

Supply and Demand for Assets

Economics 301: Money and Banking

Learning Outcomes

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- LO3: Predict changes in interest rates using fundamental economic theories including present value calculations, behavior towards risk, and supply and demand models of money and bond markets.
- LO4: Describe how interest rates, interest rate risk, and expectations of future interest rates affect decisions made by consumers and financial institutions.

Reading and Exercises

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- Chapter 4, pp. 102-115
- Chapter 4, pp. 120-123
- **Canvas quiz due Wed 11:59 PM.**
- **Homework/Exercise due Fri 11:59 PM.** We will work together in class on Thursday

Bond Price versus Interest Rate

3 / 29

Yield to maturity, i , on a discount bond, face value, F , maturity date, T , and price, P :

$$P = \frac{F}{(1+i)^T}$$

$$(1+i)^T = \frac{F}{P}$$

$$1+i = \left(\frac{F}{P}\right)^{1/T}$$

Interest rate is inversely proportional to the price of the bond.

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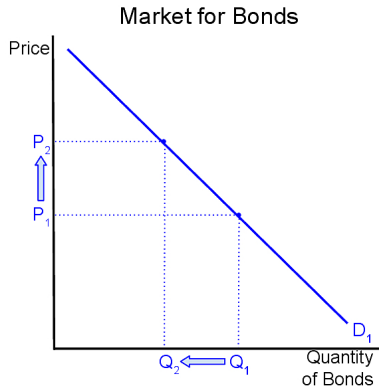
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Demand Curve for Bonds

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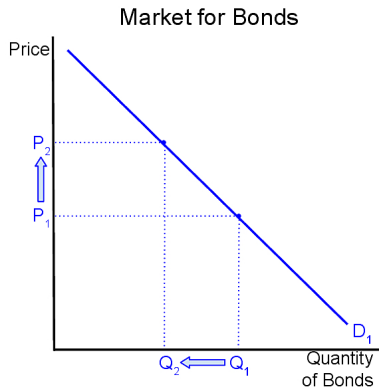
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- \rightarrow lower return on lending (buying bonds)
- \rightarrow decrease in quantity bonds demanded
- Law of demand for bonds implies the demand curve will be downward sloping.



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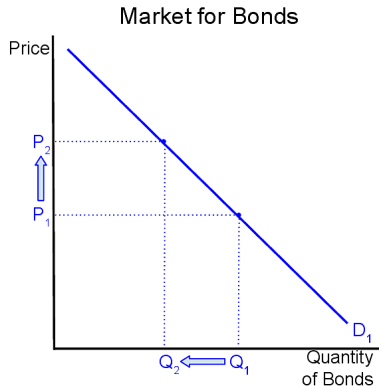
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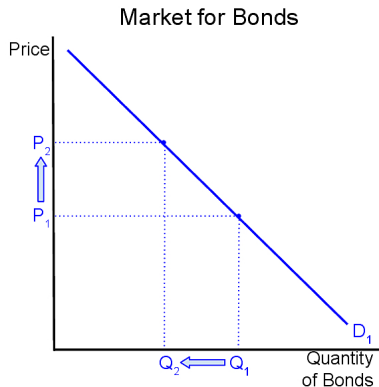
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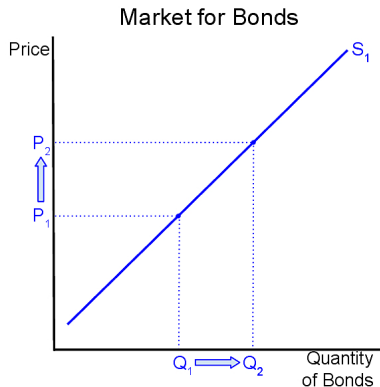
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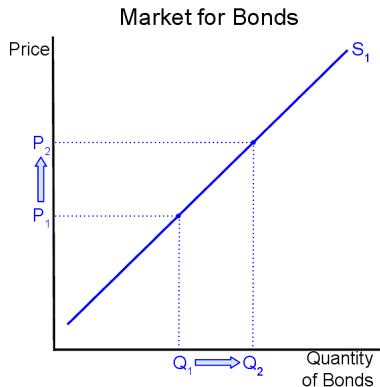
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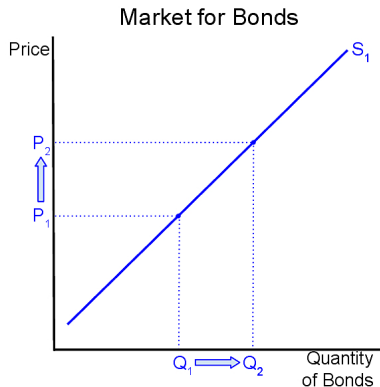
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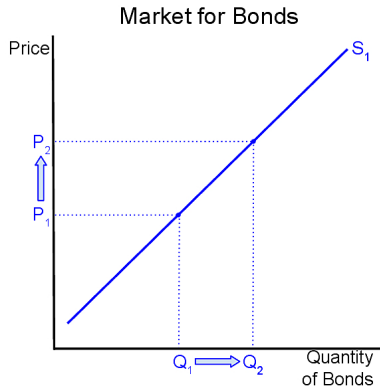
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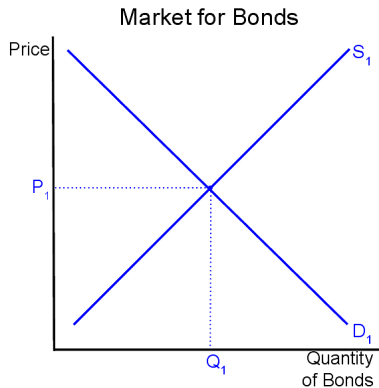
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Equilibrium

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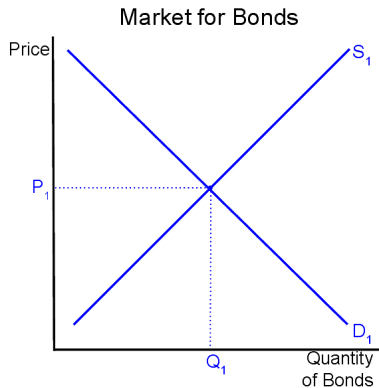
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- The equilibrium quantity is that corresponding quantity



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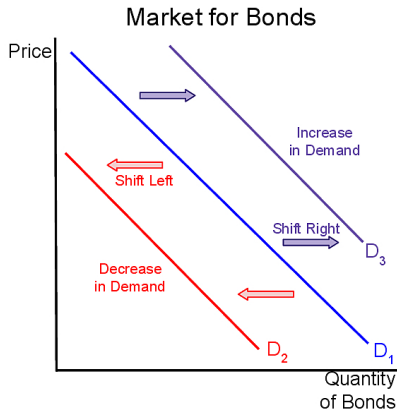
Demand Curve Shifts

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Shifts in Bond Demand Curve

- When something *besides the price of the bond (or equivalently, besides the interest rate)* affects the demand for bonds, there is a *shift in demand*.
- Something that **increases** bond demand shifts the demand curve to the **right**
- Something that **decreases** bond demand shifts the demand curve to the **left**

