

Ec 370

Money and Banking

Chapter 5: The Behavior of Interest Rate

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Today's Contents

- Demand and Supply in the Bond Market
- Changes in Equilibrium Interest Rates

Demand and Supply in the Bond Market

Demand Curve for Bond

- demand curve: relationship between quantity demanded and price
- x-axis: quantity demanded of bond
- y-axis: price of bond (**P**), also interest rate of bond (**i**)

Let's consider purchasing a discount bonds

- no coupon payments
- face value (F): \$1,000
- years to maturity: 1 year
- holding period: 1 year

Demand Curve for Bond

- What is interest rate (yield to maturity), if bond price is \$950?

- $P = \frac{F}{1+i}$
- $i = \frac{F-P}{P} = \frac{1000-950}{950} = 5.3\%$

- What is interest rate, if bond price is \$850?

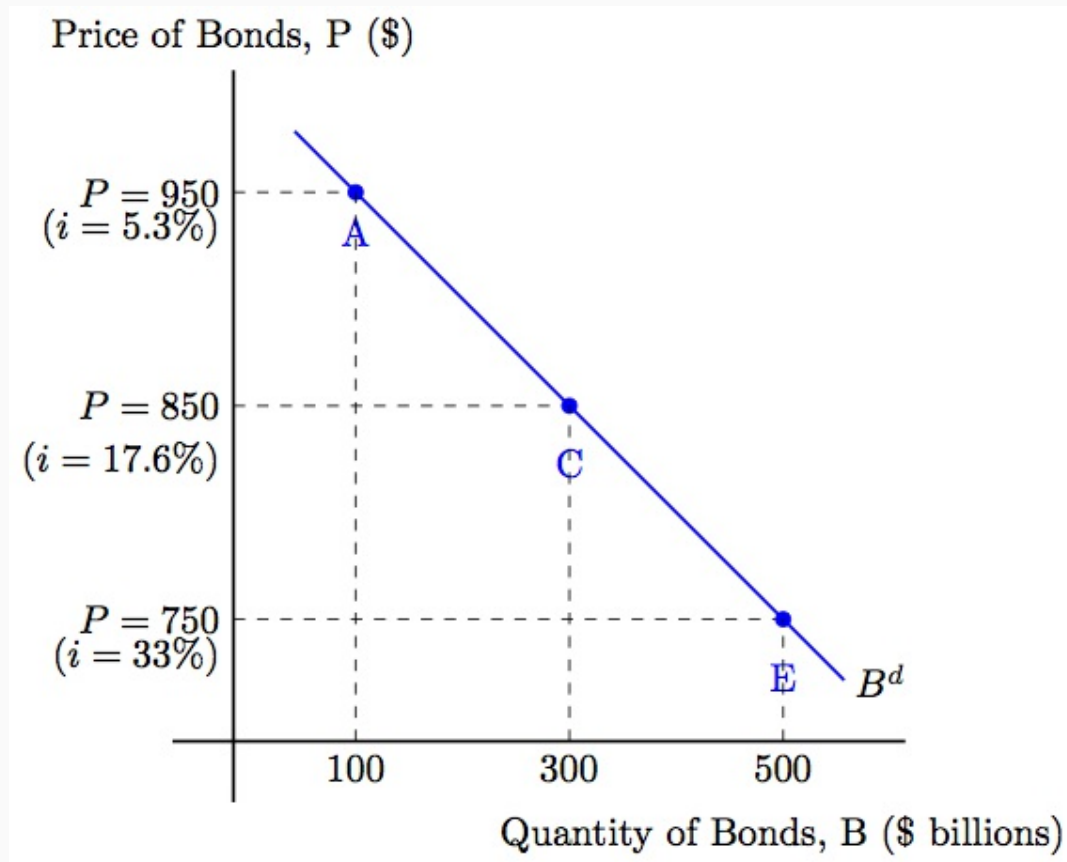
- $i = \frac{F-P}{P} = \frac{1000-850}{850} = 17.6\%$

- What is interest rate, if bond price is \$750?

