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Chapter 2

Determination of Interest Rates

Topics of discussion

- Loanable Funds theory
 - Demand for Loanable funds
 - Supply of loanable funds
 - Equilibrium interest rate
- Factors that Affect Interest Rate
- The Yield Curve
- The Factors Influencing the Yield of Debt Securities

All of chapter 2 of textbook 'Financial Markets & Institutions' (Madura - 13th Edition) is required for study

Interest Rate

An interest rate reflects the rate of return that a corporation or an individual receives when lending money, or the rate that a borrower (individual or corporation) pays when borrowing money.

Loanable Funds Theory

Loanable funds theory suggests that the market interest rate is determined by the factors that affect the supply of and demand for loanable funds

- Can be used to explain:
 - Movements in the general level of interest rates in a particular country
 - Why interest rates among debt securities of a given country vary

Loanable Funds Theory (cont.)



- Demand for Loanable Fund
 - Household Demand
 - Business Demand
 - Government Demand
 - Foreign Demand

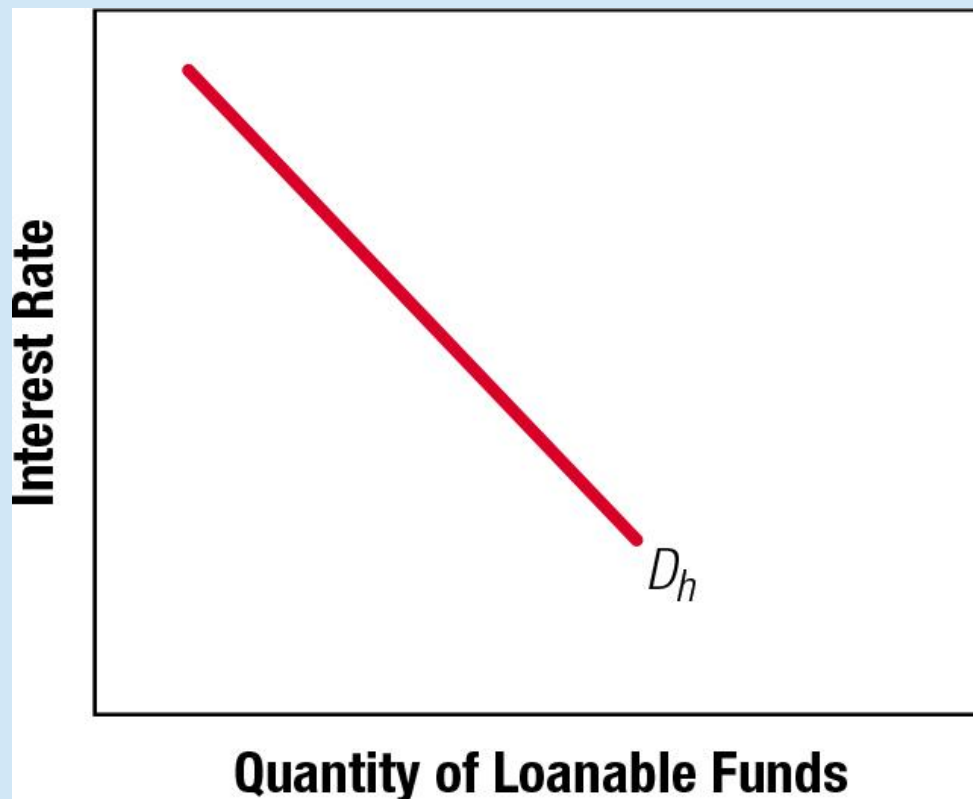
Loanable Funds Theory (cont.)



