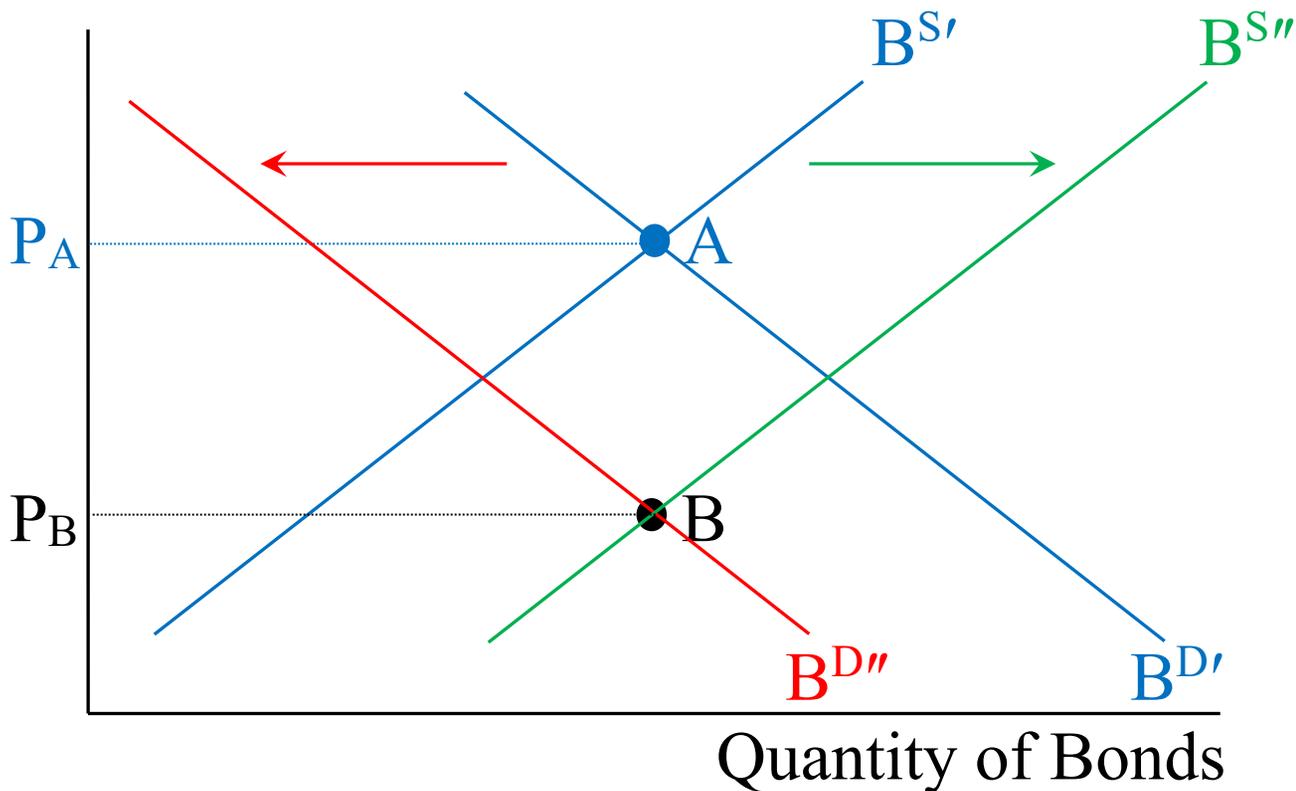
Shifts in the Demand and Supply of Bonds

- A. Factors that shift the demand curve for bonds to the right (which raises the bond price and lowers the interest rate)
1. An increase in wealth.
 2. A decline in expected future interest rates.
 3. A fall in the return on alternative assets.
 4. A decrease in the expected rate of inflation (real interest rate rises due to Fisher equation, $R = r + \pi^e$).
 5. A reduction in the riskiness of bonds.
 6. A rise in the riskiness of alternative assets.
 7. Increased liquidity of bonds.
 8. Reduced liquidity of alternative assets.

- B. Factors that shift the supply curve for bonds to the right (which lowers the bond price and raises the interest rate)
1. During an economic expansion, the expected profitability of investment opportunities rises.
 2. An increase in the expected rate of inflation (real interest rate falls due to Fisher equation, $R = r + \pi^e$).
 3. Higher government budget deficits.