- $i = \frac{F-P}{P} = \frac{1000-750}{750} = 33.0\%$

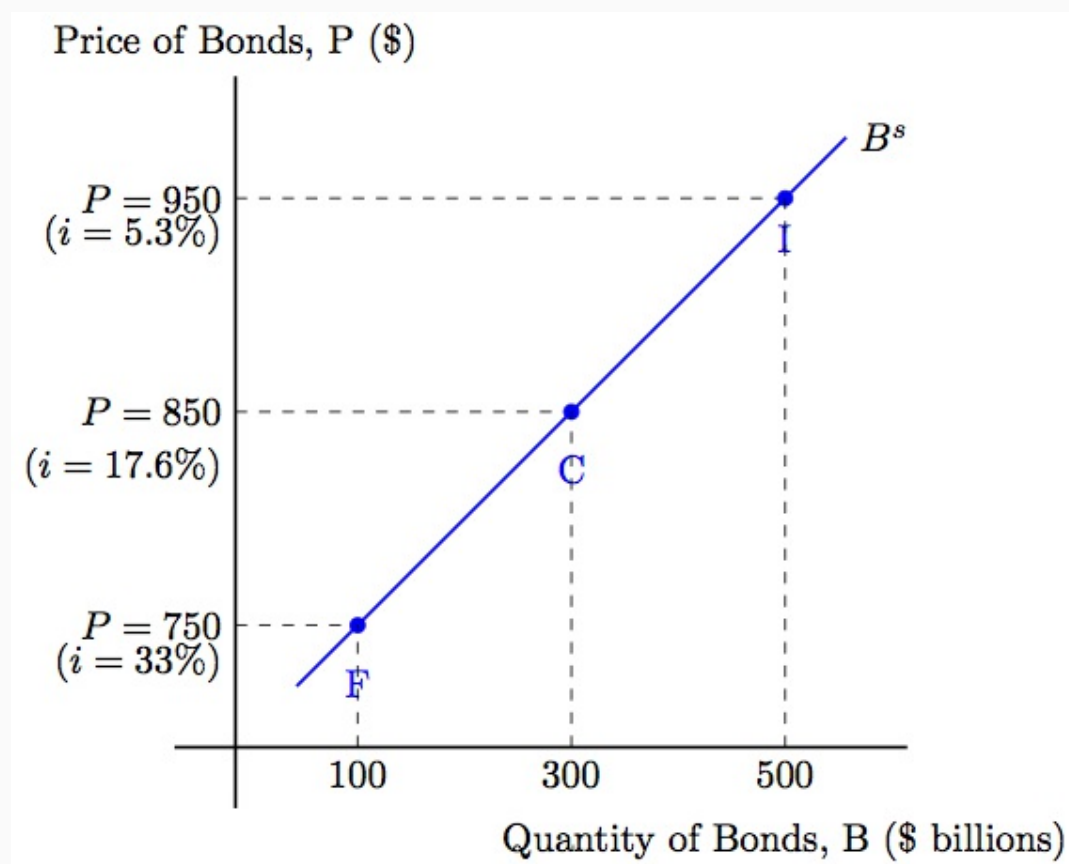
Demand Curve for Bond

- **negatively** related: if $P \uparrow$, then $B^d \downarrow$



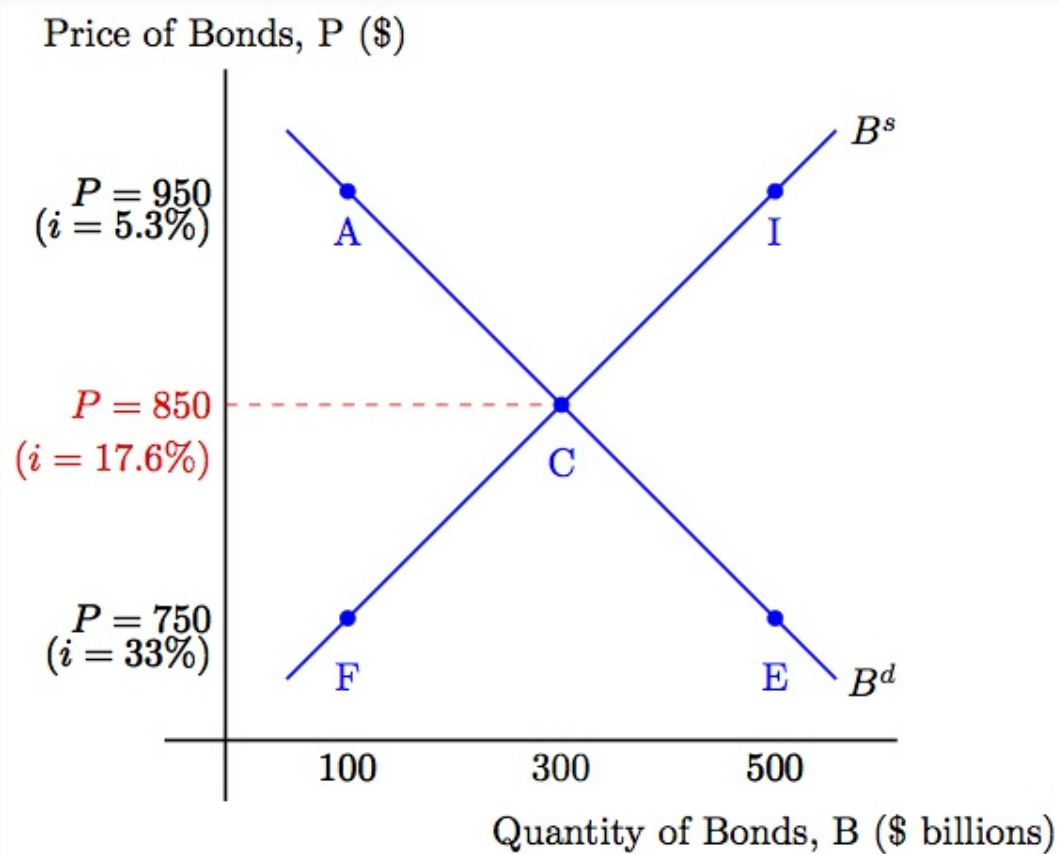
Supply Curve for Bond

- At lower P (higher i), quantity supplied of bonds is lower



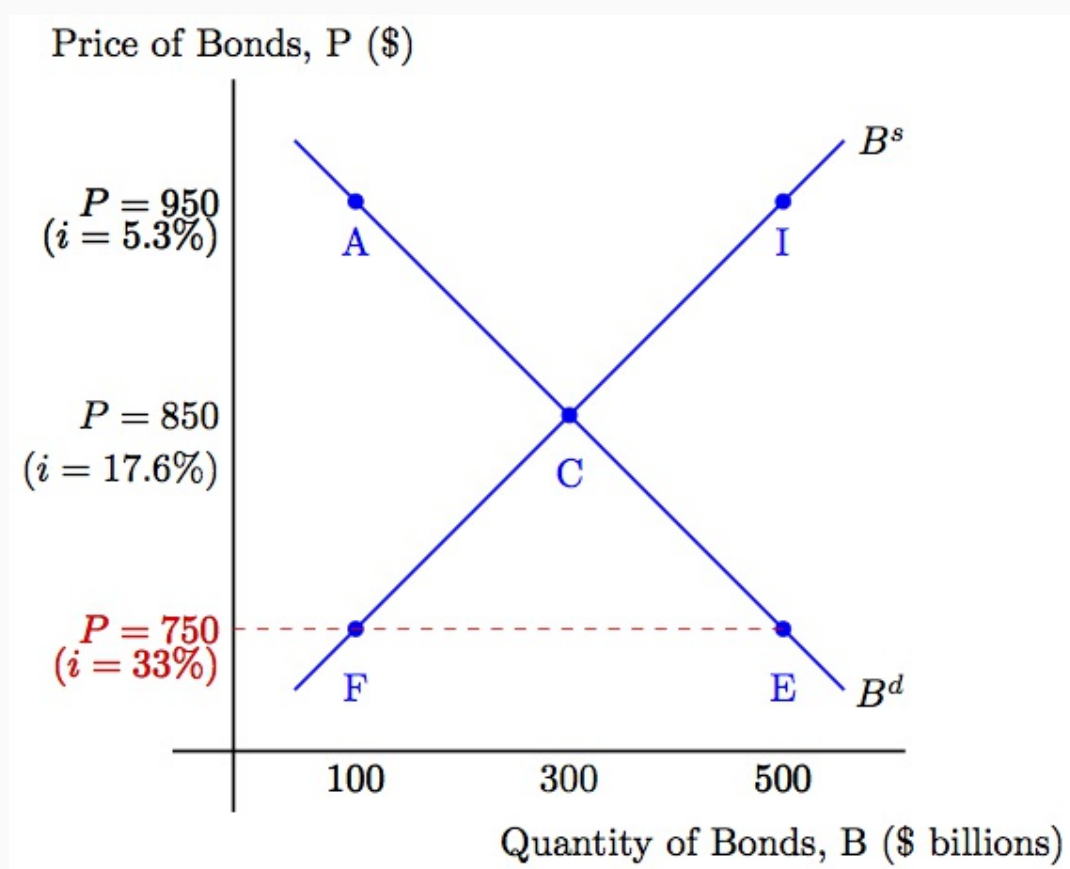
Equilibrium

- $B^d = B^s$: **bond market equilibrium**
 - equilibrium quantity: \$300 billion
 - equilibrium price (P^*): \$850
 - equilibrium interest rate (i^*): 17.6%



