Supply and Demand for Assets

Economics 301: Money and Banking

Learning Outcomes

- 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

- 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

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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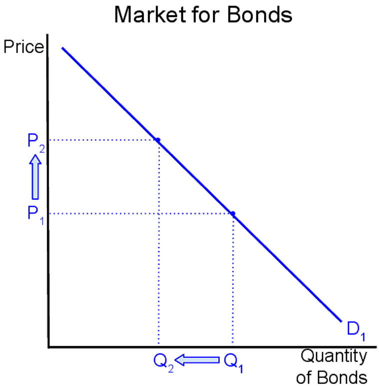
Demand Curve for Bonds

- Interest rate decrease ≡ Bond price increase
- → **lower return on lending (buying bonds)**
- → **decrease in quantity bonds demanded**
- Law of demand for bonds implies the demand curve will be downward sloping.



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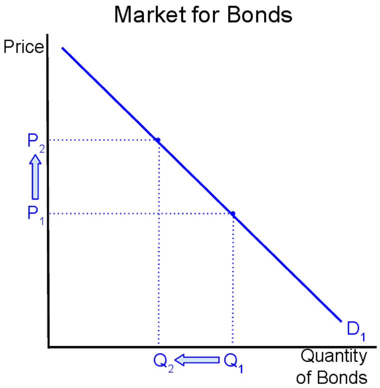

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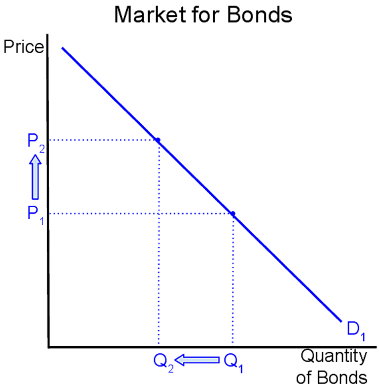

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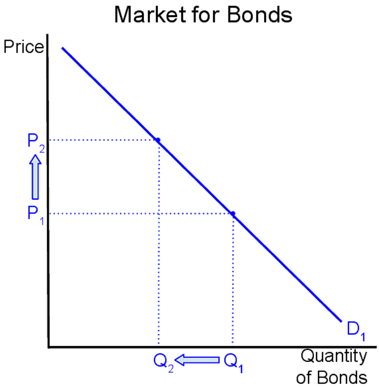

Supply Curve for Bonds

- Interest rate decrease ≡ Bond price increase
- → lower cost of borrowing (selling bonds)
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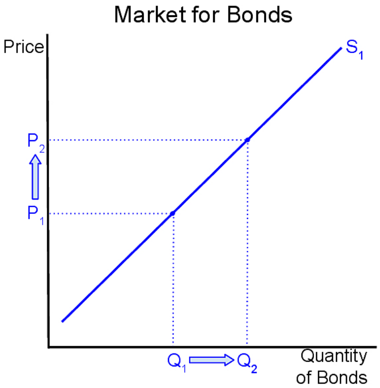

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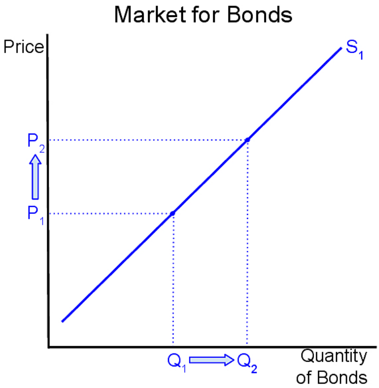

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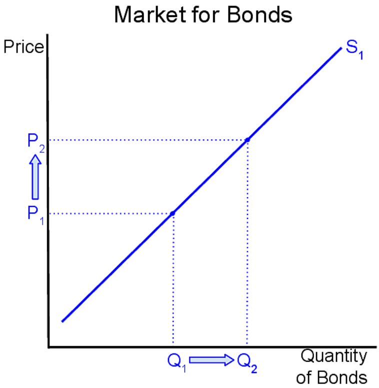

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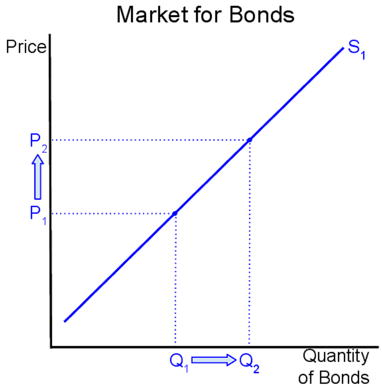
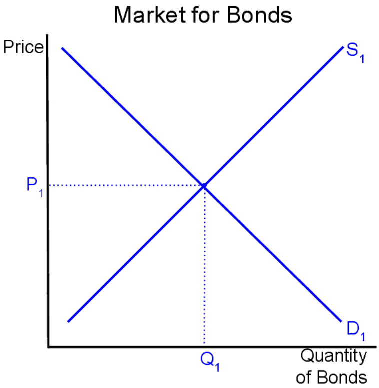


Equilibrium

- Equilibrium price of bonds is the price such that the quantity supplied is equal to the quantity demanded
- The equilibrium quantity is that corresponding quantity



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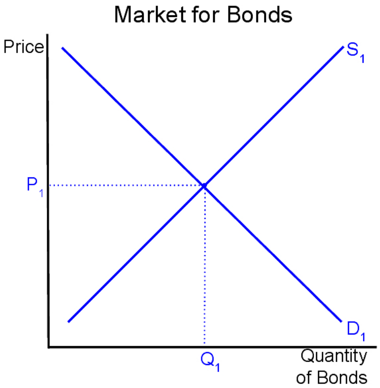
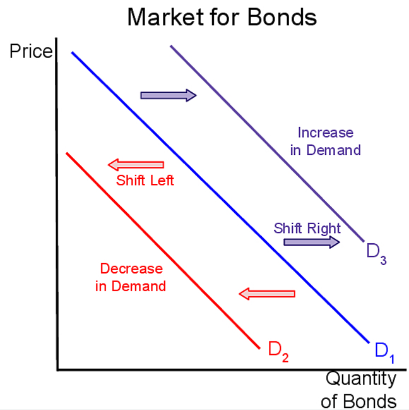


Demand Curve Shifts

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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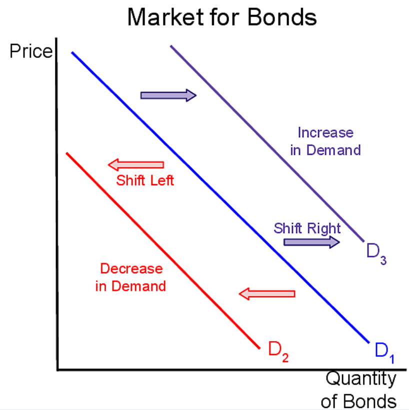

