Money and Banking

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Lecture 4 Behavior of Interest Rate

- The Demand of Assets
  - The Theory of Portfolio Choice
- Supply and Demand in the Bond Market
- Changes in Equilibrium Interest Rates
- Supply and Demand in the Market for Money
  - The liquidity preference framework
- Changes in Equilibrium Interest Rates in the Market for Money
- Does a Higher Money Growth Always Lower Interest Rates?

Determinants of Asset Demand

- **Wealth**: the total resources owned by the individual, including all assets
- **Expected Return**: the return expected over the next period on one asset relative to alternative assets
- **Risk**: the degree of uncertainty associated with the return on one asset relative to alternative assets
- **Liquidity**: the ease and speed with which an asset can be turned into cash relative to alternative assets

Theory of Portfolio Choice

Holding all other factors constant:

1. The quantity demanded of an asset is positively related to wealth (*income effect*)
2. The quantity demanded of an asset is **positively** related to its expected return relative to alternative assets (*substitution effect*)
3. The quantity demanded of an asset is **negatively** related to the risk of its returns relative to alternative assets (*risk preference*)
4. The quantity demanded of an asset is positively related to its liquidity relative to alternative assets (*liquidity preference*)

Theory of Portfolio Choice

Response of the Quantity of an Asset Demanded to Changes in Wealth, Expected Returns, Risk, and Liquidity

Variable	Change in Variable	Change in Quantity Demanded
Wealth	↑	↑
Expected return relative to other assets	↑	↑
Risk relative to other assets	↑	↓
Liquidity relative to other assets	↑	↑

Note: Only increases in the variables are shown. The effect of decreases in the variables on the change in quantity demanded would be the opposite of those indicated in the rightmost column.

Supply and Demand in the Bond Market

- According to the Theory of Portfolio Choice:
  - At lower prices (higher interest rates), *ceteris paribus*, the quantity demanded of bonds is higher: an inverse relationship
  - At lower prices (higher interest rates), *ceteris paribus*, the quantity supplied of bonds is lower: a positive relationship

- To give a more concrete illustration, consider a one year discount bond

$$i = R^e = \frac{F - P}{P}$$

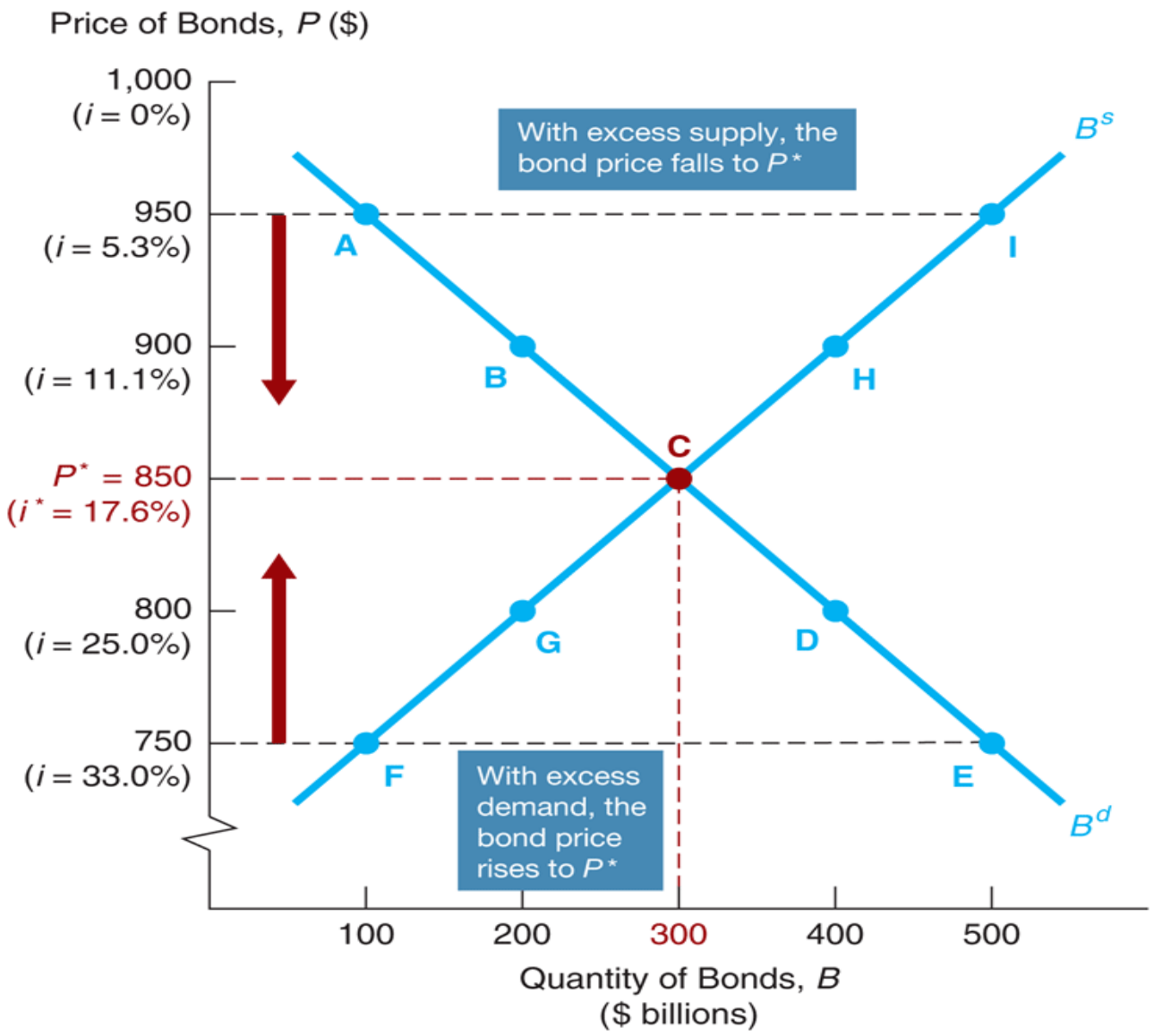
i: interest rate (yield to maturity)