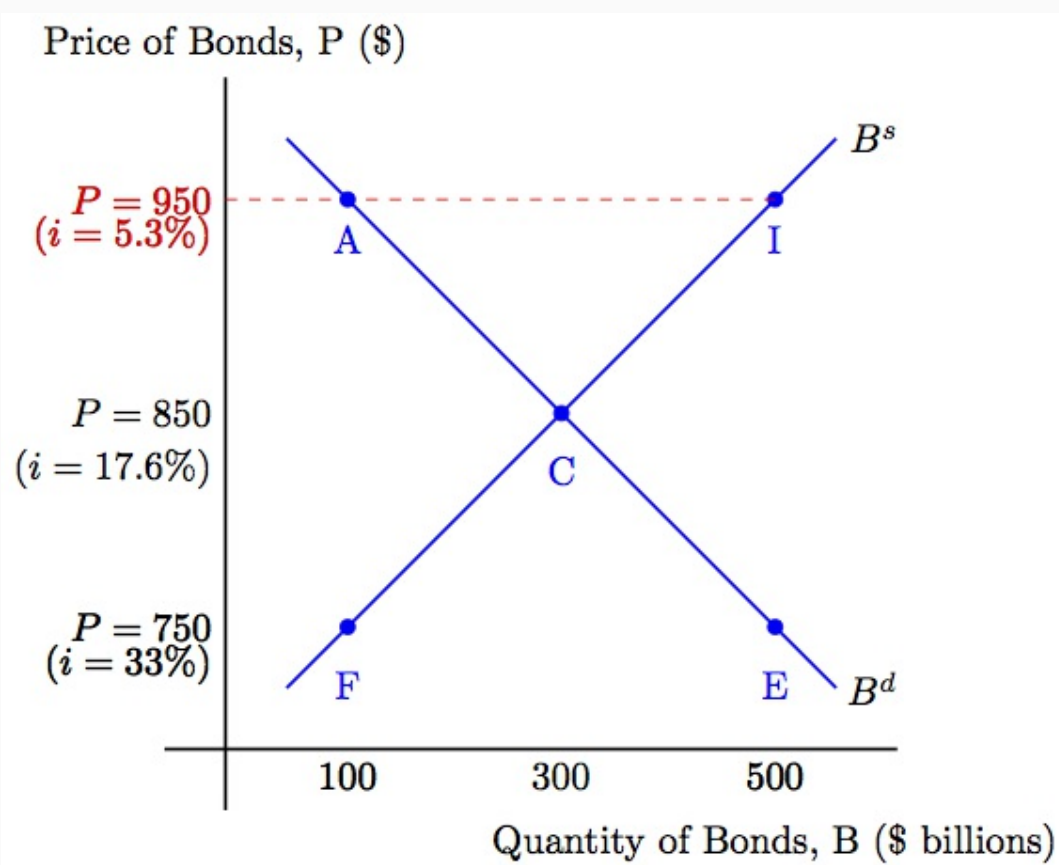
Equilibrium

- $B^d > B^s$: **excess demand**
 - P will rise until reaching P^* , i will fall until reaching i^*
 - move along supply curve from F to C , move along demand curve from E to C



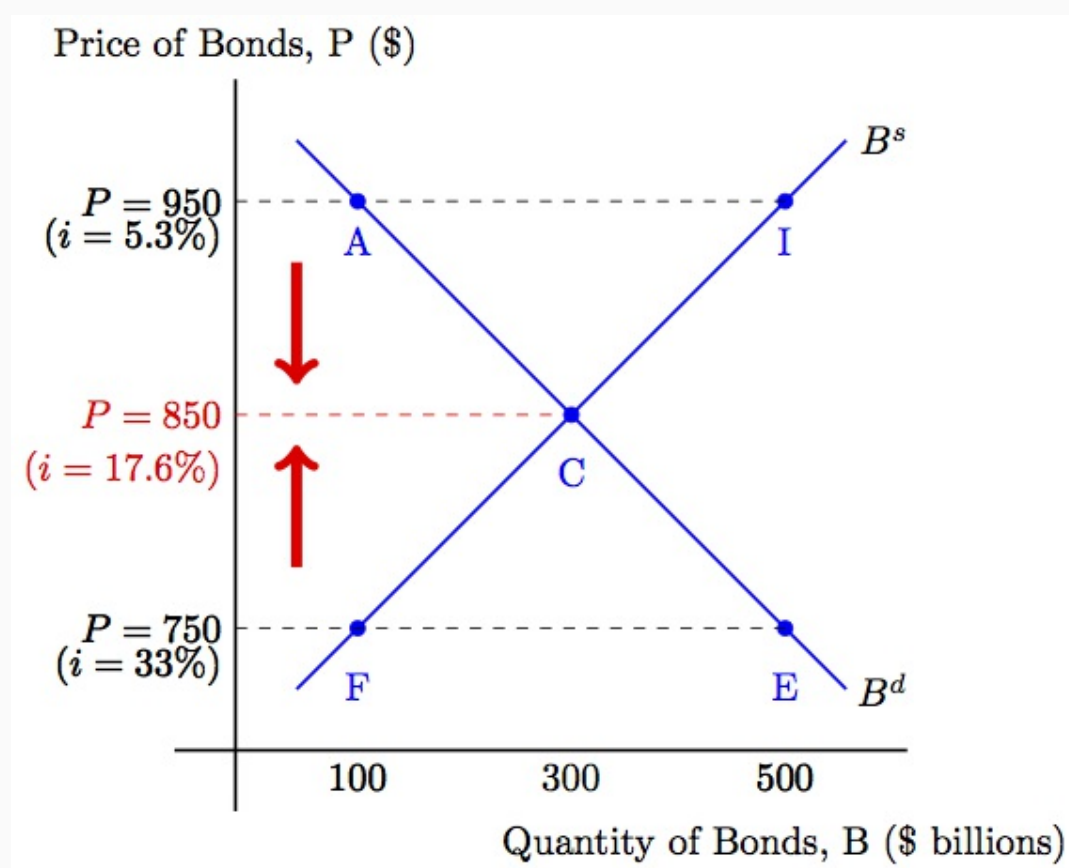
Equilibrium

- $B^d < B^s$: **excess supply**
 - P will fall until reaching P^* , i will rise until reaching i^*
 - move along supply curve from I to C ; move along demand curve from A to C