Shifts in Demand



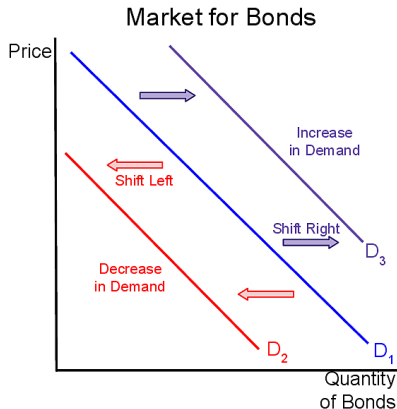
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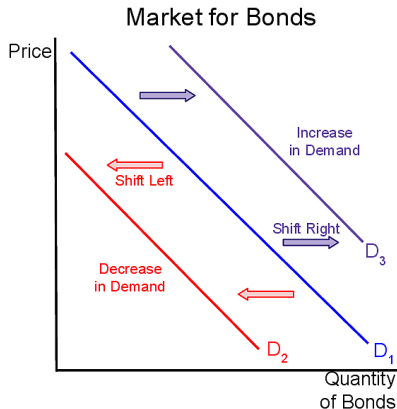
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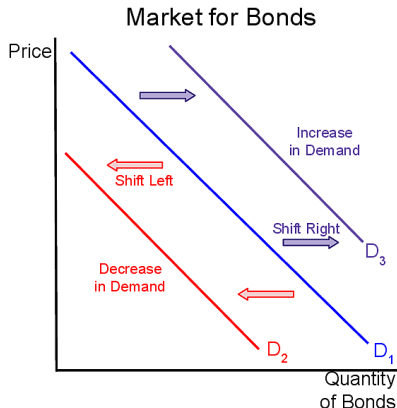
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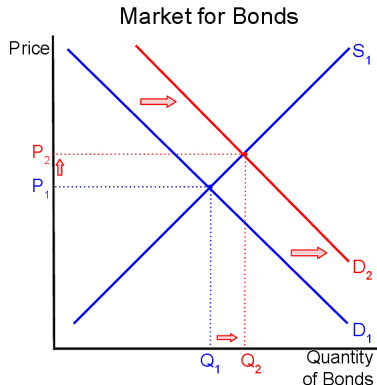
Increase in Wealth

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Increase in Wealth

- Wealth: total value of all resources owned by an individual, including all assets.
- An increase in wealth shifts the demand for bonds to the right.
- Price of bonds increases
- Interest rate decreases
- Quantity of bonds (quantity of borrowing) increases

Equilibrium



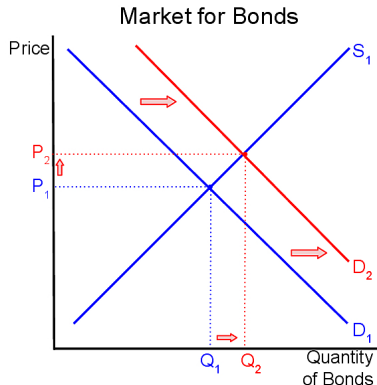
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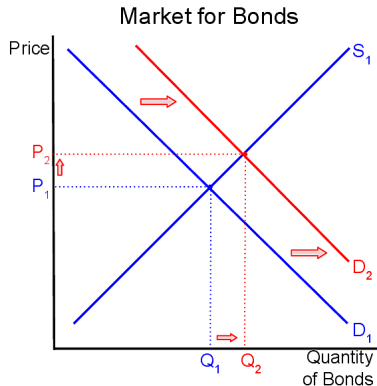
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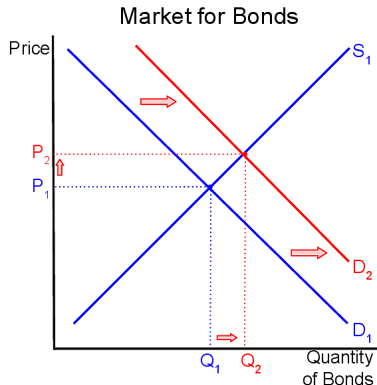
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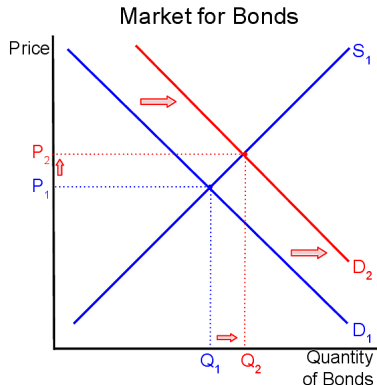
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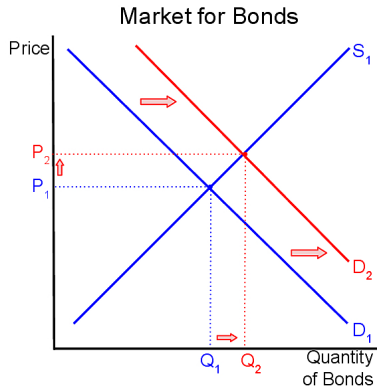
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- **Risk averse:** a lender/saver is risk averse if he/she is willing to accept a lower expected return for an asset that has greater *certainty* for the rate of return.
- **Risk neutral:** a lender/saver is risk neutral if uncertainty regarding a return *does not affect* the demand for an asset. Only expected return is considered important.
- **Risk loving:** a lender/saver is risk loving if he/she is willing to accept a lower expected return for an asset that has greater *uncertainty* for the rate of return.
- Assuming risk-averse lenders/savers, an increase in the risk of an asset causes a decrease in the demand for the asset.

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Expected Return

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- Expected return: weighted average of all possible cash flows for an asset.
- Example: Suppose a one-year discount bond with face value equal to \$150 is purchased for \$120
- ... and there is a 15% chance of full default

$$\text{YTM: } P = \frac{CF}{1+i}, \quad 1+i = \frac{CF}{P}, \quad i = \frac{CF}{P} - 1$$

- Return if no default: $CF = 150, P = 120 \rightarrow$
 $YTM = i = 150/120 - 1 = 0.25 = 25\%$
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- Expected return $\equiv R^e = 0.85(0.25) + 0.15(-1) = 0.055 = 5.5\%$.
- Higher probability of default \rightarrow decreases expected return \rightarrow
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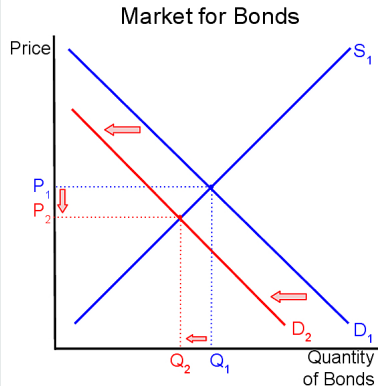
Risk of Default

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Increase in Default Risk

- Higher default risk leads to a decrease in demand for bonds
- Price of bonds decreases
- Interest rate increases
- Quantity of bonds (quantity of borrowing) decreases