R^e: expected return

F: face value of the discount bond

P: initial purchase price of the bond

Supply and Demand in the Bond Market

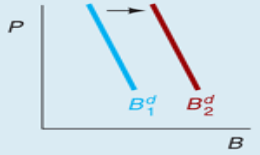
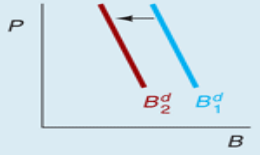
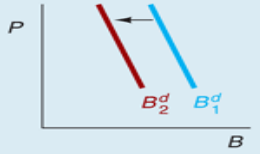
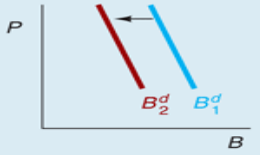
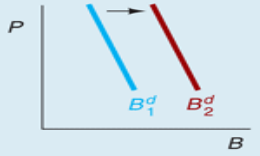


Shifts in the Demand for Bonds

- Wealth: in an expansion with growing wealth, the demand curve for bonds shifts to the right
- Expected Interest Rates: higher expected interest rates in the future lower the expected return for long-term bonds, shifting the demand curve to the left
- Expected Inflation: an increase in the expected rate of inflations lowers the expected return for bonds, causing the demand curve to shift to the left
- Risk: an increase in the riskiness of bonds causes the demand curve to shift to the left
- Liquidity: increased liquidity of bonds results in the demand curve shifting right

Shifts in the Demand for Bonds

Factors That Shift the Demand Curve for Bonds

Variable	Change in Variable	Change in Quantity Demanded at Each Bond Price	Shift in Demand Curve
Wealth	↑	↑	
Expected interest rate	↑	↓	
Expected inflation	↑	↓	
Riskiness of bonds relative to other assets	↑	↓	
Liquidity of bonds relative to other assets	↑	↑	

Note: Only increases in the variables are shown. The effect of decreases in the variables on the change in demand would be the opposite of those indicated in the remaining columns.