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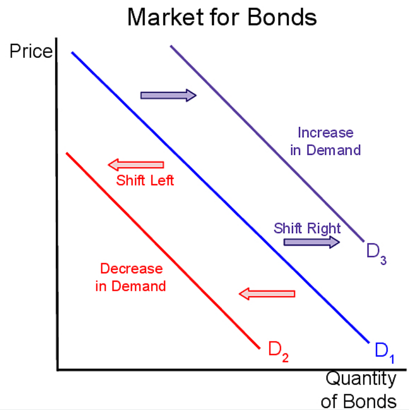

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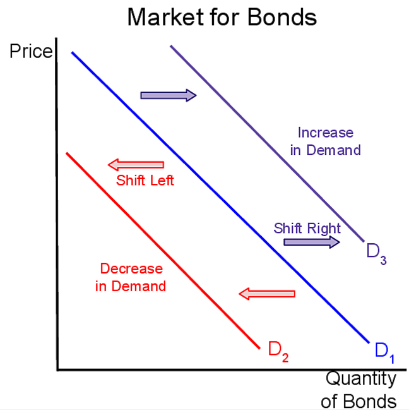
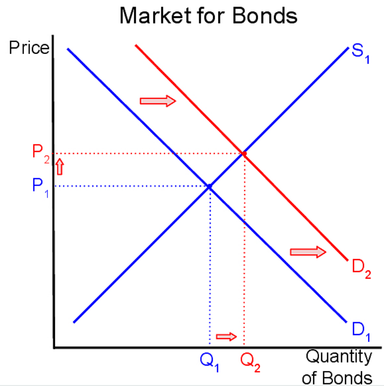


Increase in Wealth

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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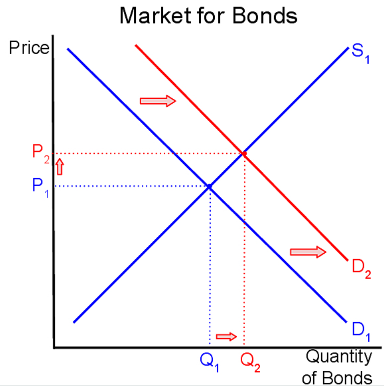

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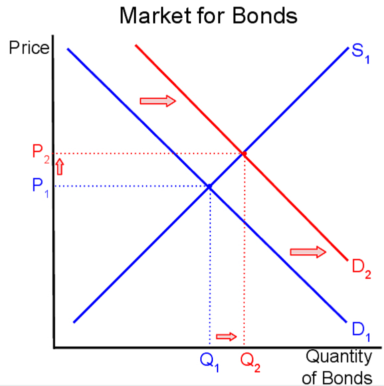

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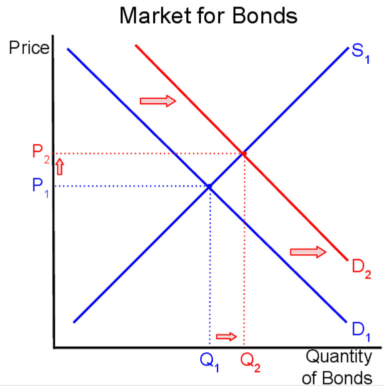

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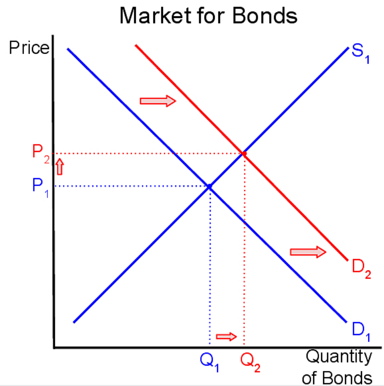

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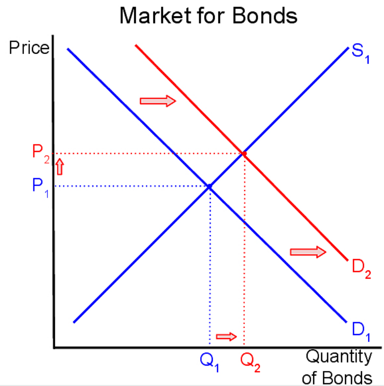

Risk

- **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 averse 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.
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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

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

  - Return if no default $CF = 150$, $P = 120 \rightarrow$ $YTM = i = 150/120 - 1 = 0.25 = 25\%$
  - Return if default: $CF = 0$, $P = 120 \rightarrow$ $YTM = i = 0/120 - 1 = -1 = -100\%$
  - Expected return $= R^e = 0.85(0.25) + 0.15(-1) = 0.055 = 5.5\%$.
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Risk of Default

Increase in Default Risk

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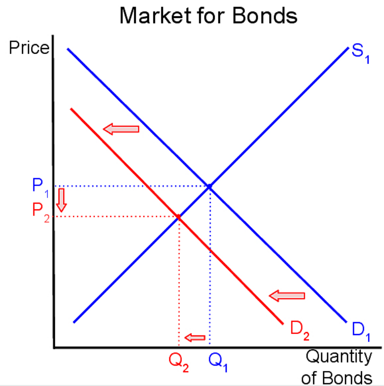
- Price of bonds decreases
- Interest rate increases
- Quantity of bonds (quantity of borrowing) decreases

Equilibrium



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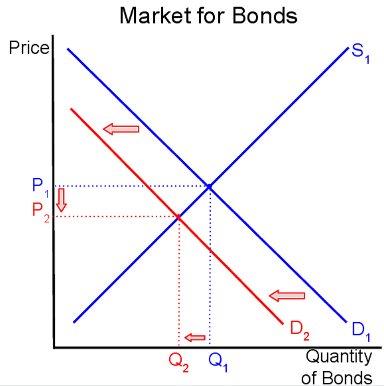

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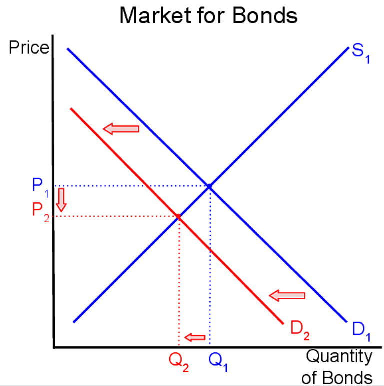