Equilibrium



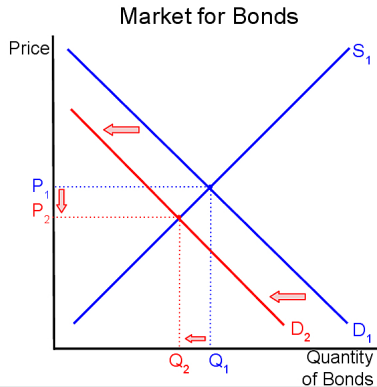
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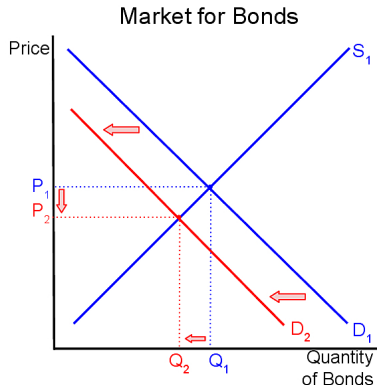
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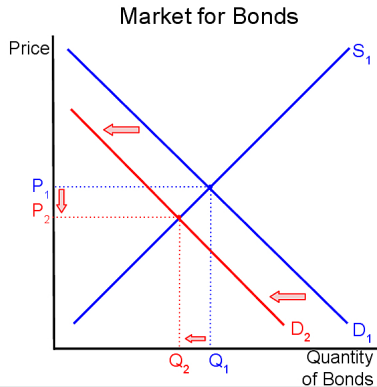
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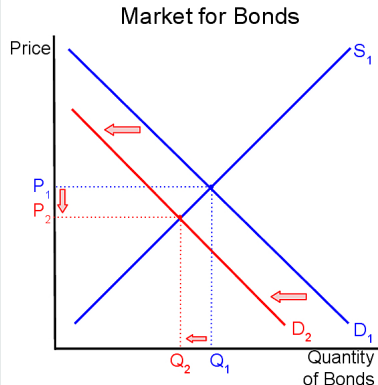
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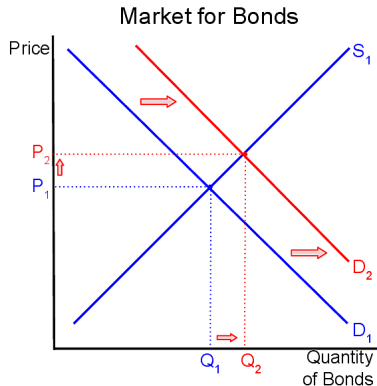
Interest Rate Risk

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Interest Rate Risk

- Less uncertainty regarding future path of interest rates leads to less capital gains risk
- Bond demand shifts to the right
- Price of bonds increases
- Interest rate decreases
- Quantity of bonds (quantity of borrowing) increases

Equilibrium



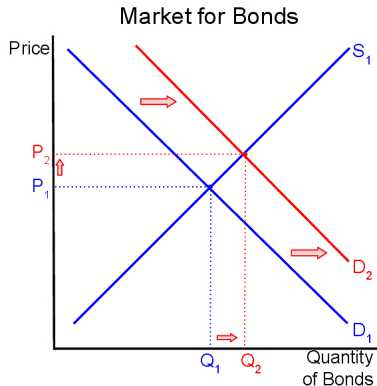
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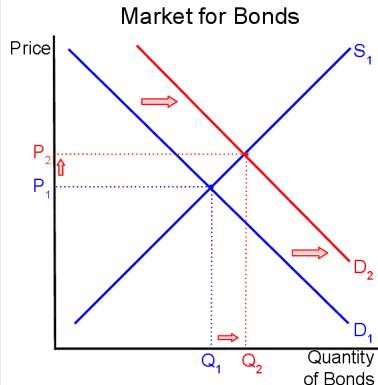
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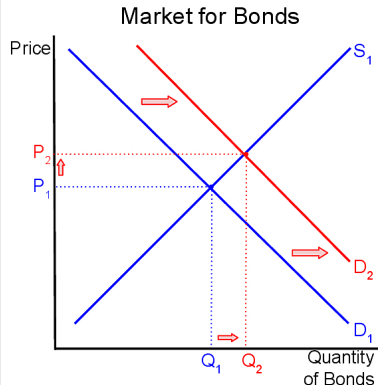
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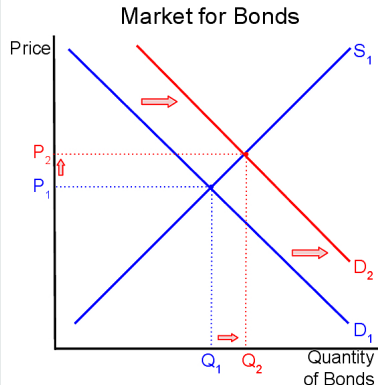
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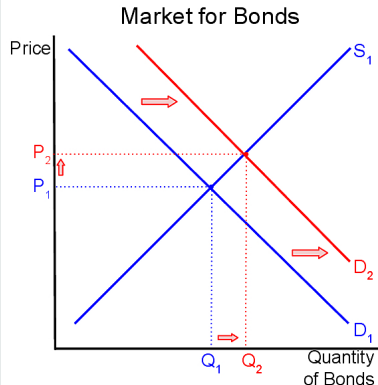
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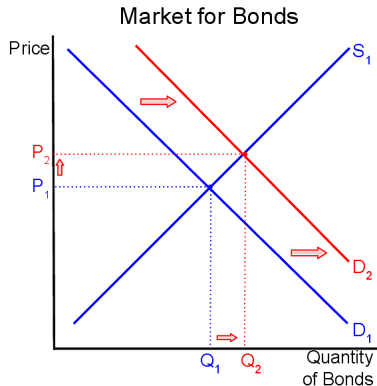
Liquidity

13 / 29

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- More liquidity causes bond demand to shift to the right
- Price of bonds increases
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Equilibrium



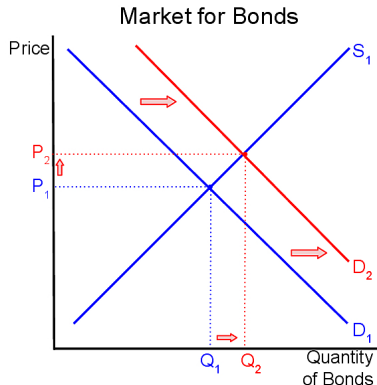
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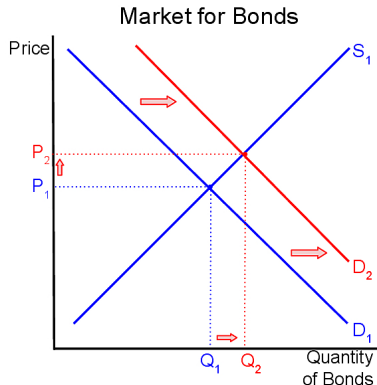
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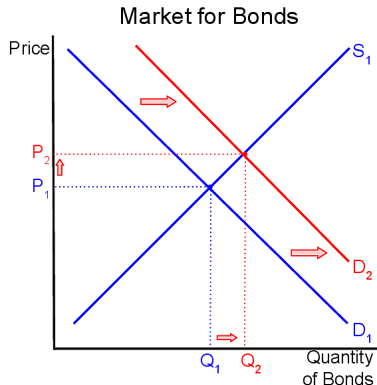
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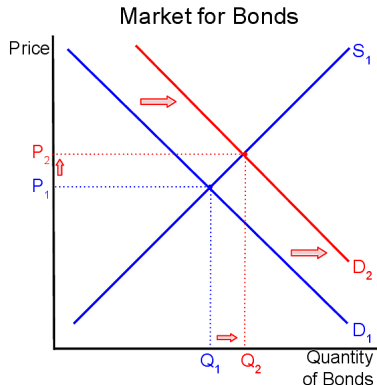
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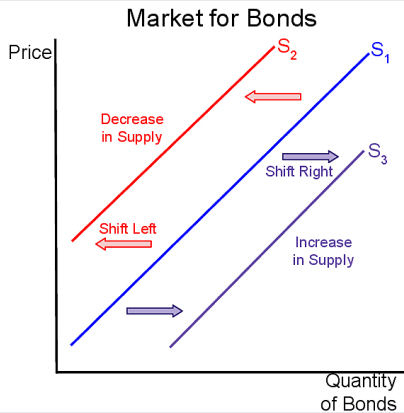
Supply Curve Shifts