Equilibrium

- The relationship between quantity demanded and quantity supplied of bonds determines interest rate
- **move along** the demand/supply curve until reaching the **equilibrium interest rate**



Changes in Equilibrium Interest Rates

Changes in Equilibrium Interest Rates

- Now, we will look at **shift** of supply/demand curves
- And how **shift** of supply/demand curves determines equilibrium bonds' prices and **equilibrium interest rate**

Demand Curve Shift

Changes in factors that affect how many bonds people will want to hold will make **demand curve for bonds shift**

- Wealth
- Expected returns on bonds relative to alternative assets
 - Expected interest rate
 - Expected return on alternative assets
 - Expected inflation
- Risk of bonds relative to alternative assets
- Liquidity of bonds relative to alternative assets

Demand Curve Shift

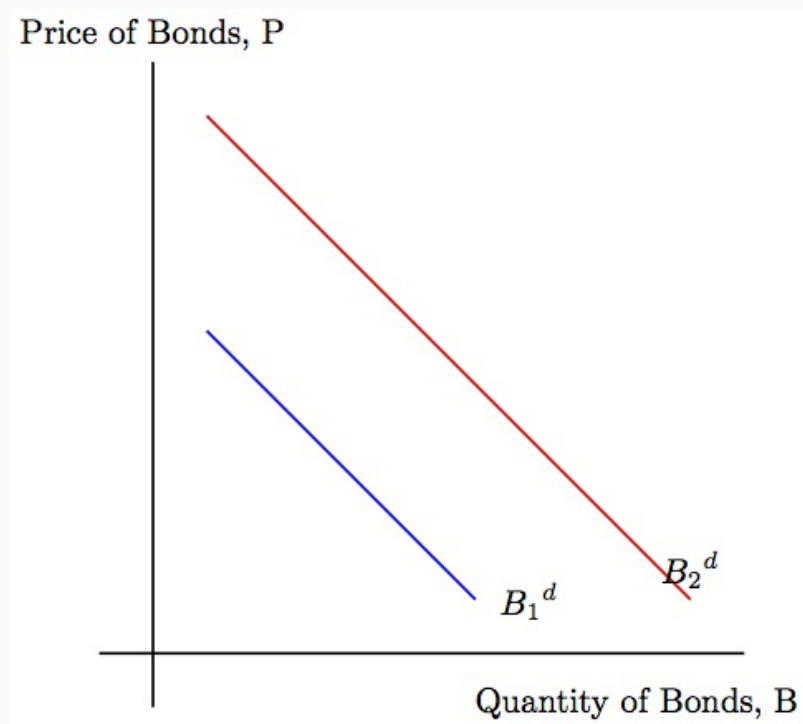
(1) Wealth

- if wealth increases, demand for bonds at each bond price (or at each interest rate) rises
 - business cycle expansion
 - increased propensity to save

Demand Curve Shift

(1) Wealth

- **business cycle expansion (or: propensity to save increases)** \Rightarrow wealth increases \Rightarrow demand for bonds increases \Rightarrow demand curve shifts to the right



Demand Curve Shift

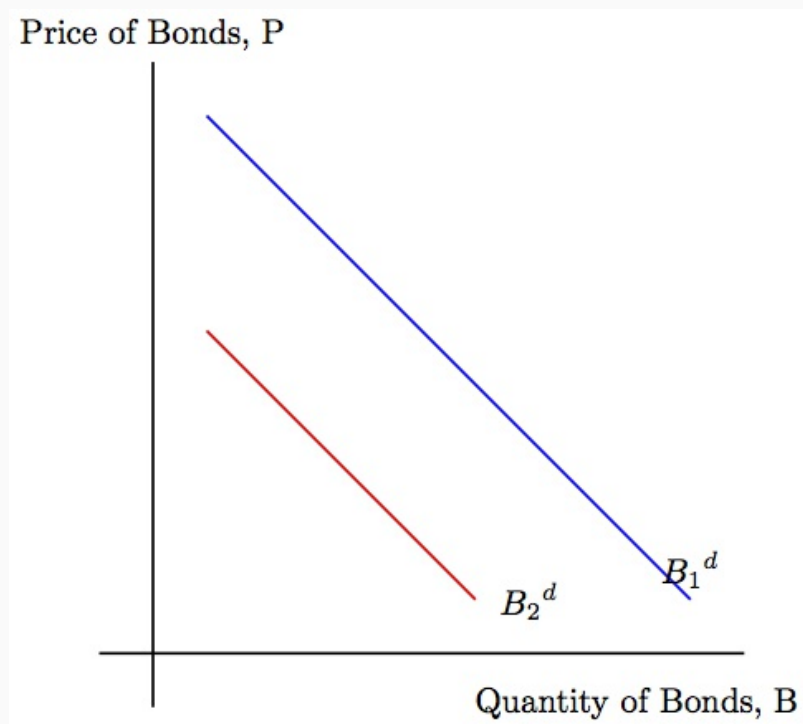
(1) Wealth

- if wealth decreases, demand for bonds at each bond price (or at each interest rate) decreases
 - business cycle recession
 - decreased propensity to save

Demand Curve Shift

(1) Wealth

- **business cycle recession (or: propensity to save decreases)** \Rightarrow wealth decreases \Rightarrow demand for bonds decreases \Rightarrow demand curve shifts to the left