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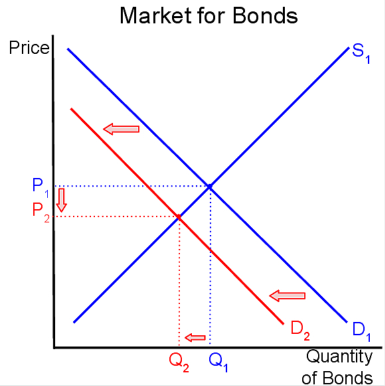
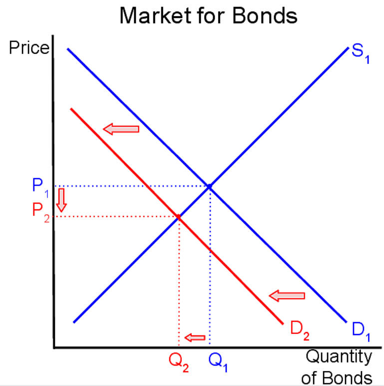


Risk of Default

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



Interest Rate Risk

Interest Rate Risk

- Less uncertainty regarding future path of interest rates leads to less capital gains risk
- Bond demand shifts to the right
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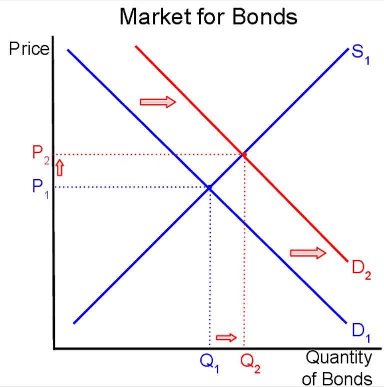

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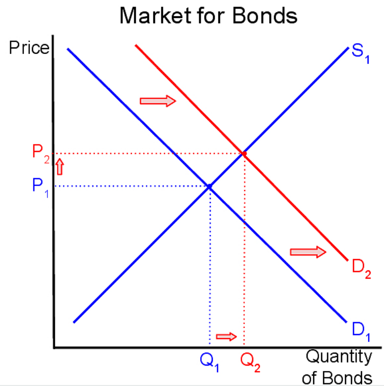

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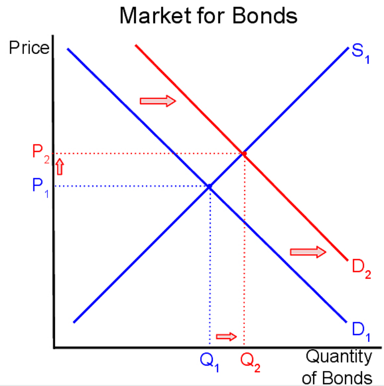

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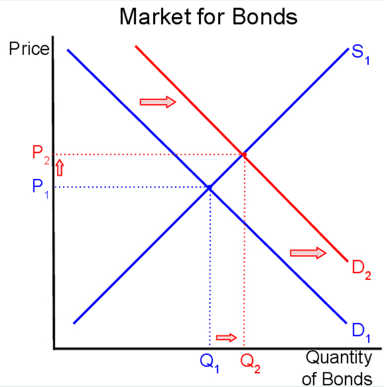

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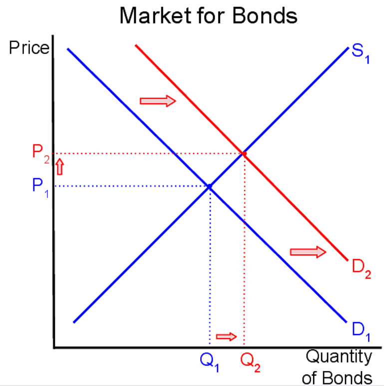

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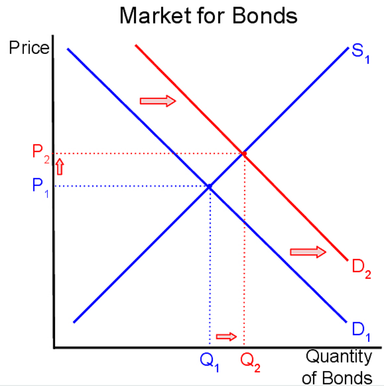

Liquidity

Increase in Liquidity

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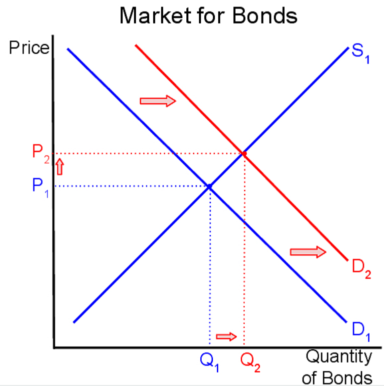
Equilibrium



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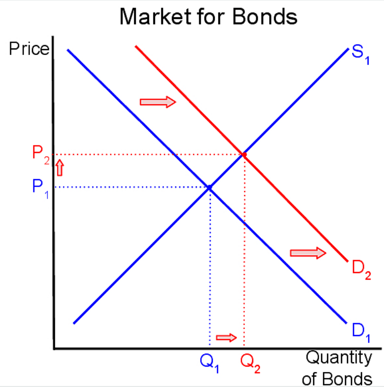

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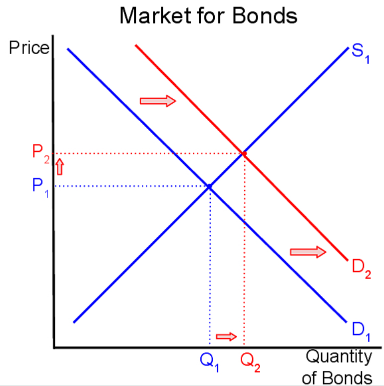

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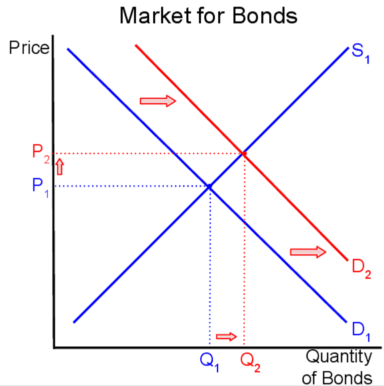

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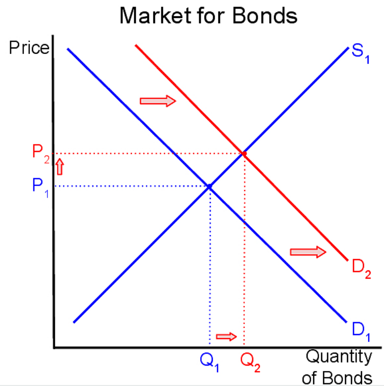