C. Case study 1: Expected inflation rises

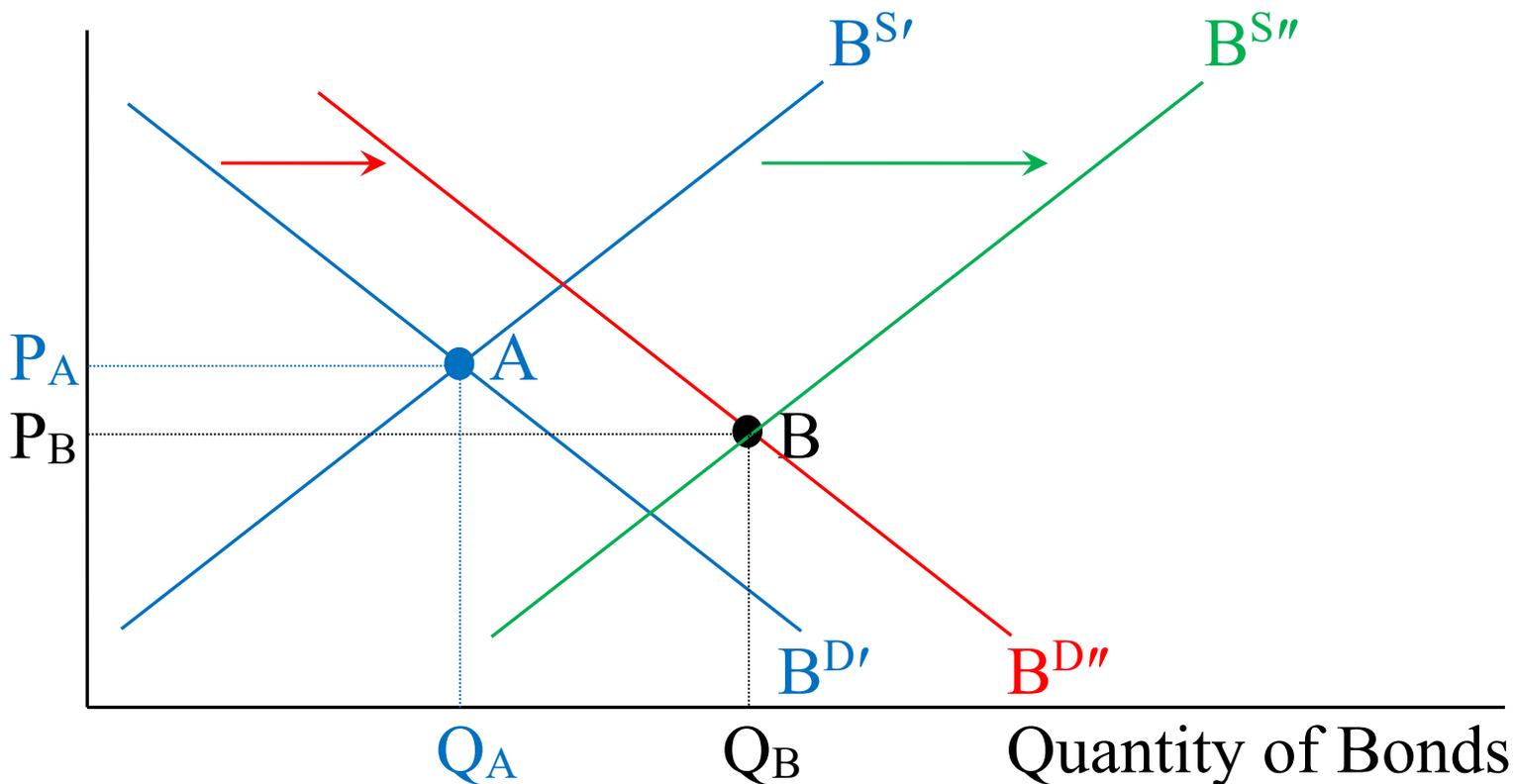
Price of Bonds



1. Demand for bonds shifts left. [Red]
2. Supply of bonds shifts right. [Green]
3. Bond prices fall and interest rates rise but cannot determine the change in quantity of bonds sold.

D. Case study 2: An economic expansion

Price of Bonds



1. Demand for bonds shifts right (wealth rises). [Red]
2. Supply of bonds shifts right (invest. opport. rise). [Green]
3. Quantity of bonds sold rises while bond prices usually fall (and usually interest rates rise).