14 / 29

Shifts in Bond Supply Curve

- Corporations, governments, financial institutions supply bonds to borrow funds
- When something *besides the price of the bond (or equivalently, besides the interest rate)* affects the supply for bonds, there is a *shift in supply*.
- Something that **increases** bond supply shifts the supply curve to the **right**
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Shifts in Supply

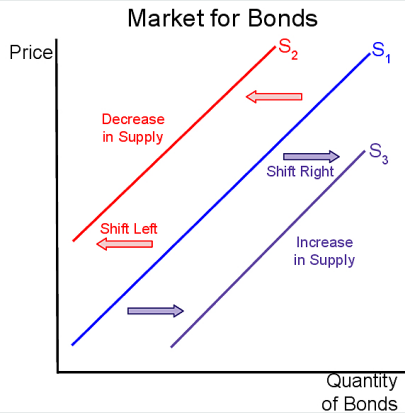


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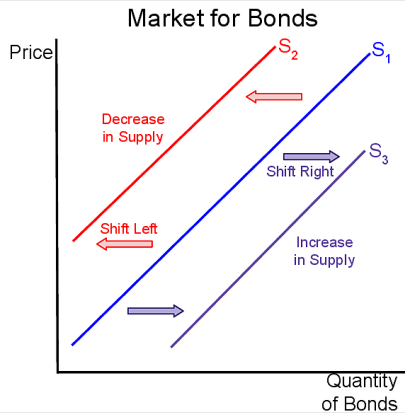


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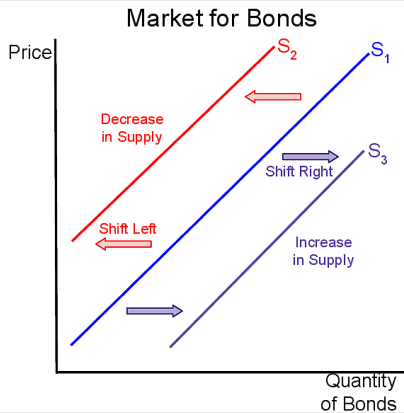
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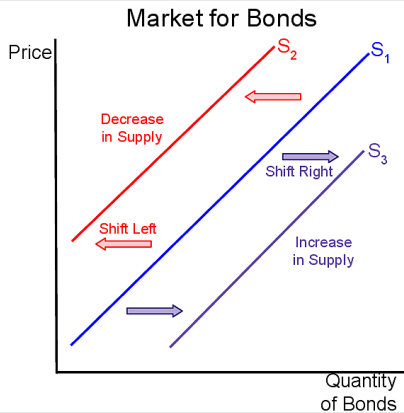


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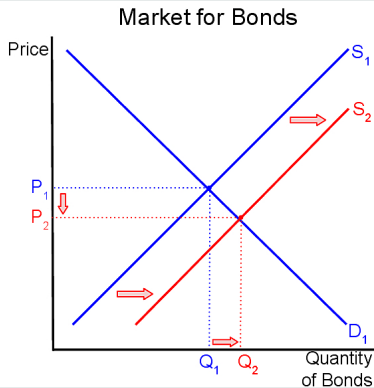
Expectations for Profitability

15 / 29

Increase in Expected Profitability

- If corporations are optimistic about future profitability, they are more likely to invest in capital, more willing to borrow to finance investment
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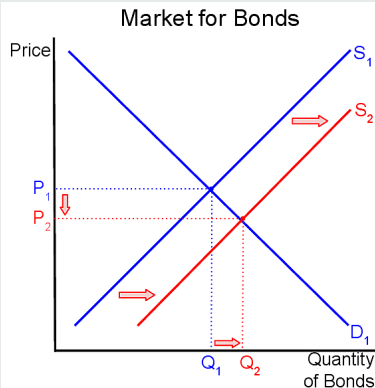
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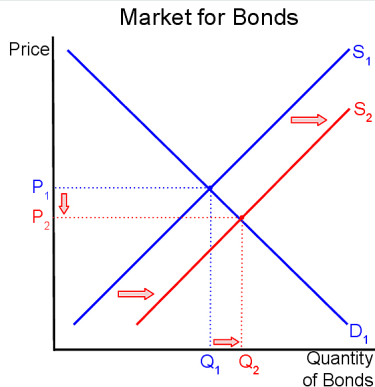


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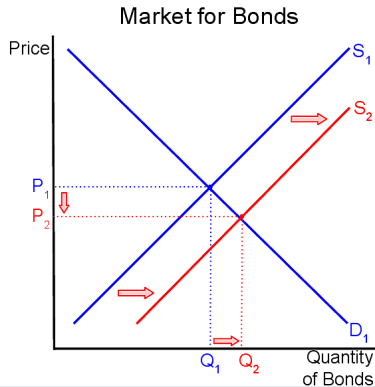
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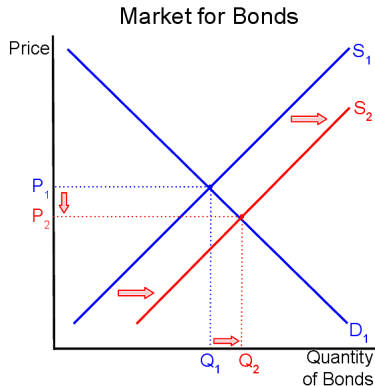
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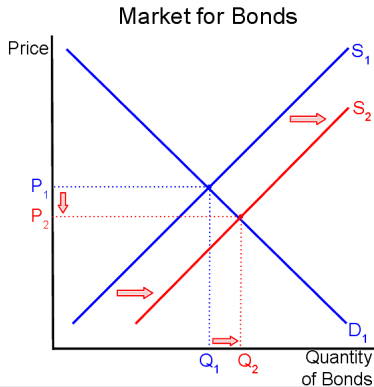
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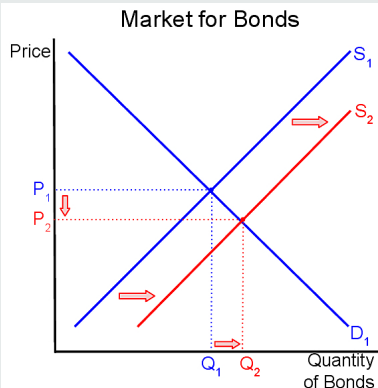
Government Borrowing