Supply Curve Shifts

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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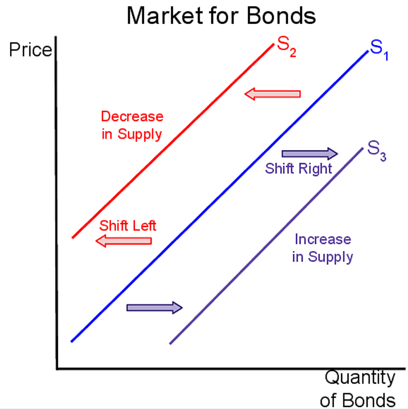
Shifts in Supply



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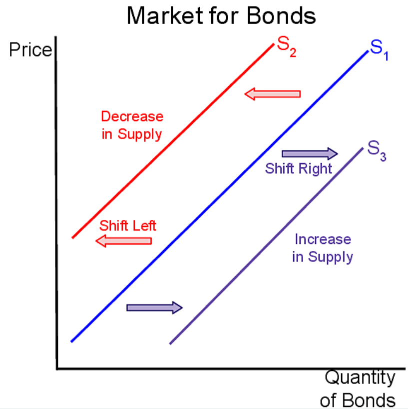

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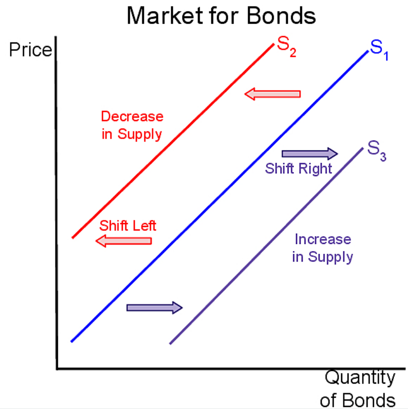

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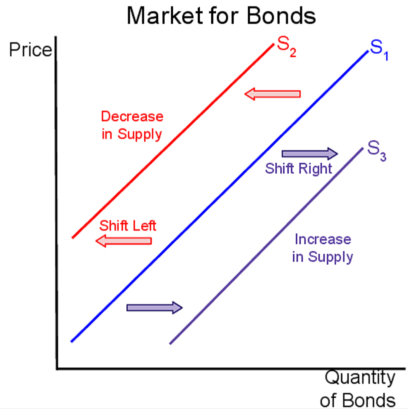

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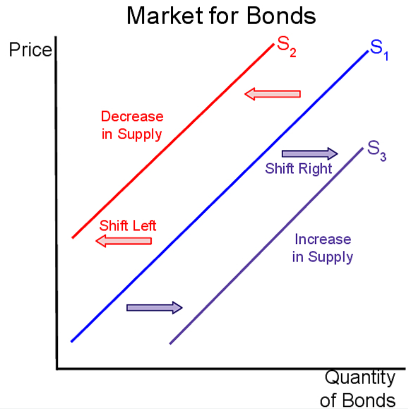

Expectations for Profitability

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
- Bond supply shifts to the right
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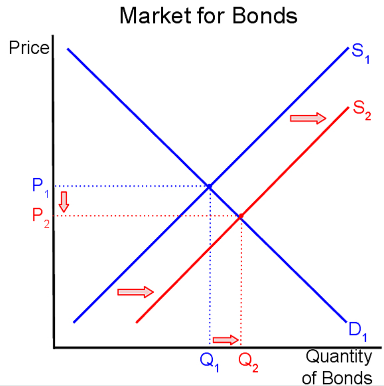

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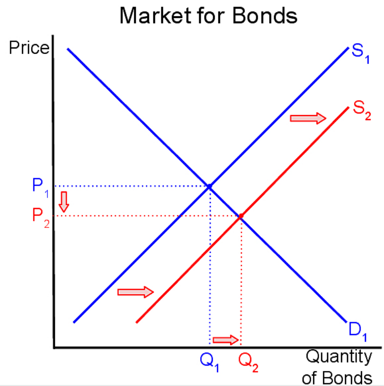

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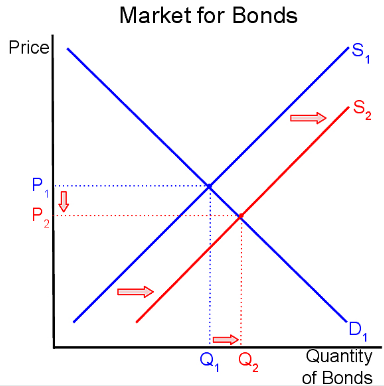

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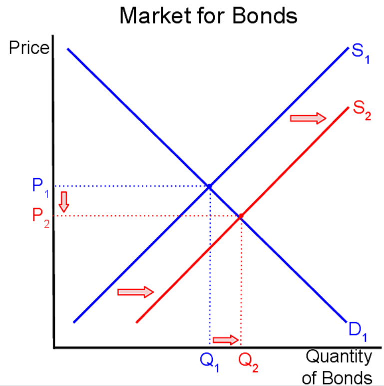

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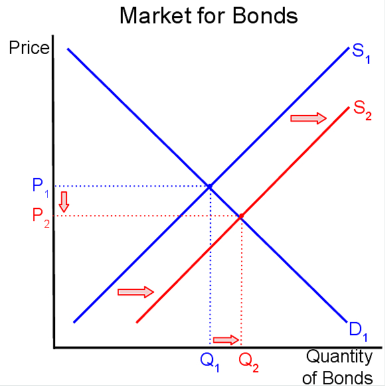

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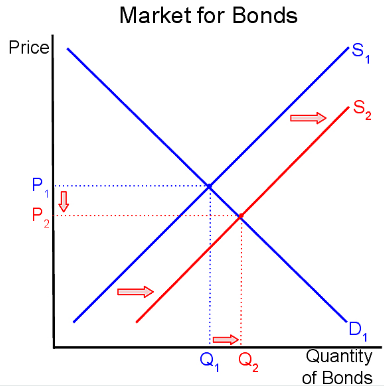

Government Borrowing

Increase in Government Borrowing

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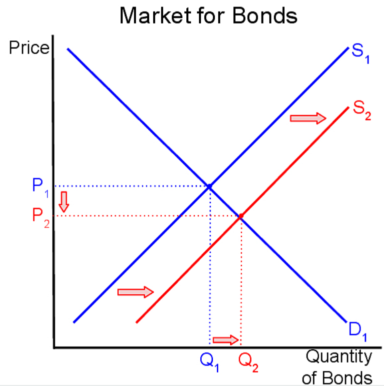

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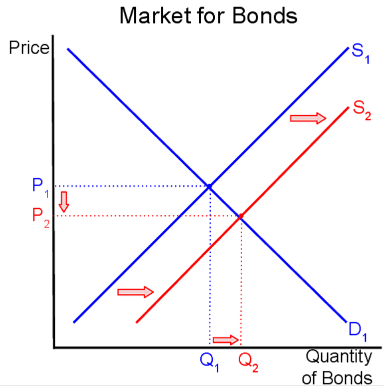