Demand Curve Shift

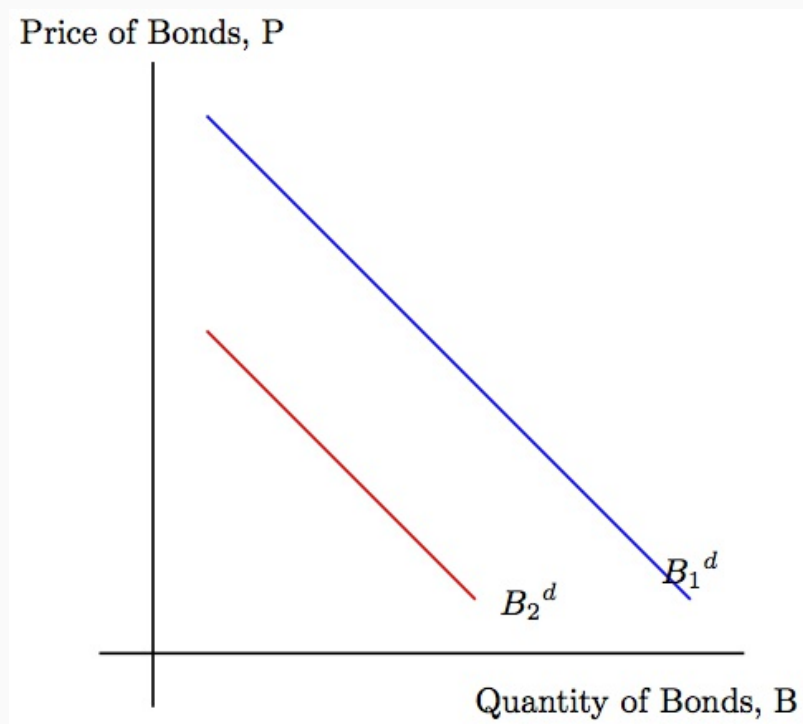
(2) Expected returns

- Recall Chapter 4: if interest rate when you sell the bond is higher than the interest rate when you buy the bond \Rightarrow the price at which you sell the bond is lower than the price at which you buy the bond
- interest-rate risk: interest rate rises \Rightarrow bond price falls \Rightarrow capital loss \Rightarrow rate of return falls
- if you expect that interest rate will rise in the future, then you also expect that return on bonds will fall; hence, you demand less bonds today

Demand Curve Shift

(2) Expected returns

- **expected future interest rates** increases \Rightarrow expected return on bonds decreases \Rightarrow demand for bonds decreases \Rightarrow demand curve shifts to the left

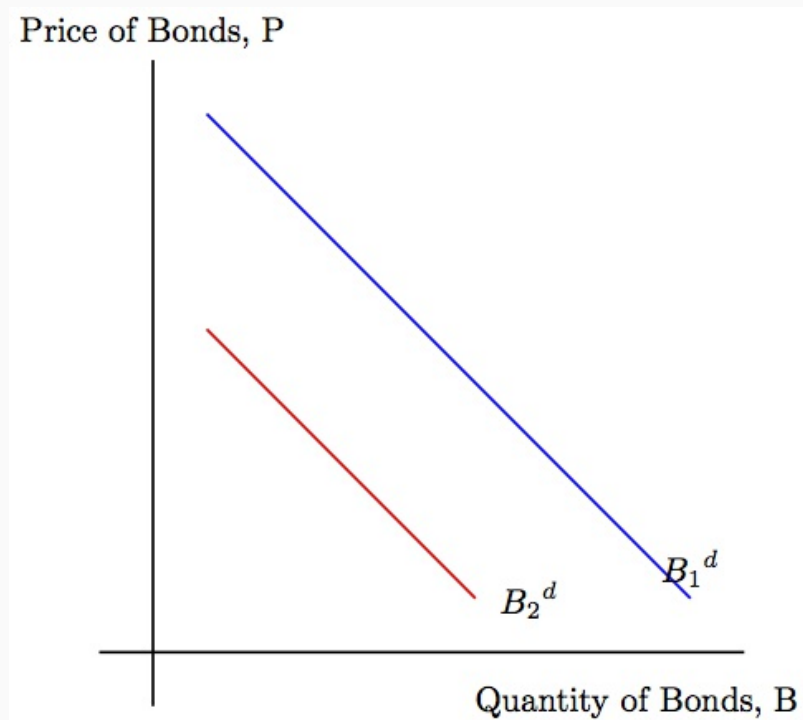


- **expected future interest rates** decreases \Rightarrow demand curve shifts to the right

Demand Curve Shift

(2) Expected returns

- **expected return on alternative assets** increases \Rightarrow expected returns on bonds relative to alternative assets decreases \Rightarrow demand for bonds decreases \Rightarrow demand curve shifts to the left



- **expected return on alternative assets** decreases \Rightarrow demand curve shifts to the right

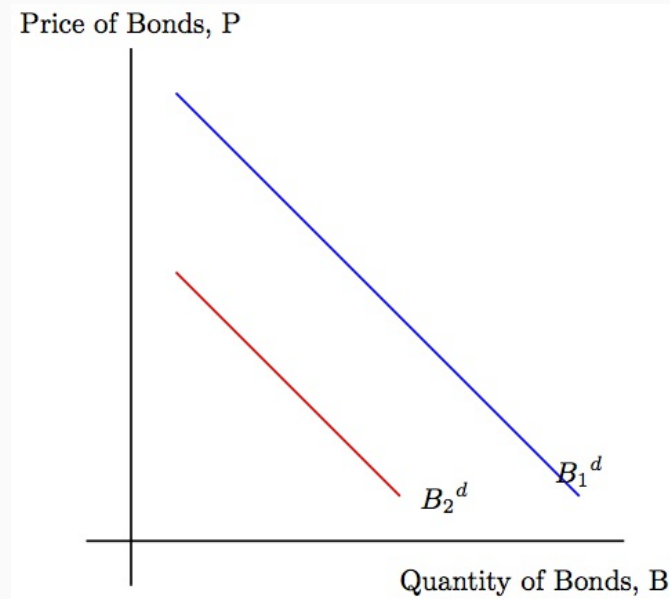
Demand Curve Shift

(2) Expected returns

- Recall Chapter 4: $r = i - \pi^e$
- **expected inflation** increases \Rightarrow real interest rate decreases \Rightarrow expected return on bonds decreases \Rightarrow demand for bonds decreases \Rightarrow demand curve shifts to the left