Shifts in the Supply for Bonds

- **Expected profitability of investment opportunities**: in an expansion, the supply curve shifts to the right
- **Expected inflation**: an increase in expected inflation shifts the supply curve for bonds to the right
- **Government budget**: increased budget deficits shift the supply curve to the right

Shifts in the Supply for Bonds

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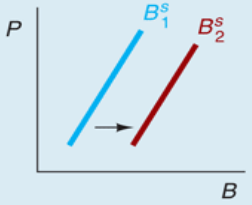
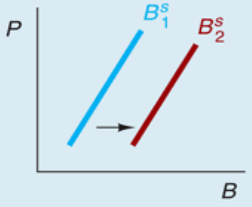
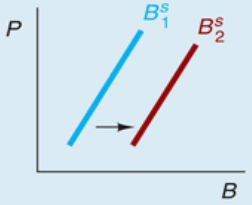
- **Government budget**: increased budget deficits shift the supply curve to the right

Shifts in the Supply for Bonds

Factors That Shift the Supply of Bonds

Variable	Change in Variable	Change in Quantity Supplied at Each Bond Price	Shift in Supply Curve
Profitability of investments	↑	↑	
Expected inflation	↑	↑	
Government deficit	↑	↑	

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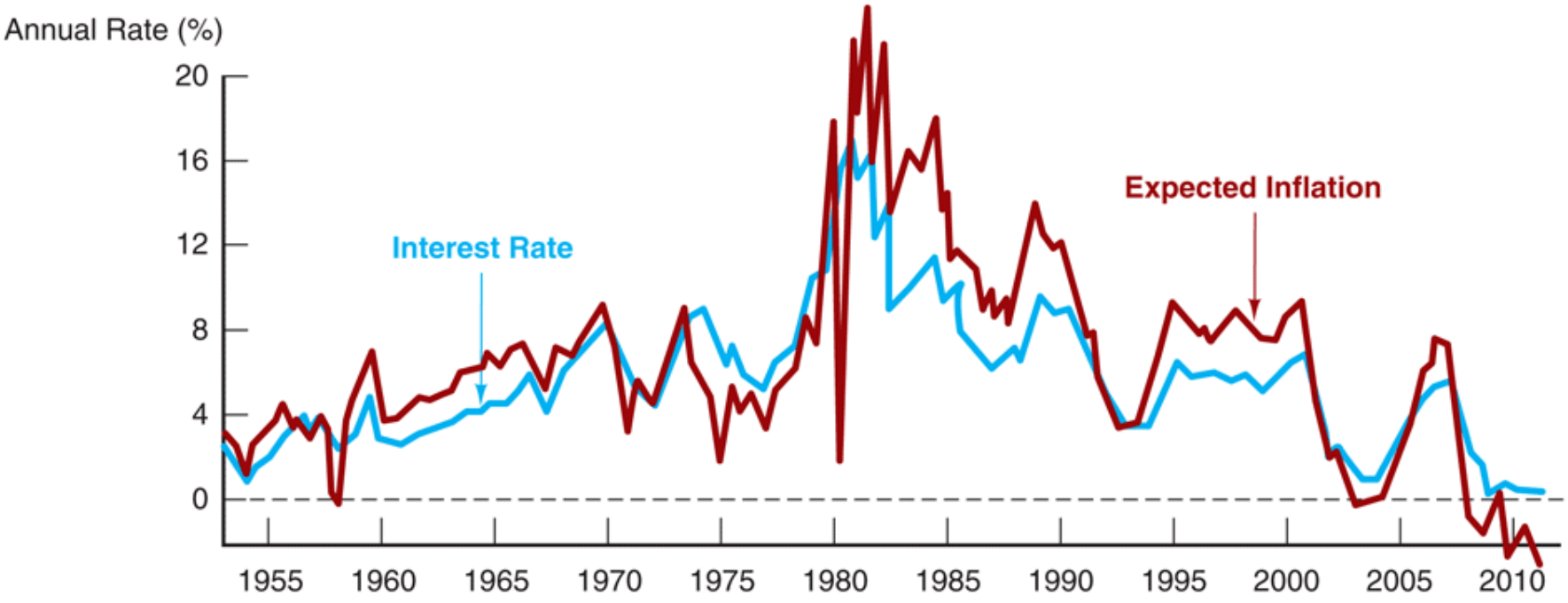
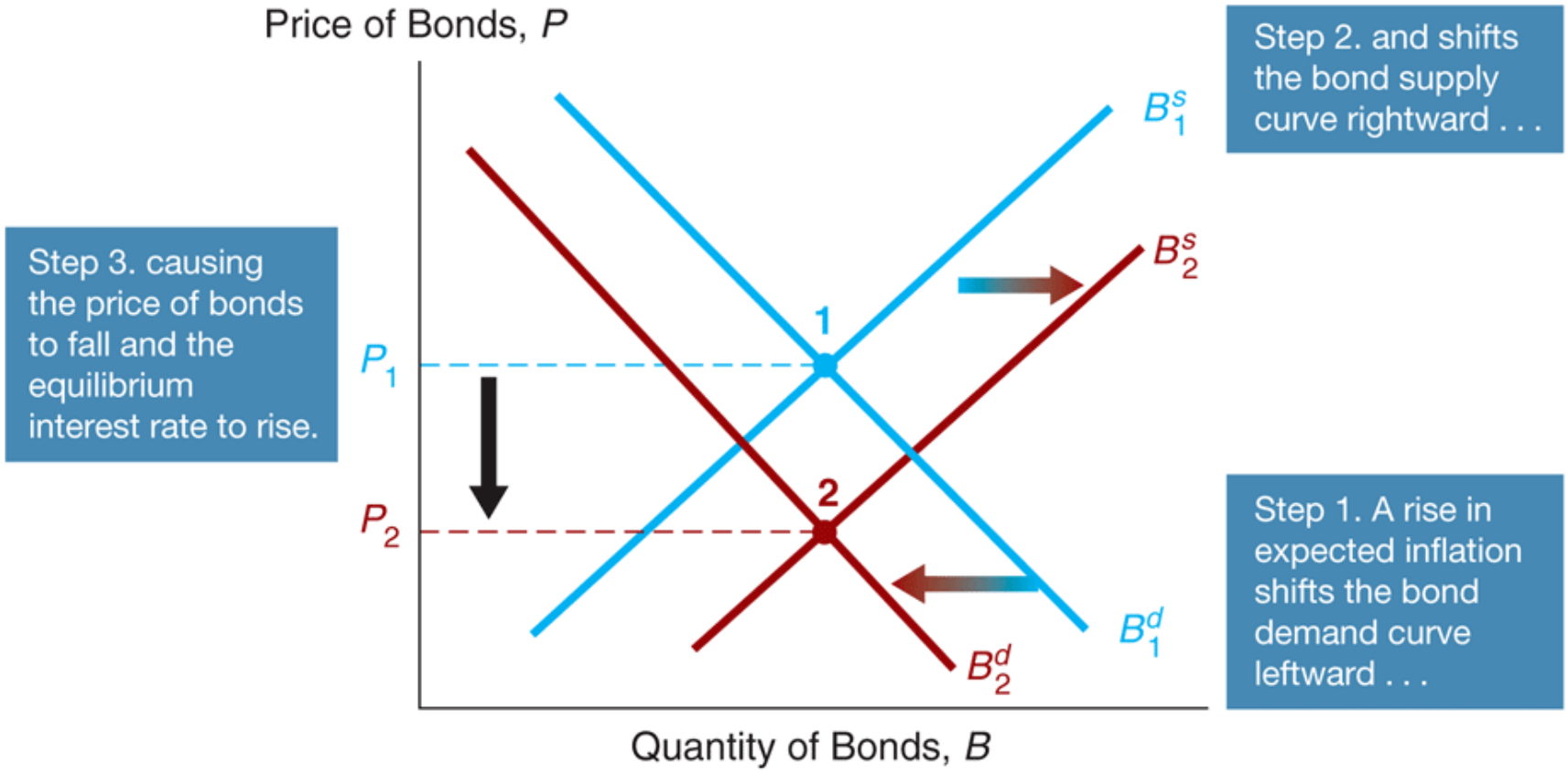
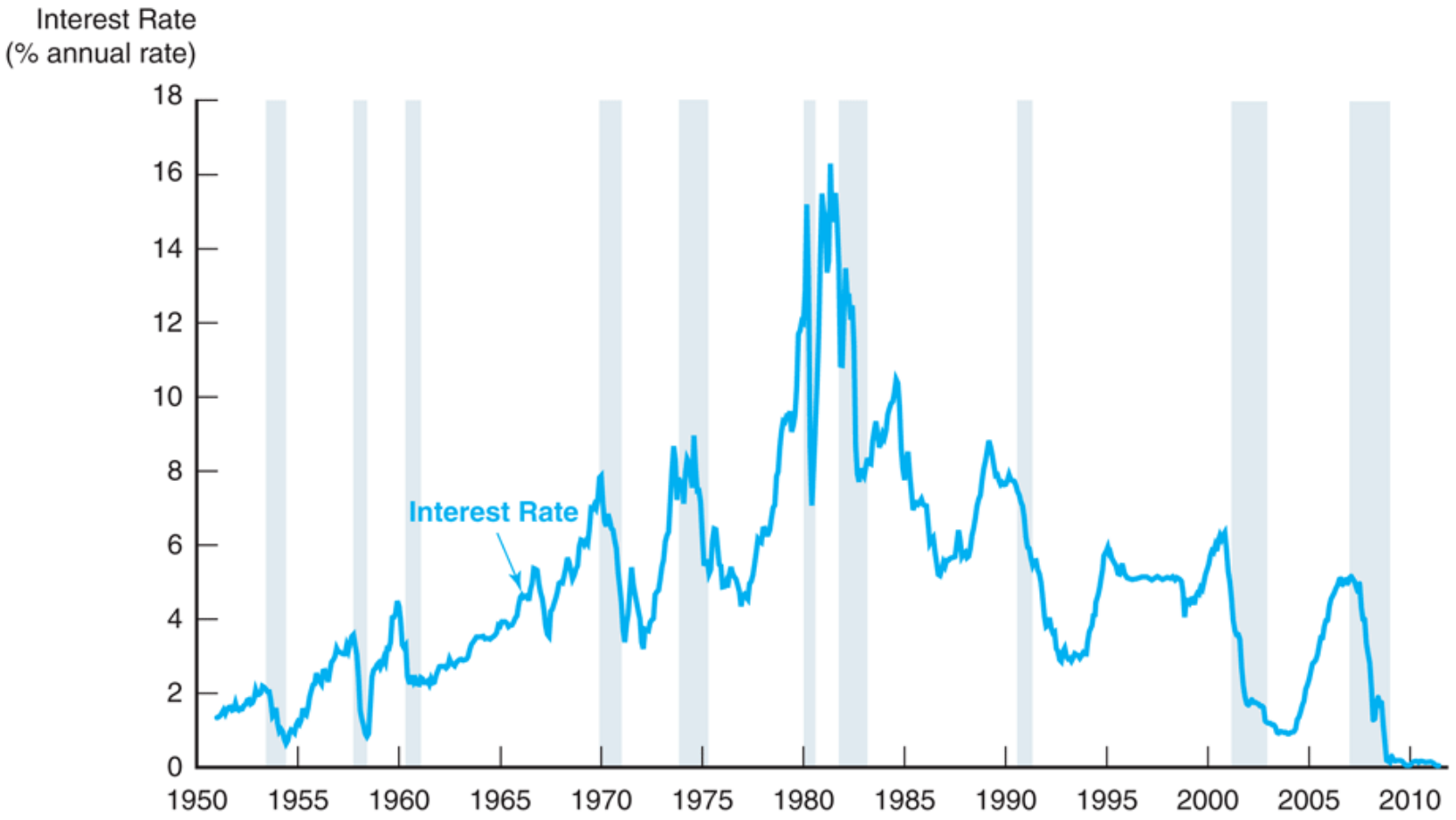
Expected Inflation and Interest Rate, Data