16 / 29

Increase in Government Borrowing

- When governments borrow more, bond supply shifts to the right
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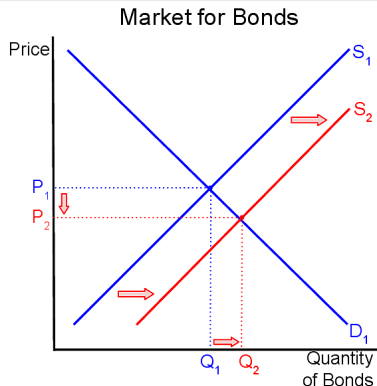
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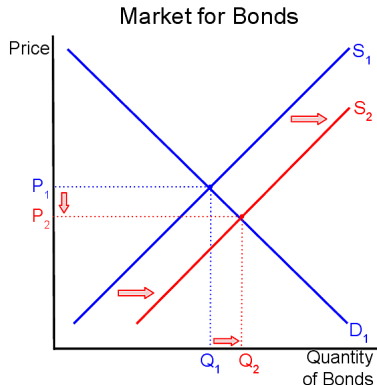
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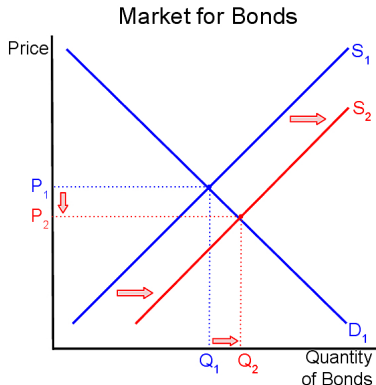
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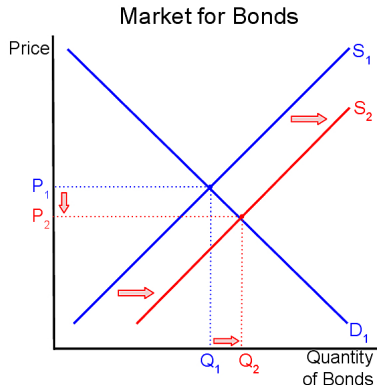
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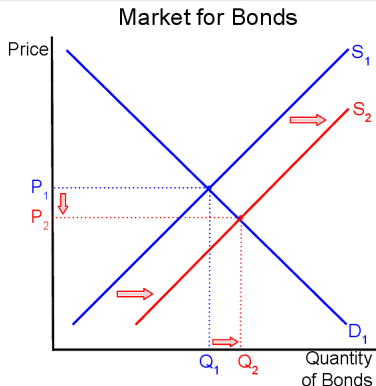
Open Market Operations

17 / 29

Open Market Sale of Bonds

- When the central bank conducts an open market sale of bonds, bond supply shifts to the right
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- Quantity of bonds increases

Equilibrium



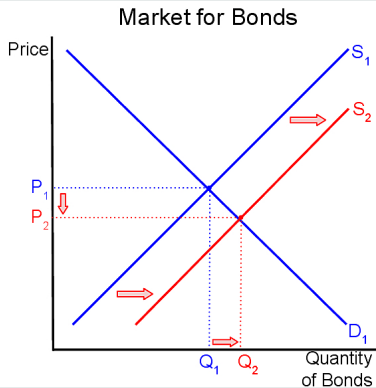
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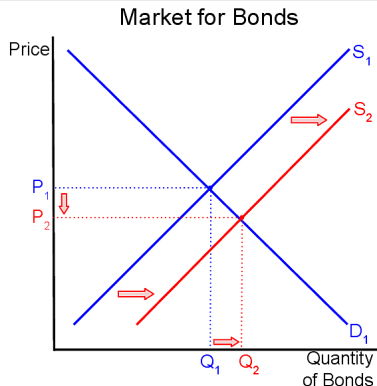
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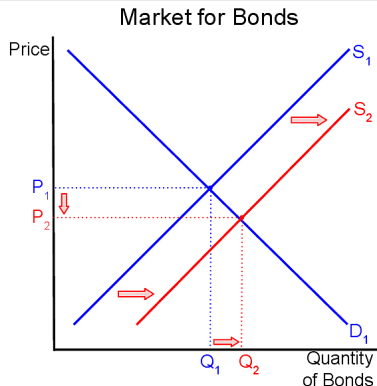
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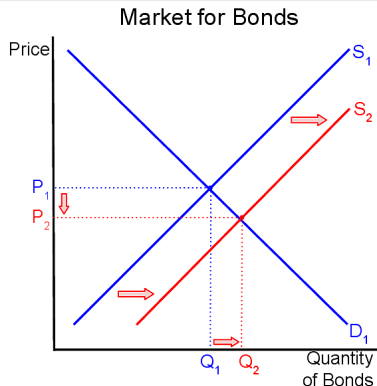
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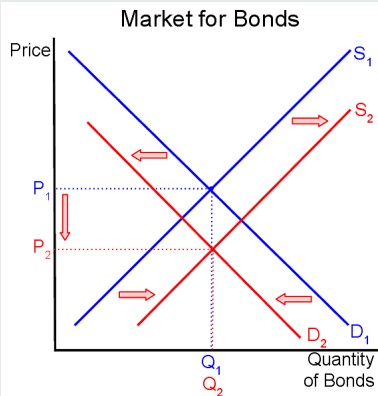
Expectations for Inflation

18 / 29

Increase in Expected Inflation

- If corporations expect higher inflation → they expect the real value of the future bond payments to decrease → more willing to borrow to finance investment
- If lenders expect higher inflation → they expect the real value of the future cash flows to decrease → less willing to borrow to finance investment
- Bond supply shifts to the right, bond demand shifts to the left
- Price of bonds decreases, interest rate increases
- Quantity of bonds is indeterminate

Equilibrium



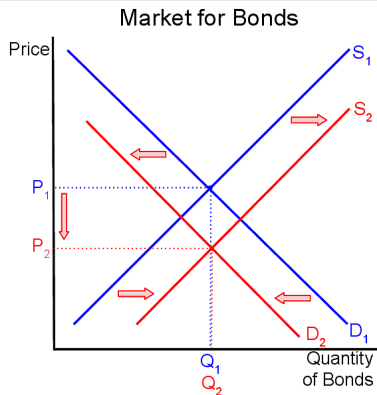
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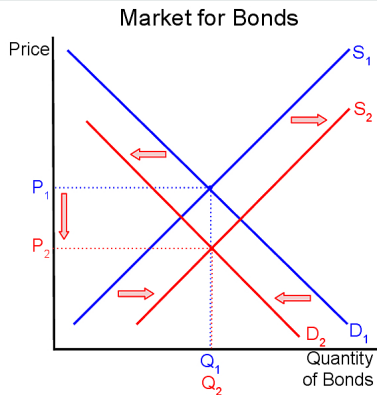
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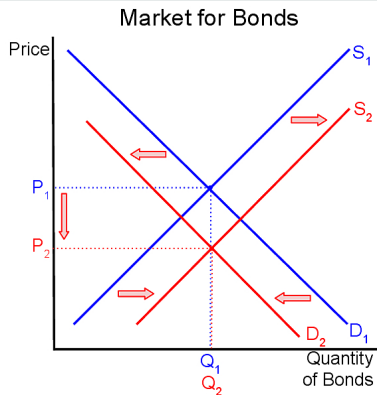
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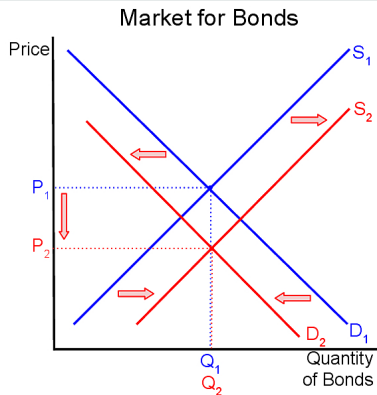
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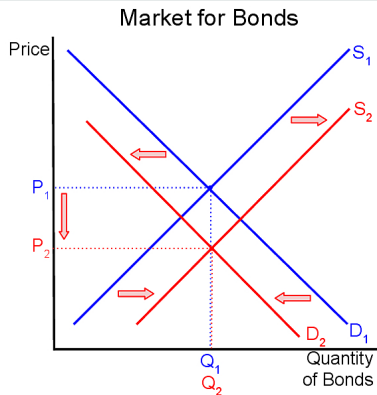
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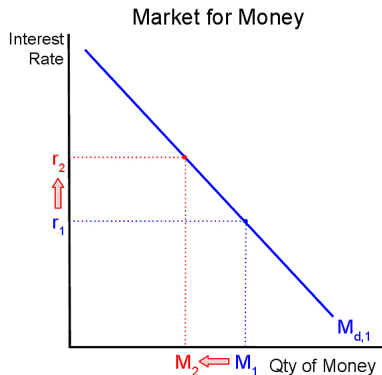
Equilibrium