Demand Curve Shift

(2) Expected returns

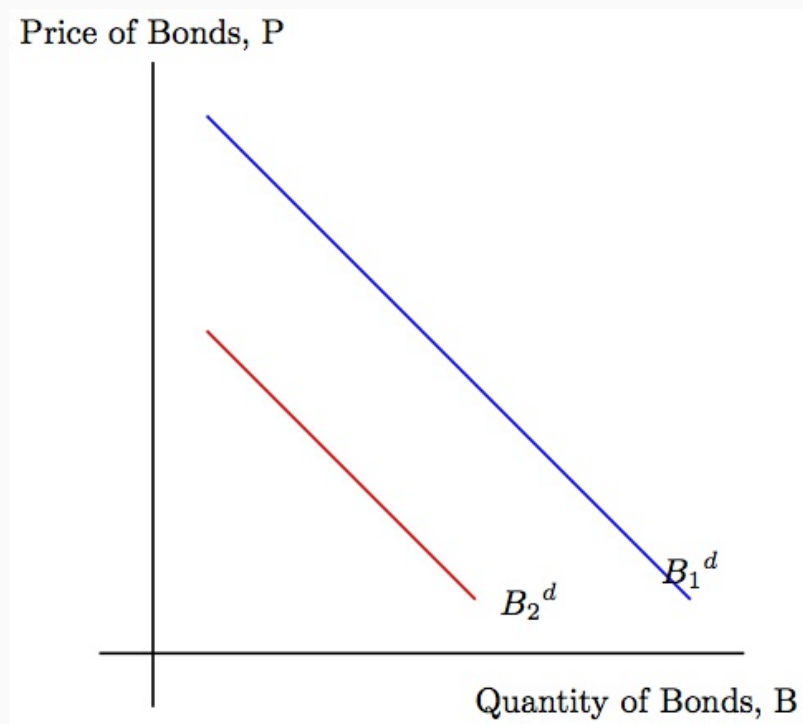


- **expected inflation** decreases \Rightarrow demand curve shifts to right

Demand Curve Shift

(3) Risk

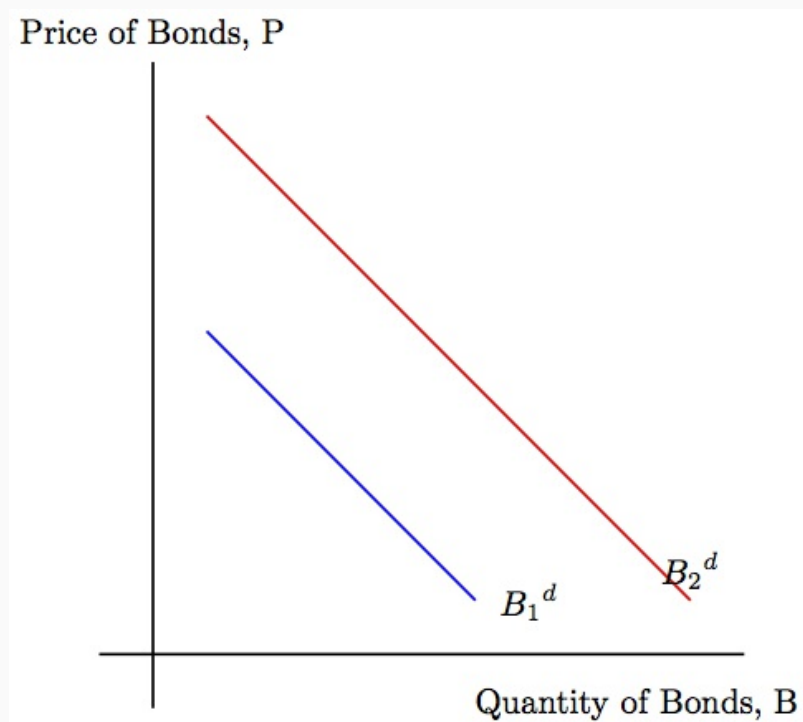
- prices in the bond market become more volatile \Rightarrow **riskiness of bonds** increases \Rightarrow demand for bonds decreases \Rightarrow demand curve shifts to the left



Demand Curve Shift

(3) Risk

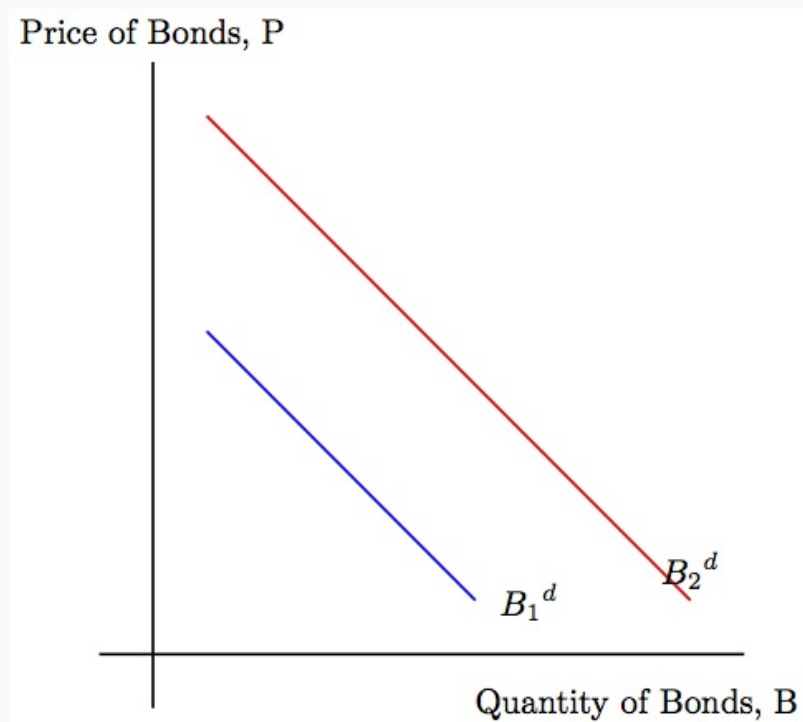
- an increase in the volatility of prices in another asset market (e.g. stock market)
⇒ **riskiness of alternative assets** increases ⇒ demand for bonds increases
⇒ demand curve shifts to the right