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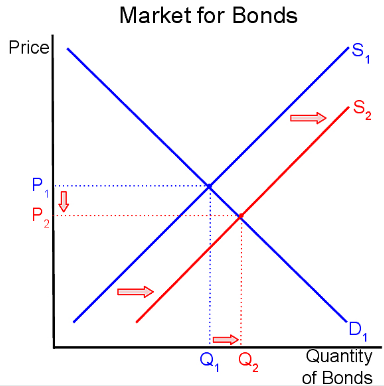

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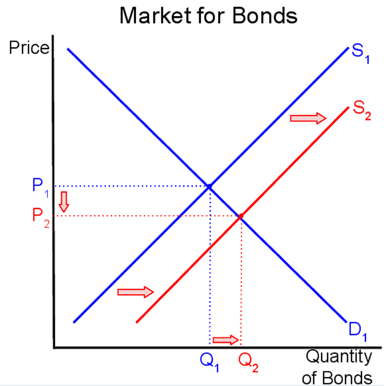

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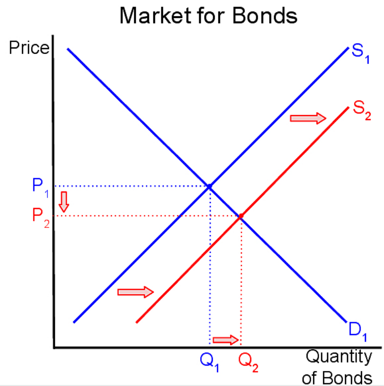

Open Market Operations

Open Market Sale of Bonds

- When the central bank conducts an open market sale of bonds, bond supply shifts to the right
- Price of bonds decreases
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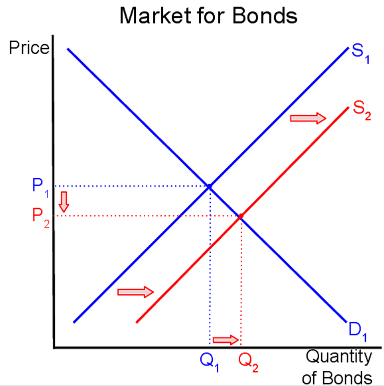
Equilibrium



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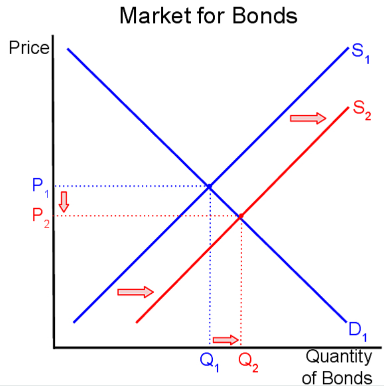

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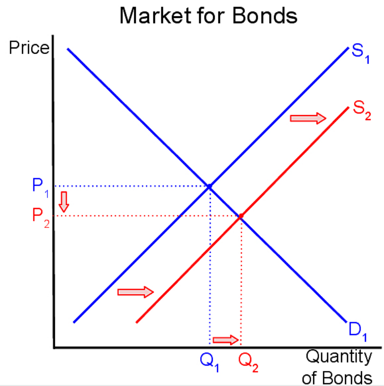

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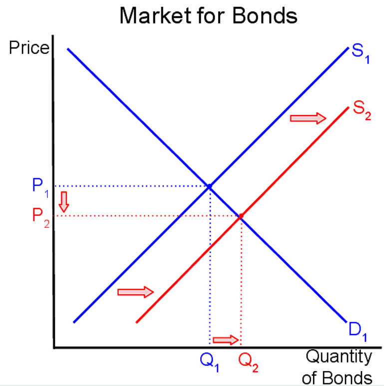

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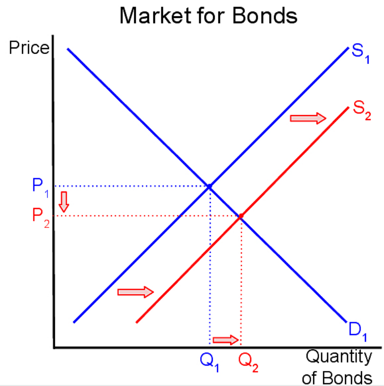
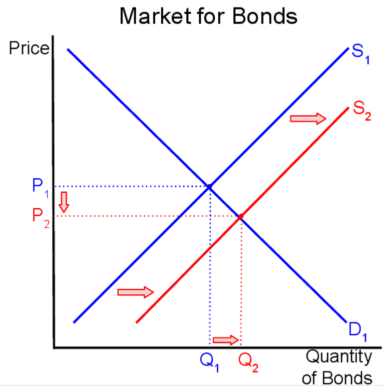


Expectations for Inflation

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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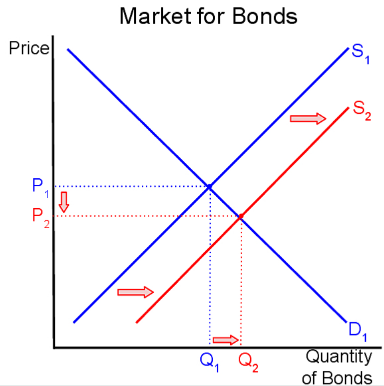

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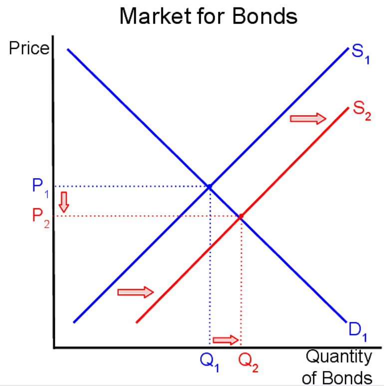

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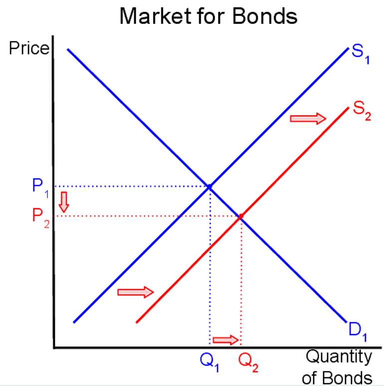

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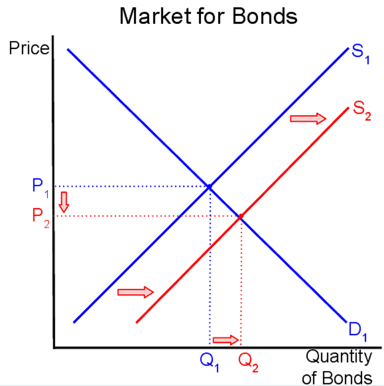