Demand Curve for Money

19 / 29

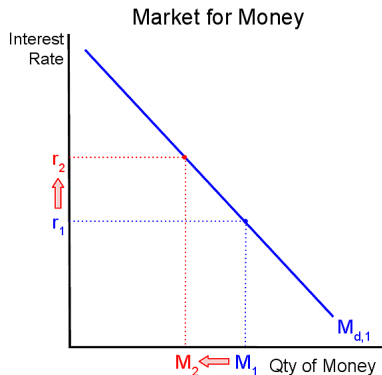
- Interest rate is the opportunity cost of holding money
- Higher interest rate leads consumers to hold a smaller quantity of money
- Demand curves are downward sloping



Demand Curve for Money

19 / 29

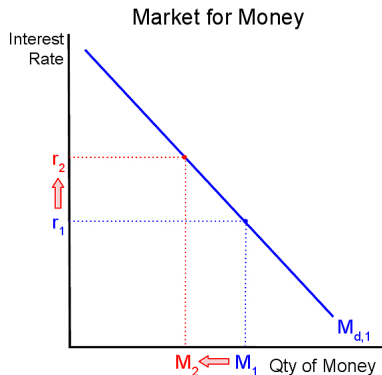
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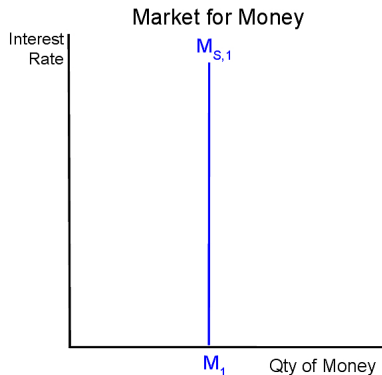
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Supply Curve for Money

20 / 29

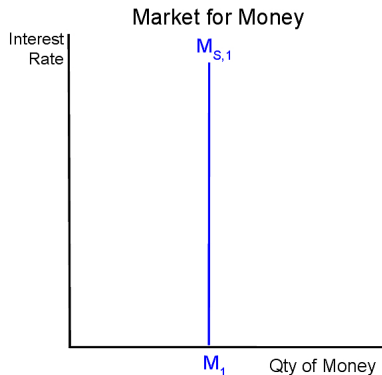
- The money supply is determined by the central bank
- It is vertical at the quantity of money that the central bank wants.



Supply Curve for Money

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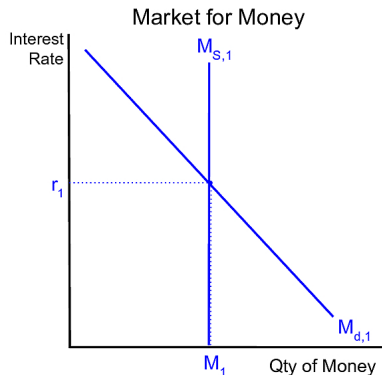
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Equilibrium in the Market for Money

21 / 29

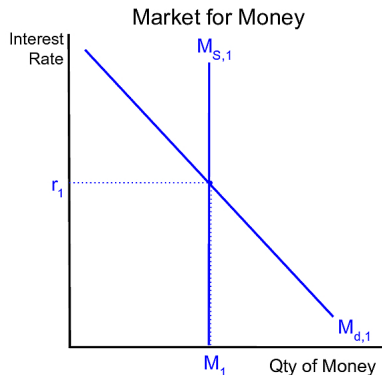
- Equilibrium interest rate is where the quantity of money supplied is equal to the quantity of money demanded
- The equilibrium quantity of money is that corresponding quantity



Equilibrium in the Market for Money

21 / 29

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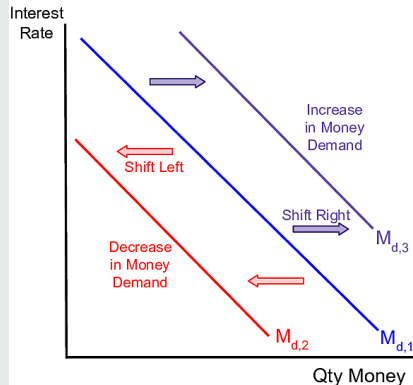
Shifts in Money Demand

22 / 29

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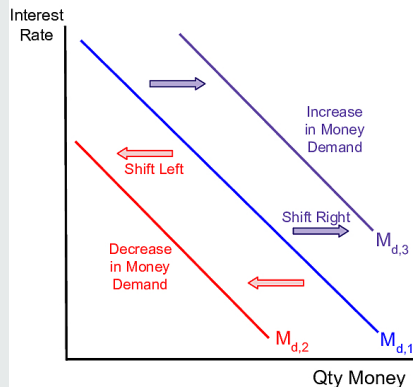
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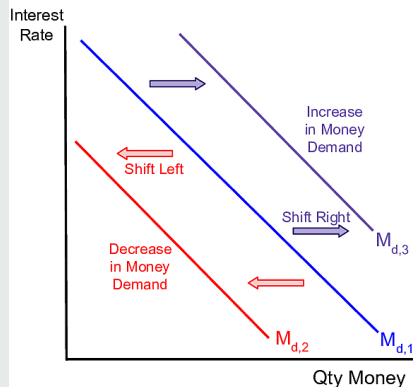
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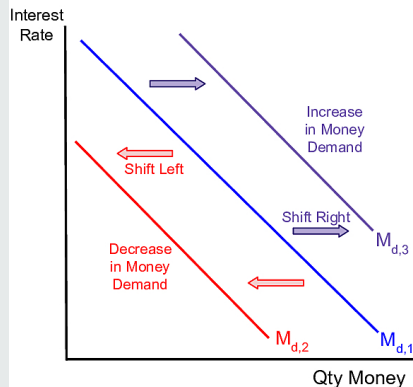
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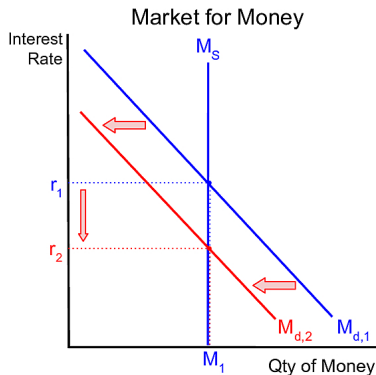
Improvements in Financial Technology