Demand and Supply of Money

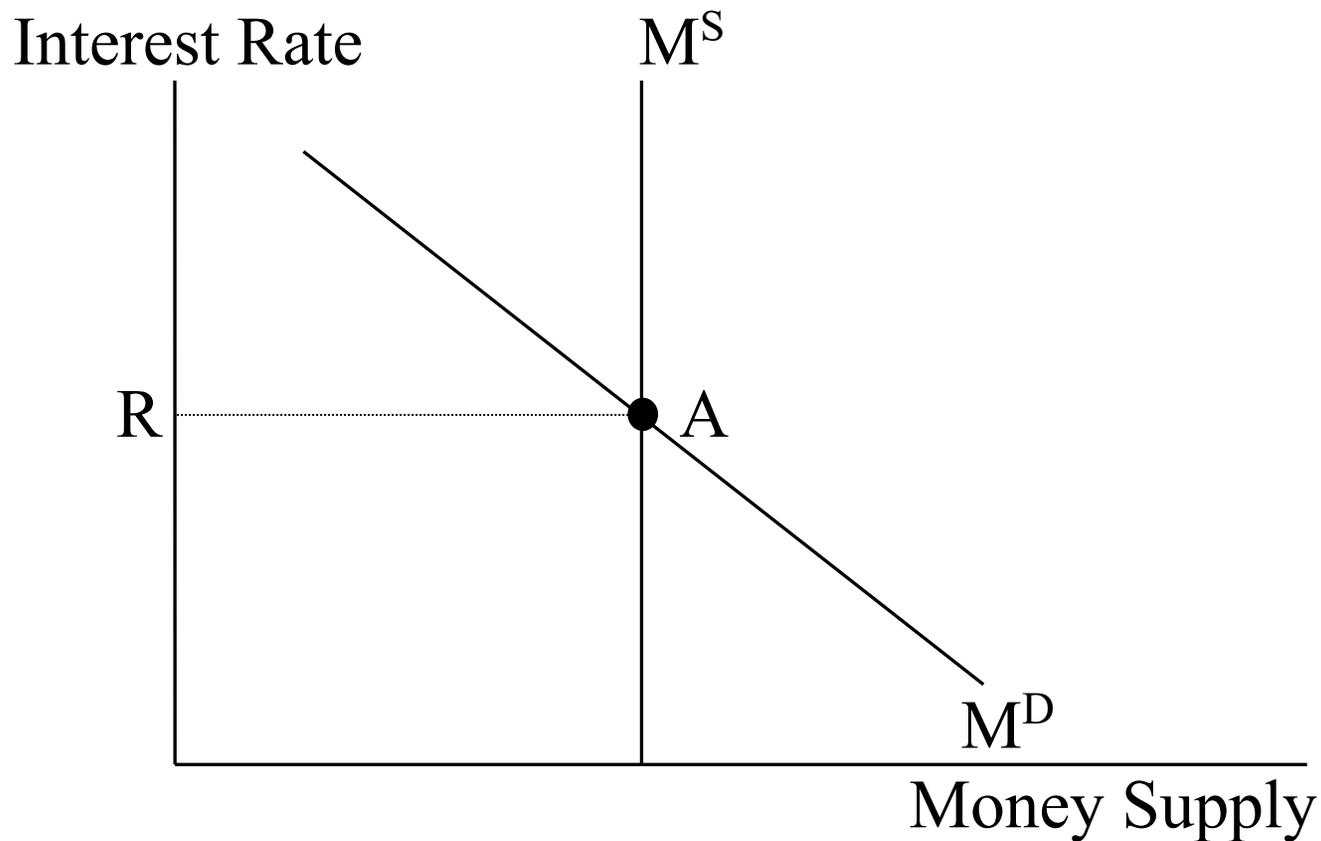
A. Liquidity preference framework

1. This theory says people can hold either money, which is liquid but earns no interest, or bonds, which are illiquid but earn interest.
2. $B^D + M^D = B^S + M^S$
3. If the money market is in equilibrium ($M^D = M^S$), then the bond market must be in equilibrium ($B^D = B^S$).