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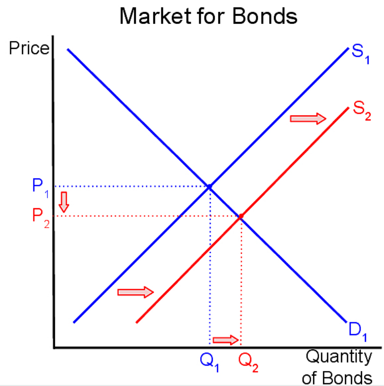
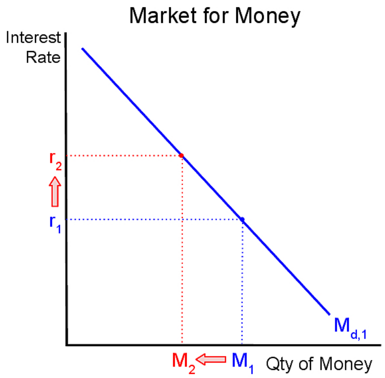


Demand Curve for Money

- 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



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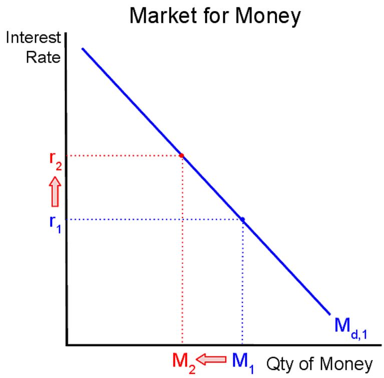

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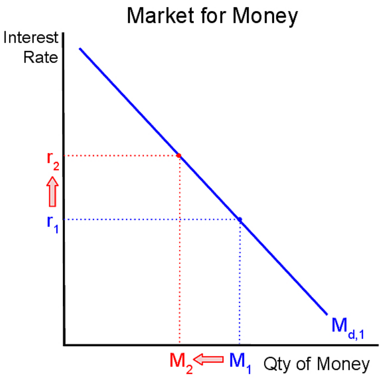
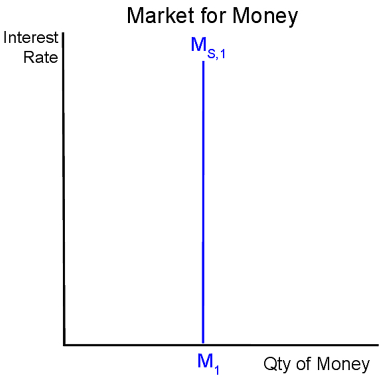


Supply Curve for Money

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



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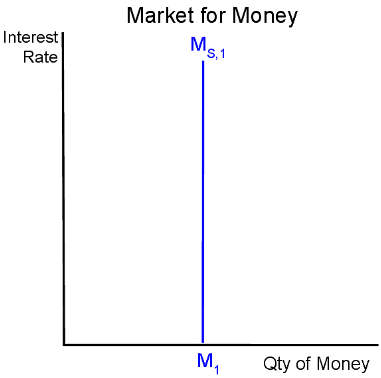
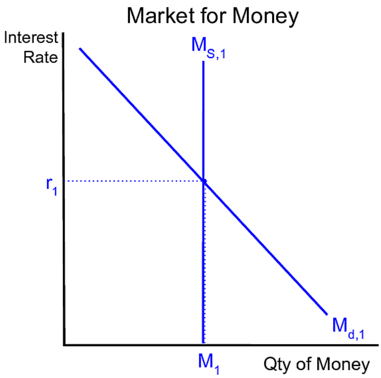


Equilibrium in the Market for Money

- 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

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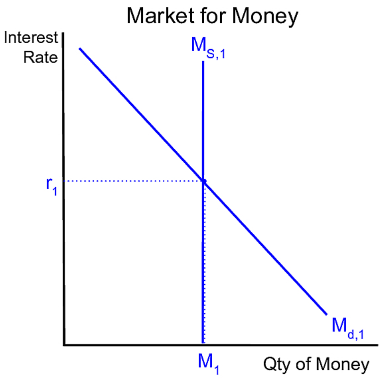
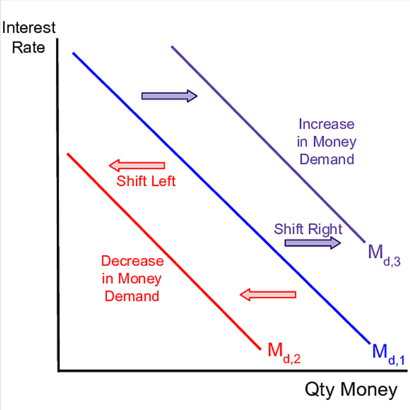


Shifts in Money Demand

Shifts in Bond Demand Curve

- When something *besides the interest rate)* affects the demand for money, there is a *shift in demand.*
- Something that **increases** money demand shifts the demand curve to the **right**
- Something that **decreases** money demand shifts the demand curve to the **left**

Shifts in Demand



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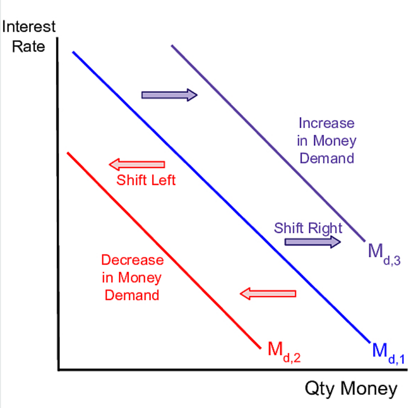

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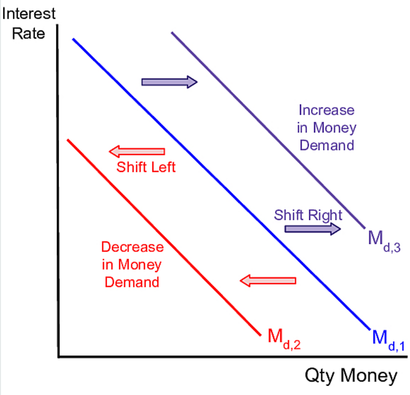