23 / 29

Improvement in Financial Technology

- Improvements in financial technology create less need to hold financial wealth in money
- Can use credit services and/or move financial wealth to money quickly and easily when ready to make purchases
- Money demand shifts to the left
- Interest rate decreases

Equilibrium



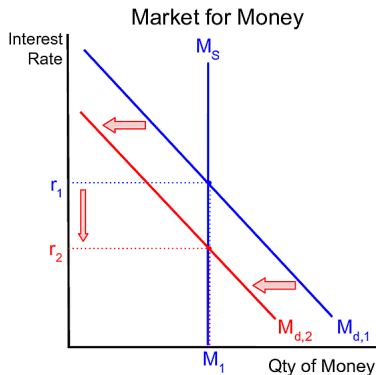
Improvements in Financial Technology

23 / 29

Improvement in Financial Technology

- Improvements in financial technology create less need to hold financial wealth in money
- Can use credit services and/or move financial wealth to money quickly and easily when ready to make purchases
- Money demand shifts to the left
- Interest rate decreases

Equilibrium



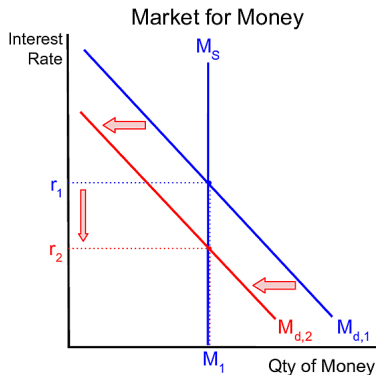
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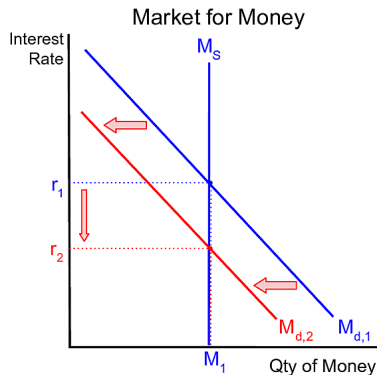
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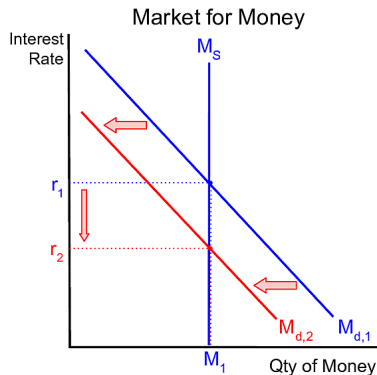
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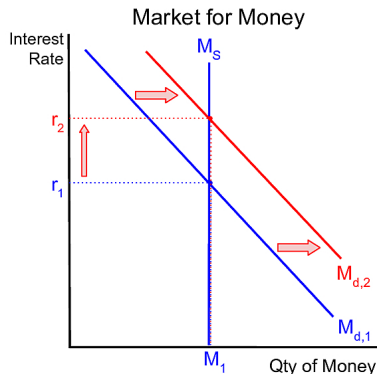
Increase in the Price Level

24 / 29

Increase in the Price Level

- Increase in prices leads consumers to demand more money to have on hand for purchases
- Money demand shifts to the right
- Interest rate increases

Equilibrium



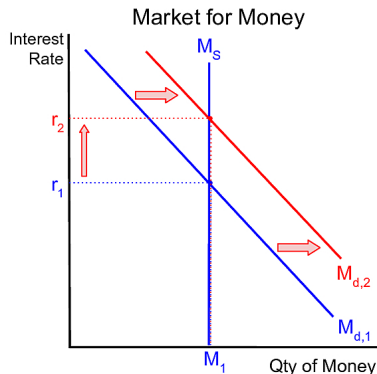
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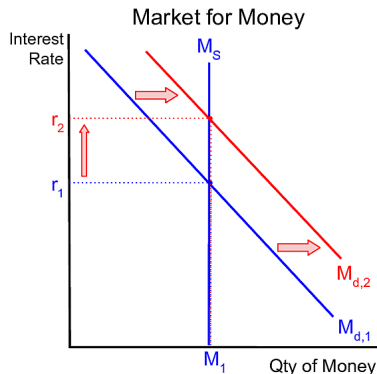
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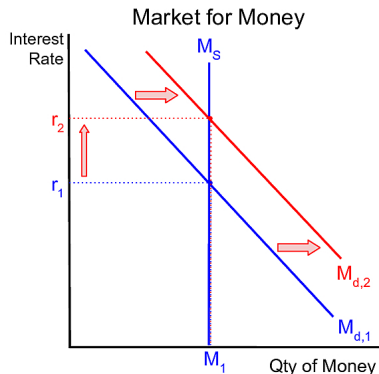
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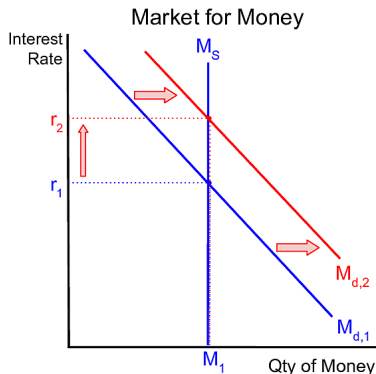
Increase in Expected Inflation

25 / 29

Increase in Expected Inflation

- An increase in expected inflation reduces the real interest rate, real opportunity cost of holding money
- Money demand shifts to the right
- Interest rate increases

Equilibrium



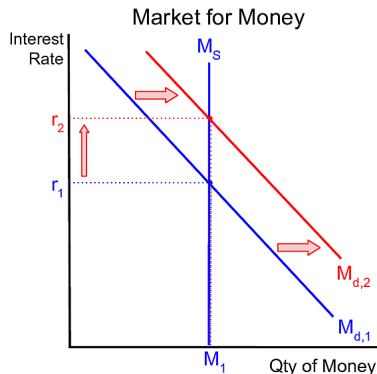
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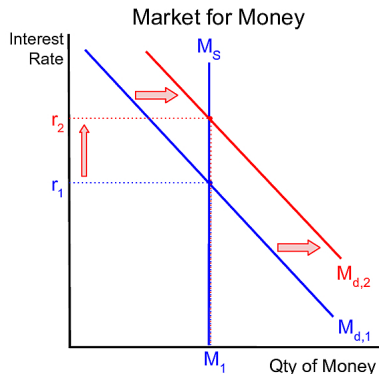
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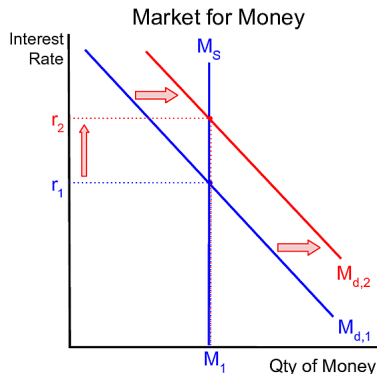
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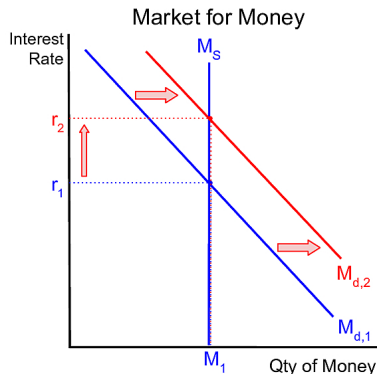
Increase in Income