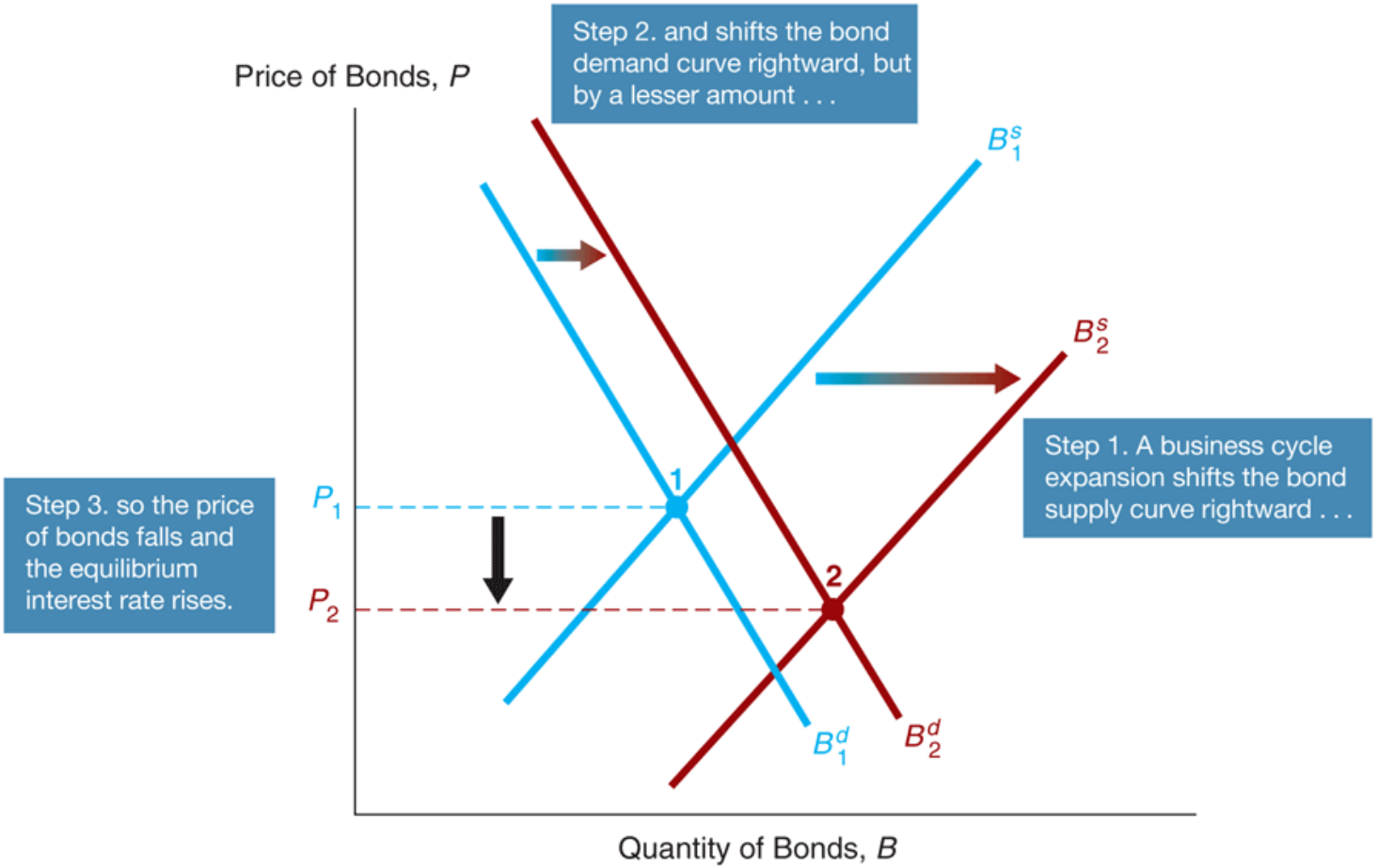
Expected Inflation and Interest Rate, Model