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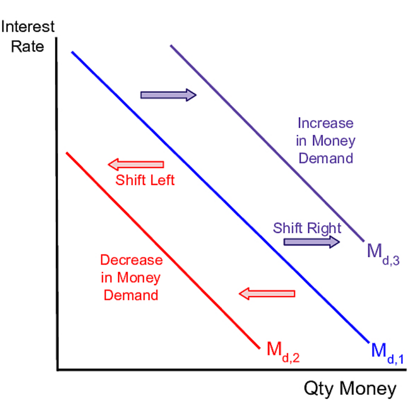
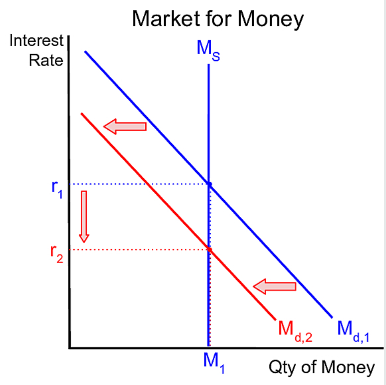


Improvements in Financial Technology

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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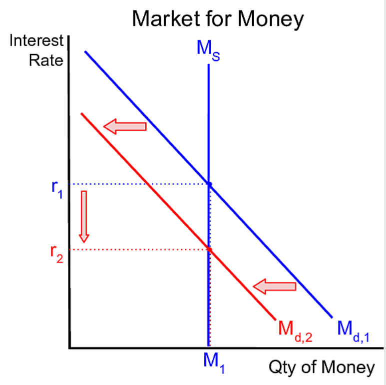

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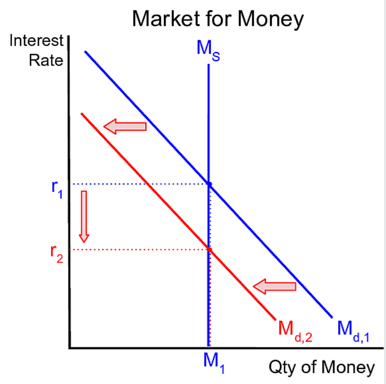

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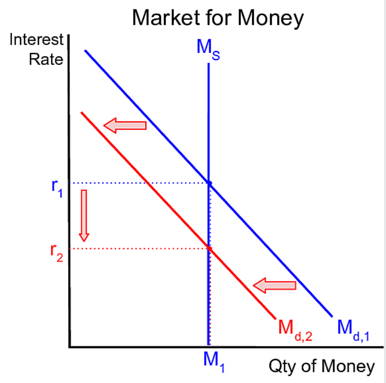

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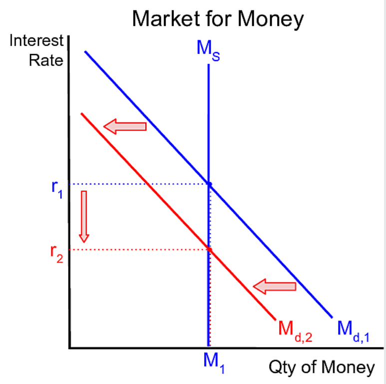

Increase in the Price Level

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
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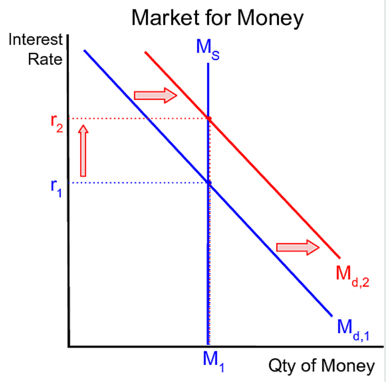
Equilibrium



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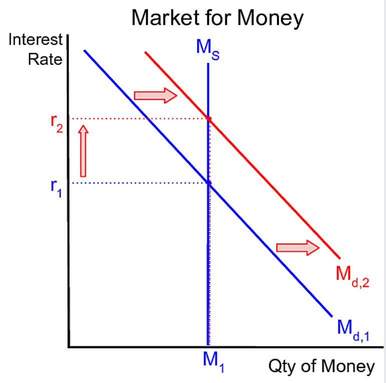

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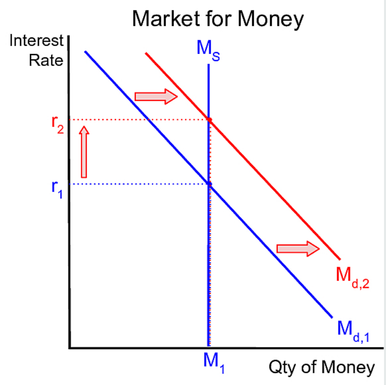

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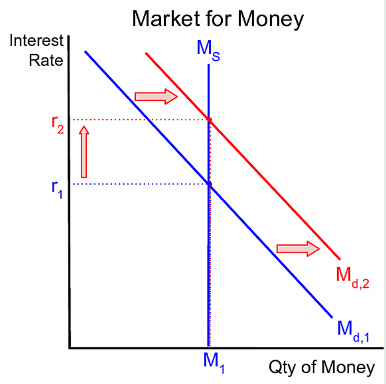
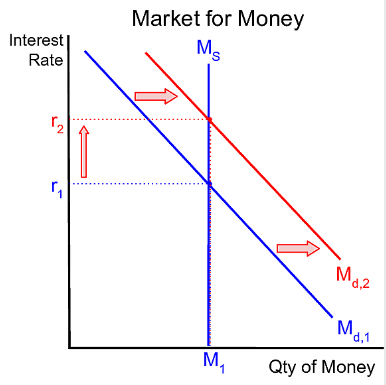


Increase in Expected Inflation

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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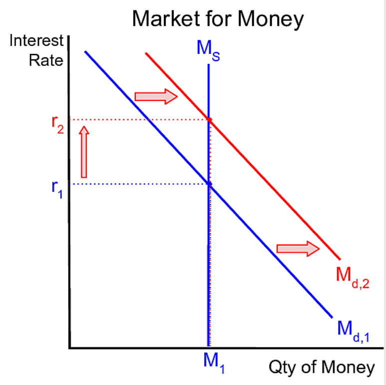

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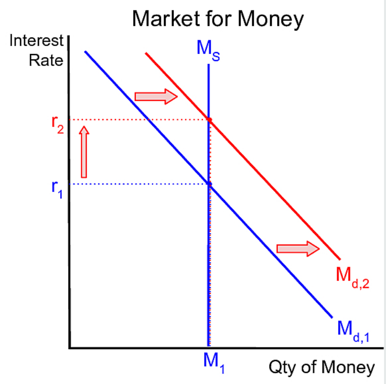

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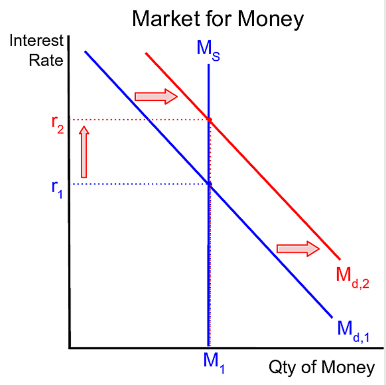