B. Money demand and money supply in equilibrium

1. The demand for money (M^D)
 - a. People want to hold more (less) money when the interest rate (R) falls (rises). [$R \downarrow \rightarrow M^D \uparrow$]
 - b. People want to hold more (less) money when their income (Y) rises (falls). [$Y \uparrow \rightarrow M^D \uparrow$]

- c. People want to hold more (less) money when the price level (P) rises (falls). [$P \uparrow \rightarrow M^D \uparrow$]
2. The supply of money (M^S) is determined completely at the central bank's discretion.
3. Graph

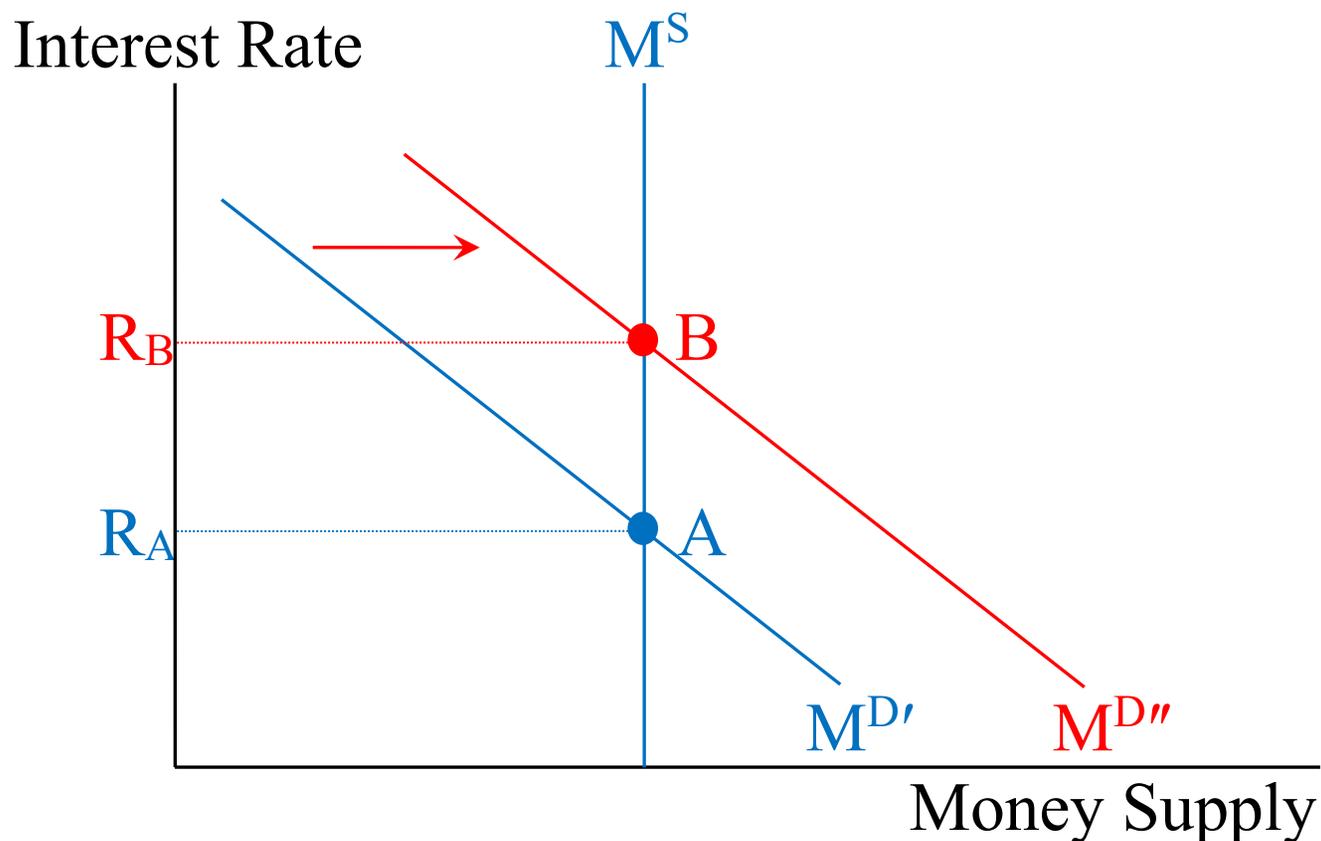


C. Factors that shift money demand and money supply

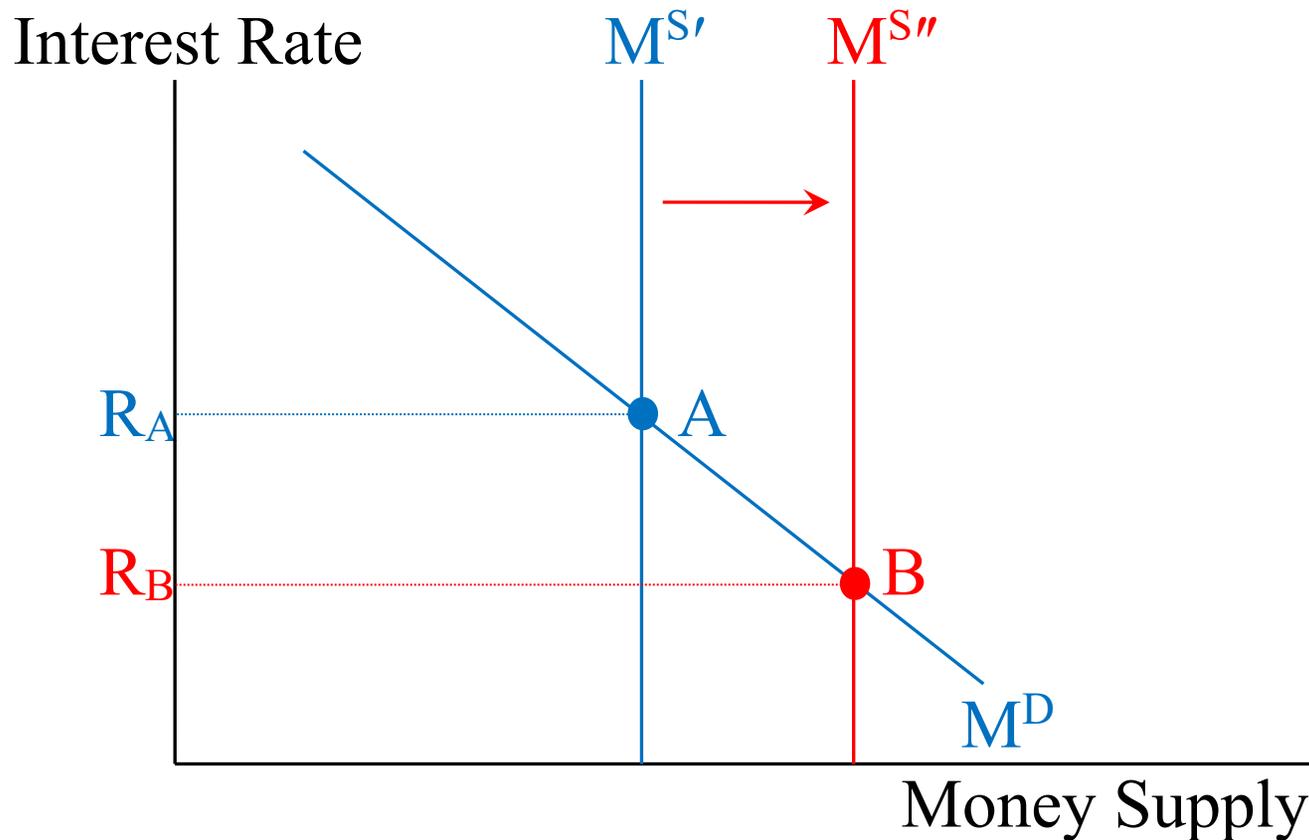
1. Factors that shift the money demand curve to the right and increase the interest rate.

a. An increase in income. [$Y \uparrow \rightarrow M^D \uparrow \rightarrow R \uparrow$]

b. A rise in the price level. [$P \uparrow \rightarrow M^D \uparrow \rightarrow R \uparrow$]



2. An increase in the money supply is completely controlled by the central bank.
 - a. An increase in the money supply, holding everything else constant, causes the interest rate to fall (the liquidity effect). [$M^S \uparrow \rightarrow R \downarrow$]



- b. Increasing the money supply can have other effects that might push up the interest rate.
 - i. Higher M^S raises income and wealth (the income effect) which puts upward pressure on interest rates.
 - ii. A larger M^S increases the price level (the price-level effect) which puts upward pressure on interest rates.
 - iii. An increase in M^S may cause people to expect higher M^S in the future which raises expected inflation (the expected-inflation effect) which pushes up nominal interest rates. This effect only lasts as long as people expect the price level to continue to rise.
- c. Research indicates an increase in the money supply temporarily lowers the interest rate but the income, price-level, and expected-inflation effects could cause the interest rate to rise in the long run.