Business Expansion and Interest Rate, Data



Business Expansion and Interest Rate, Model



Supply and Demand in the Market for Money: The Liquidity Preference Framework

Keynesian model that determines the equilibrium interest rate in terms of the supply of and demand for money.

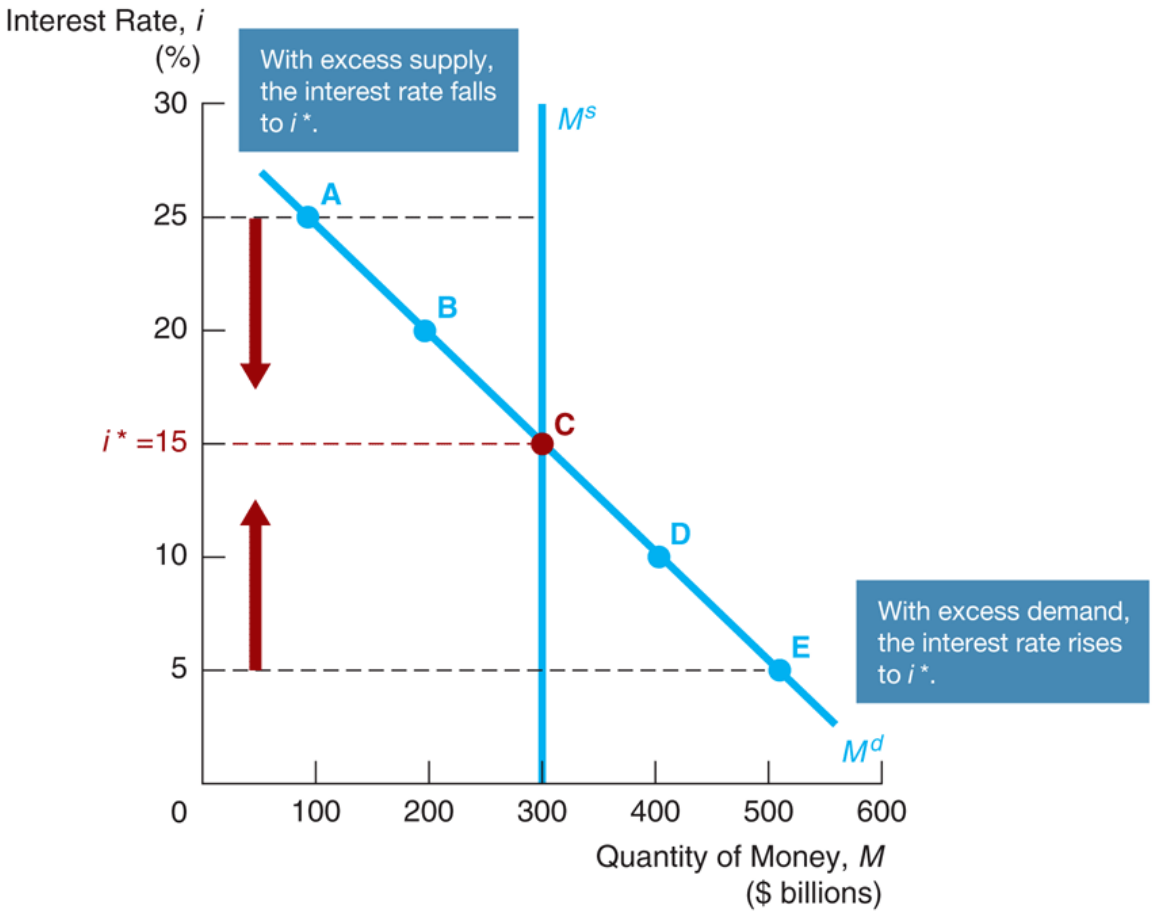
There are two main categories of assets that people use to store their wealth: money and bonds.

Total wealth in the economy = $B^s + M^s = B^d + M^d$

Rearranging: $B^s - B^d = M^s - M^d$

If the market for money is in equilibrium ($M^s = M^d$), then the bond market is also in equilibrium ($B^s = B^d$).

Supply and Demand in the Market for Money



As the interest rate increases:

- The opportunity cost of holding money increases
- The relative expected return of money decreases

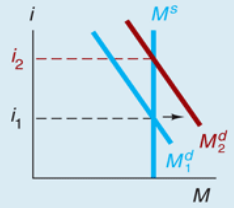
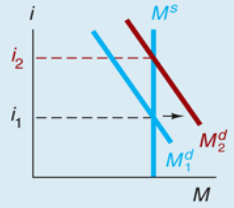
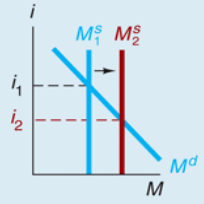
Therefore the demand curve for money is downward sloping.