Demand Curve Shift

(4) Liquidity

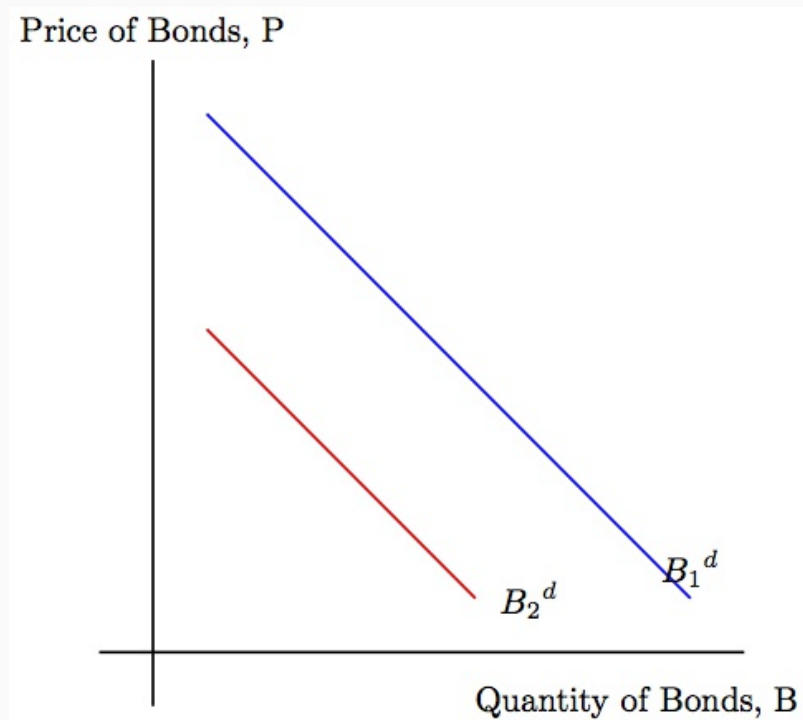
- more people started trading in the bond market \Rightarrow easier to sell bonds quickly \Rightarrow **liquidity of bonds** increases \Rightarrow demand for bonds increases \Rightarrow demand curve shifts to the right



Demand Curve Shift

(4) Liquidity

- **liquidity of alternative assets** increases \Rightarrow demand for bonds decreased \Rightarrow demand curve shifts to the left
 - the reduction of brokerage commissions for trading common stocks in 1975



Supply Curve Shifts

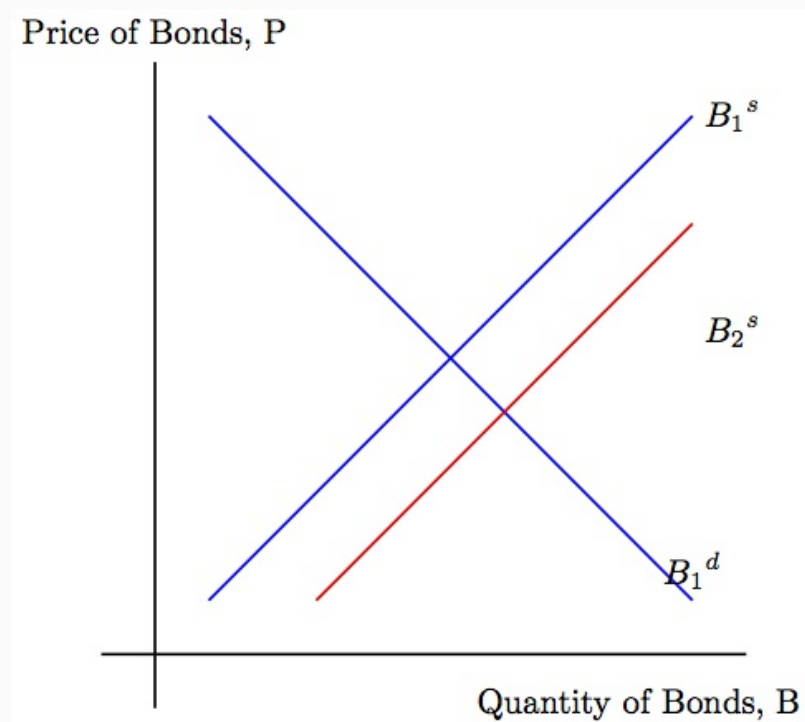
Changes in factors that affect how many bonds corporates or government will want to issue will make **supply curve shift**

- Expected profitability of investment opportunities
- Expected inflation
- Government budget deficits

Supply Curve Shifts

(1) Expected Profitability of Investment Opportunities

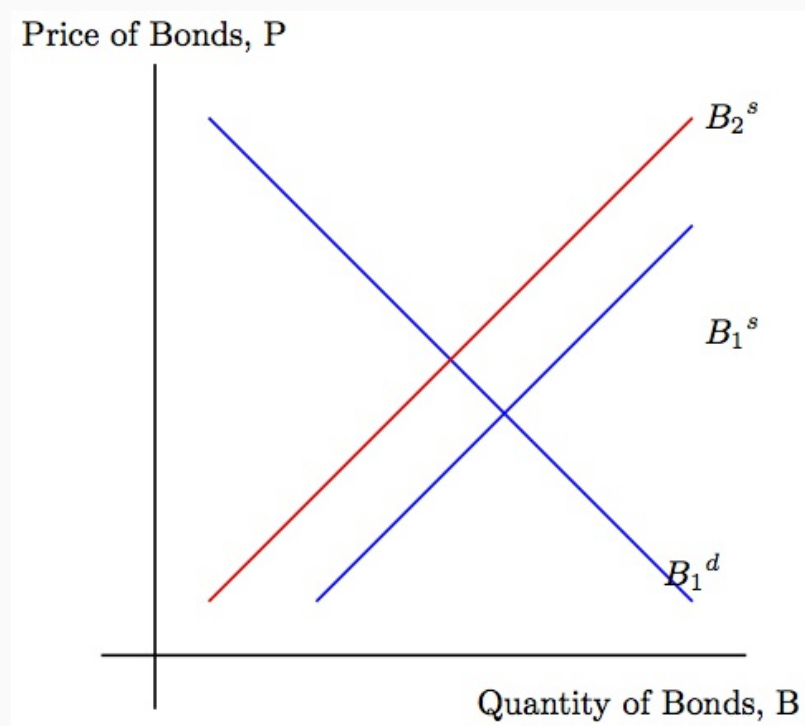
- business cycle expansion \Rightarrow **expected profitability of investment opportunities** increases \Rightarrow supply of bonds increases \Rightarrow supply curve shifts to the right