Increase in Income

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
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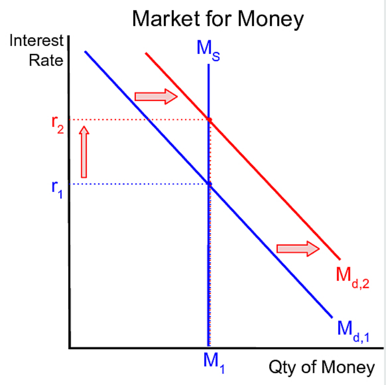
Equilibrium



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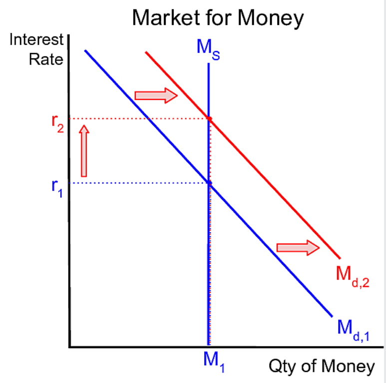

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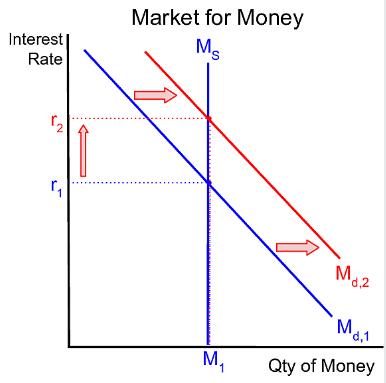

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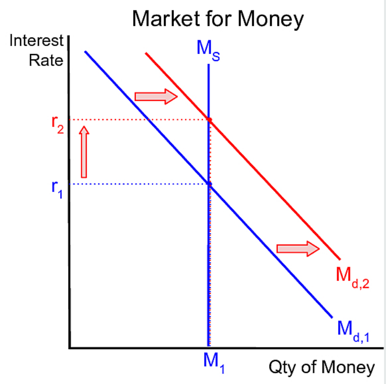
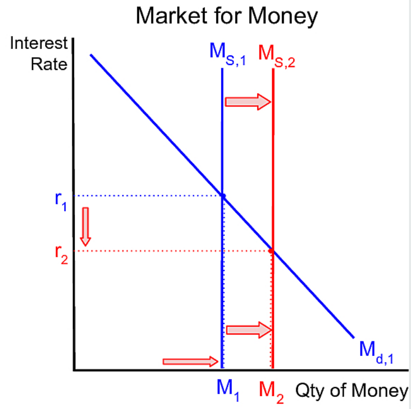


Open Market Purchase of Bonds

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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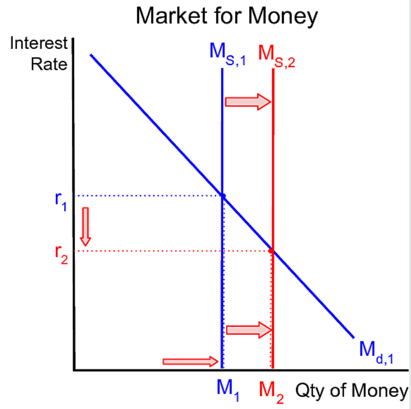

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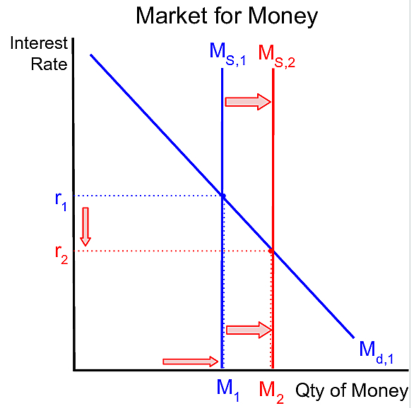

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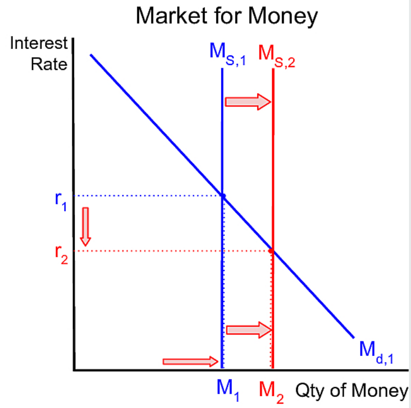

Open Market Sale of Bonds

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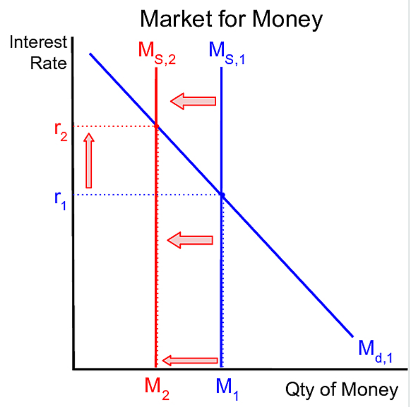
Equilibrium



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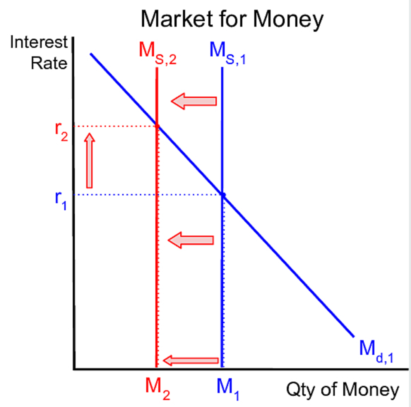

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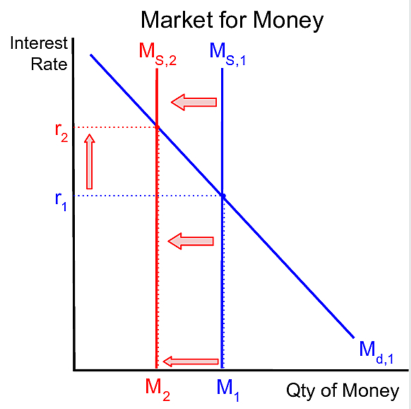

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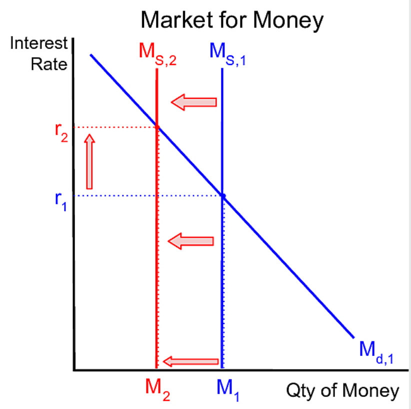

Reading and Exercises

- 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