Shifts of Supply and Demand in the Market for Money

- Shifts in the demand for money:
  - **Income Effect**: a higher level of income causes the demand for money at each interest rate to increase and the demand curve to shift to the right
  - **Price-Level Effect**: a rise in the price level causes the demand for money at each interest rate to increase and the demand curve to shift to the right
- Shifts in the supply of money:
  - An increase in the money supply engineered by the Federal Reserve will shift the supply curve for money to the right (**monetary expansion**)

Shifts of Supply and Demand in the Market for Money

Factors That Shift the Demand for and Supply of Money

Variable	Change in Variable	Change in Money Demand (M^d) or Supply (M^s) at Each Interest Rate	Change in Interest Rate	
Income	↑	M^d↑	↑	
Price level	↑	M^d↑	↑	
Money supply	↑	M^s↑	↓	

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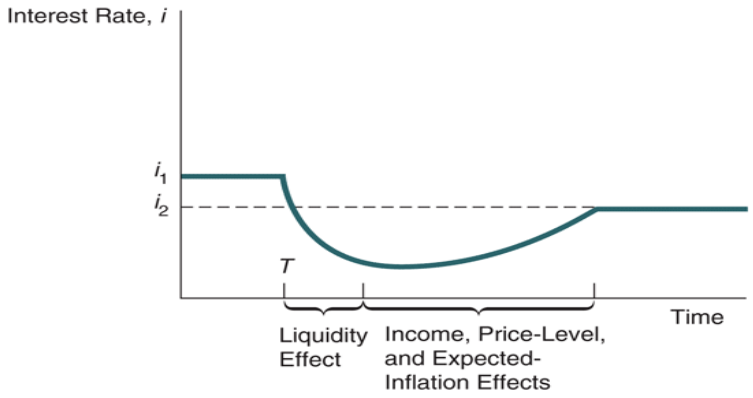
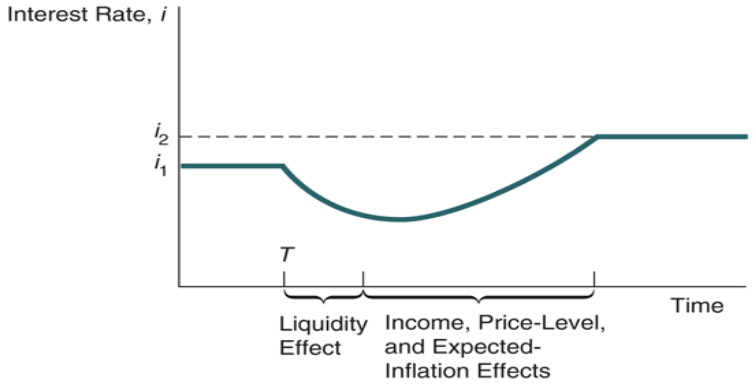
Money and Interest Rates

- **Liquidity effect**: increase in the money supply will lower interest rates:
- **Income Effect**: increasing money supply expands the economy , and raises national income and wealth, which raises the interest rates (*bond market* and *liquidity preference* framework)
- **Price Level Effect**: increasing money supply raises the over all price, which raises the interest rates (*liquidity preference* framework)
    - Price-level effect remains even after prices have stopped rising.

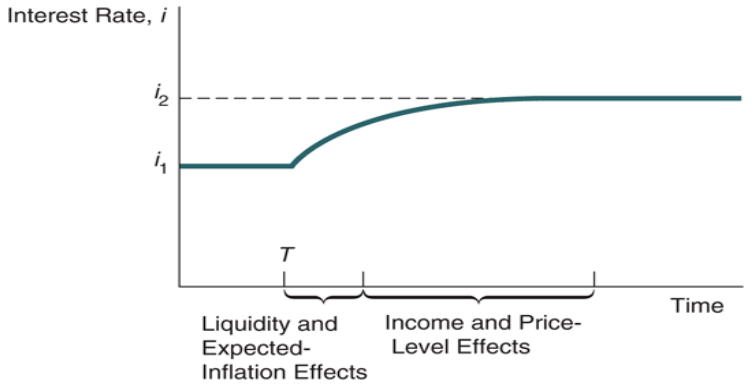
- **Expected Inflation Effect**: increasing money supply leads people to expect a higher price level in the future, which raises the interest *rates(bond market* framework)
    - Expected-inflation effect persists only as long as the price level continues to rise.



(a) Liquidity effect larger than other effects



(b) Liquidity effect smaller than other effects and slow adjustment of expected inflation



(c) Liquidity effect smaller than expected-inflation effect and fast adjustment of expected inflation