Supply Curve Shifts

(1) Expected Profitability of Investment Opportunities

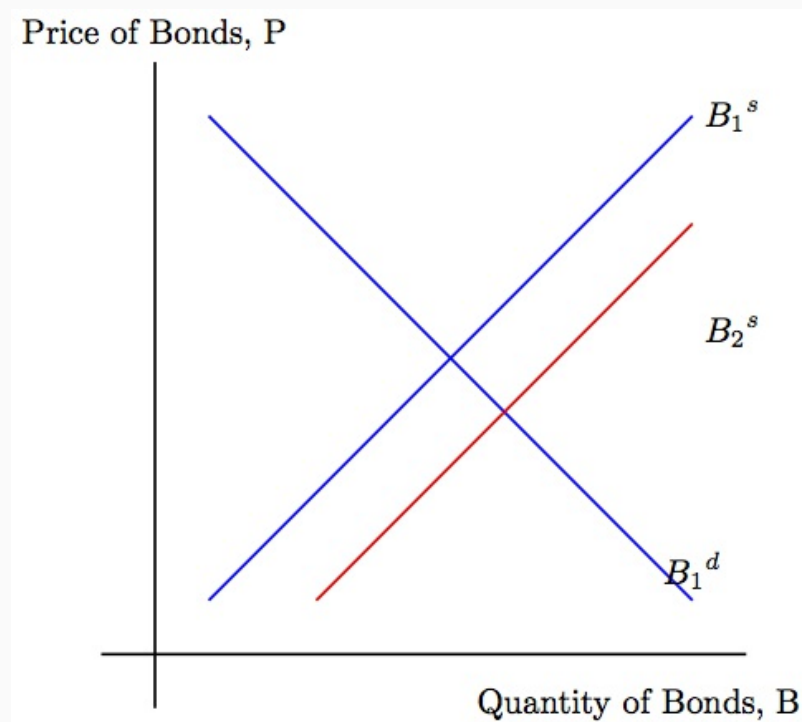
- business cycle recession \Rightarrow **expected profitable investment opportunities** decreases \Rightarrow supply of bonds decreases \Rightarrow supply curve shifts to the left



Supply Curve Shifts

(2) Expected Inflation

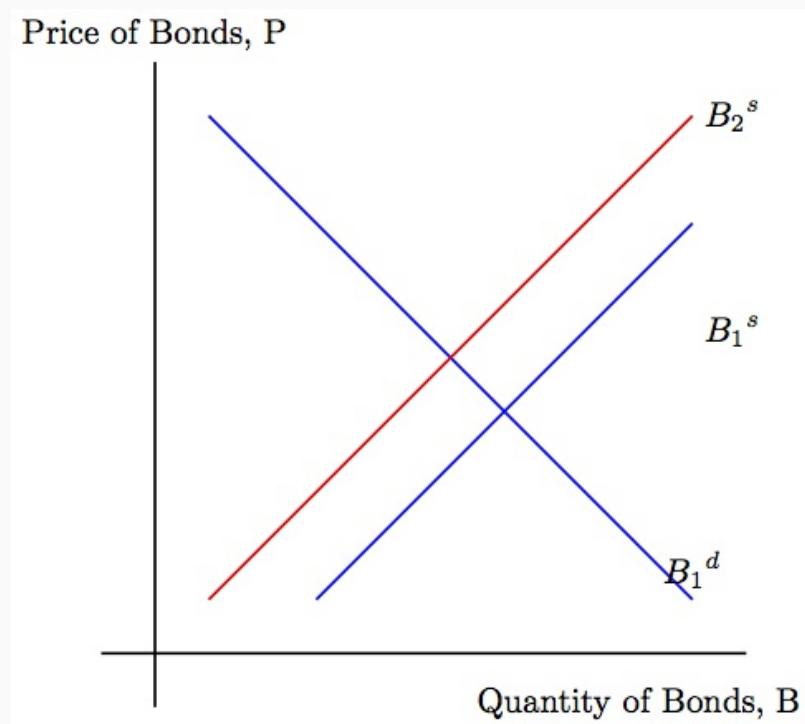
- **expected inflation** increases \Rightarrow real interest rate decreases \Rightarrow real cost of borrowing decreases \Rightarrow issuing more bonds \Rightarrow supply of bonds increases \Rightarrow supply curve shifts to the right



Supply Curve Shifts

(2) Expected Inflation

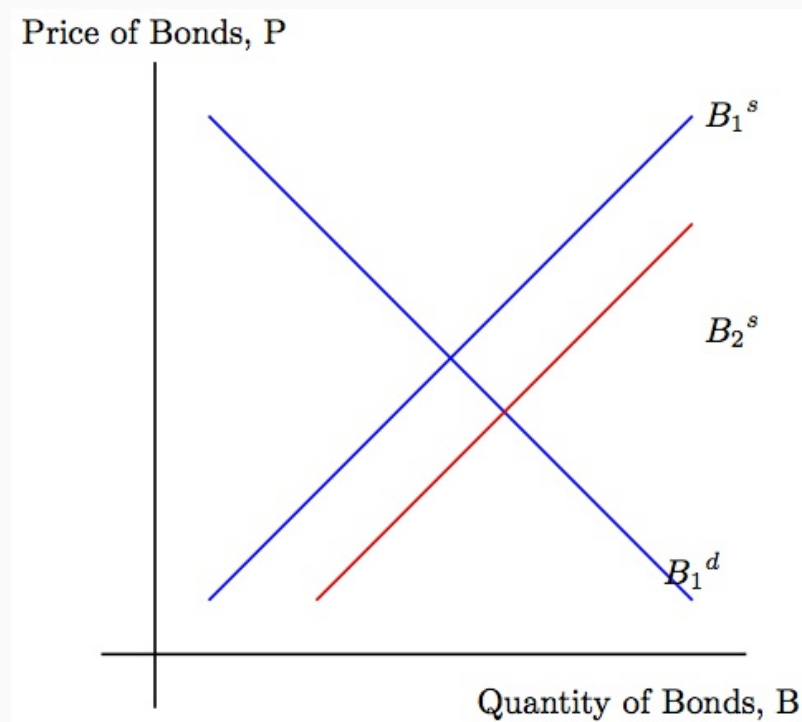
- **expected inflation** decreases \Rightarrow supply of bonds decreases \Rightarrow supply curve shifts to the left



Supply Curve Shifts

(3) Government Budget Deficits

- government's expenditures is higher than its revenues \Rightarrow **government deficits**
 \Rightarrow U.S. Treasury issues bonds to finance government deficits \Rightarrow supply of bonds increases \Rightarrow supply curve shifts to the right



Supply Curve Shifts

(3) Government Budget Deficits

- government's expenditures is less than its revenues \Rightarrow **government surpluses**
 \Rightarrow supply of bonds decreases \Rightarrow supply curve shifts to the left