26 / 29

Increase in Income

- An increase in income leads to an increase in demand for good and services, and so an increase in demand for money to purchase goods and services
- Money demand shifts to the right
- Interest rate increases

Equilibrium



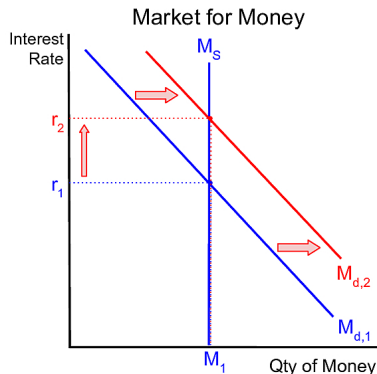
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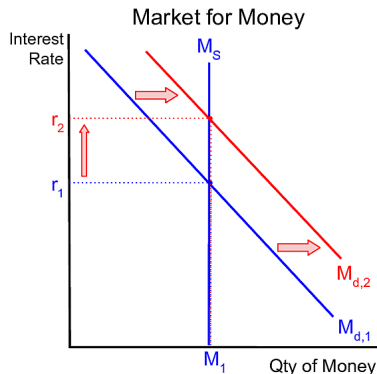
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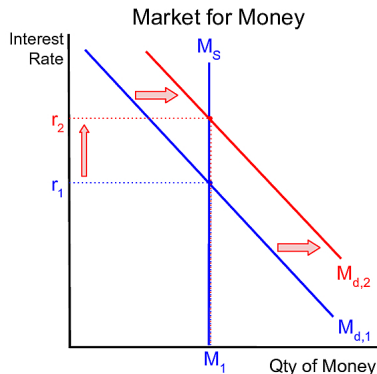
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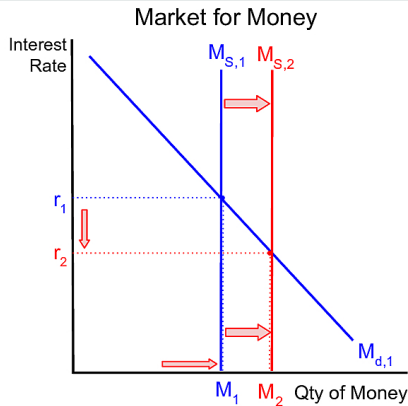
Open Market Purchase of Bonds

27 / 29

Open Market Purchase of Bonds

- An open market purchase of bonds **increases** money supply
- Money supply shifts to the **right**
- Interest rate **decreases**

Equilibrium



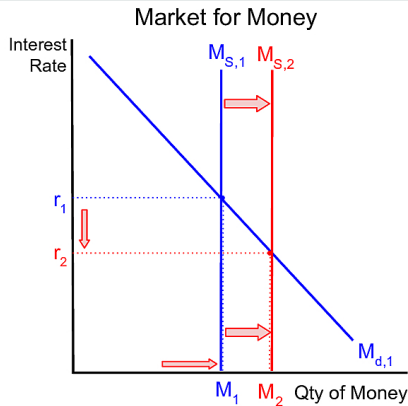
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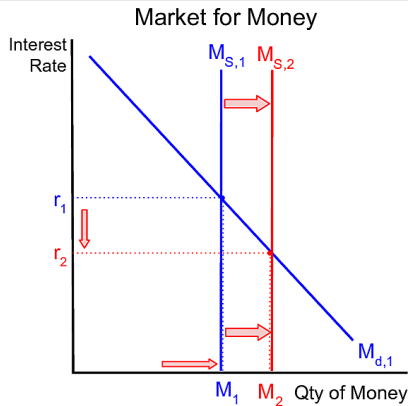
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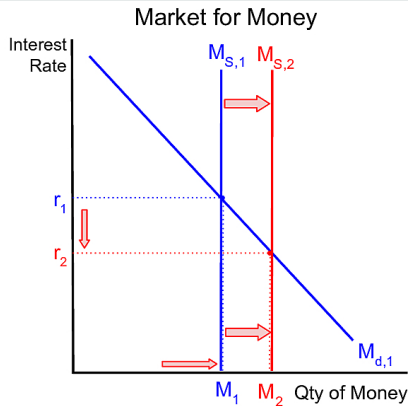
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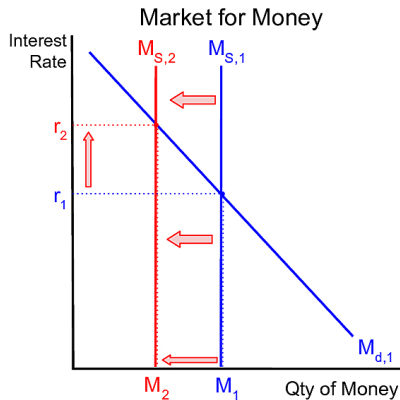
Open Market Sale of Bonds

28 / 29

Open Market Sale of Bonds

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- Money supply shifts to the **left**
- Interest rate **increases**

Equilibrium



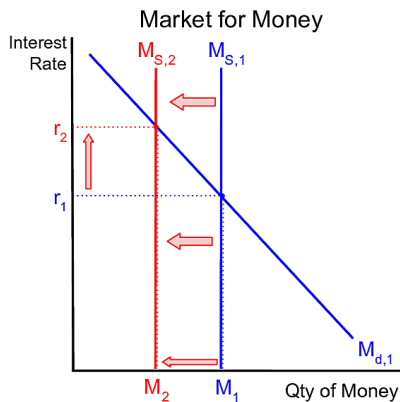
Open Market Sale of Bonds

28 / 29

Open Market Sale of Bonds

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Equilibrium



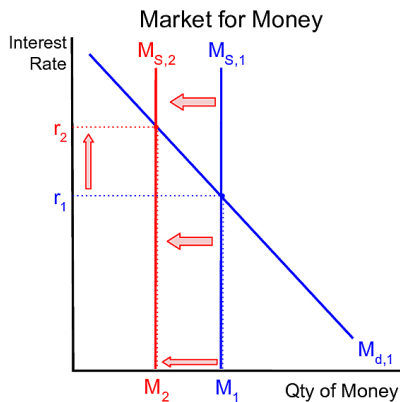
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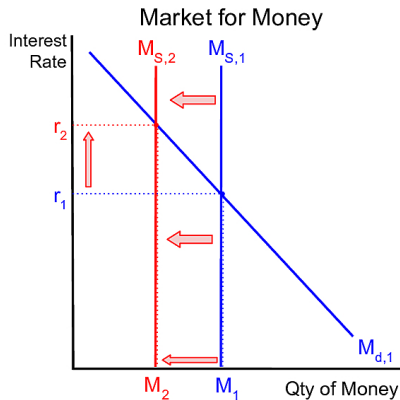
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Equilibrium



Reading and Exercises

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- Chapter 4, pp. 102-115
- Chapter 4, pp. 120-123
- **Canvas quiz due Wed 11:59 PM.**
- **Homework/Exercise due Fri 11:59 PM.** We will work together in class on Thursday