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- Household demand
 - Households demand loanable funds to finance
 - Housing expenditures
 - Automobiles
 - Household items
 - There is an inverse relationship between the interest rate and the quantity of loanable funds demanded

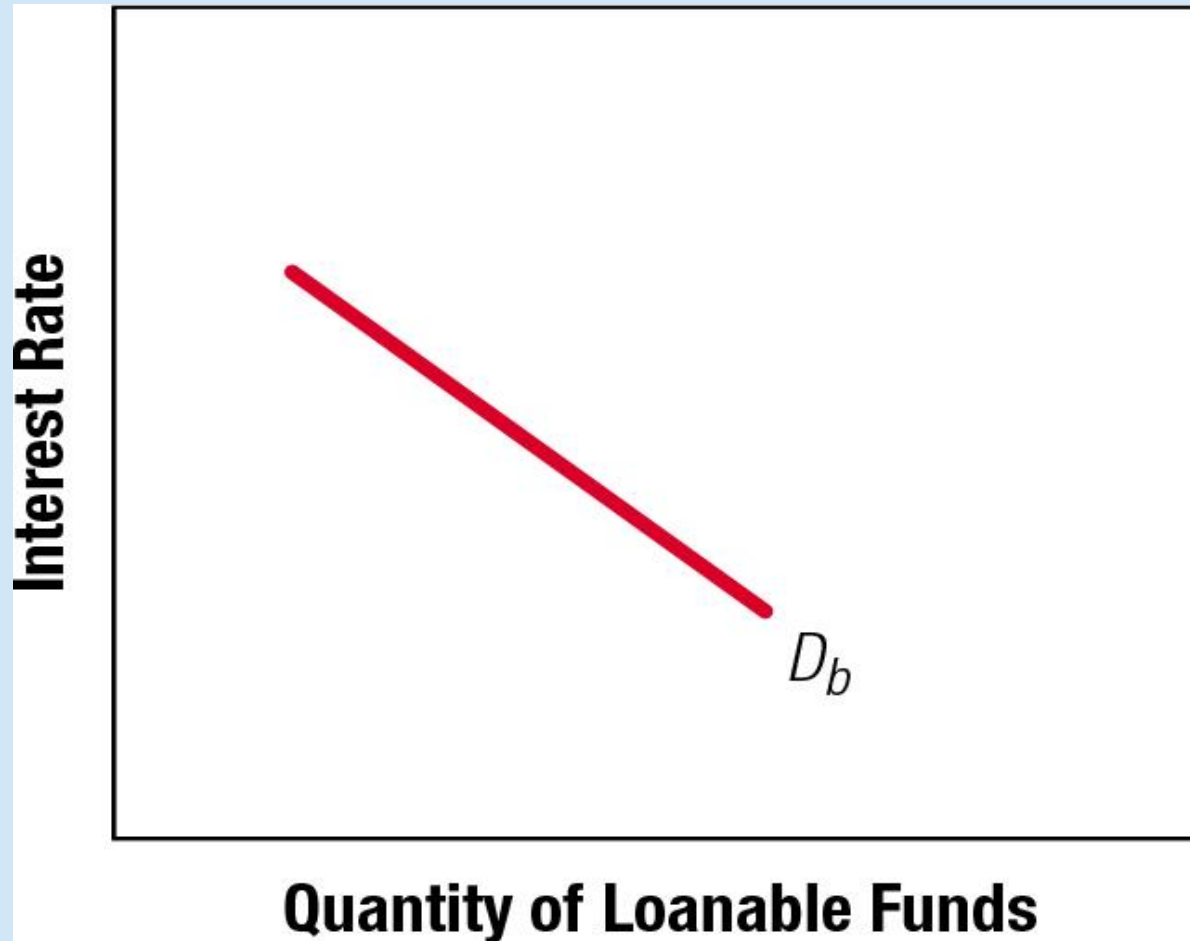
Loanable Funds Theory (cont.) Household demand



Loanable Funds Theory (cont.)

- **Business demand**
 - Businesses demand loanable funds to invest in fixed assets and short-term assets.
 - There is an inverse relationship between interest rates and business demand for loanable funds.

Loanable Funds Theory (cont.) Business demand



Loanable Funds Theory (cont.)

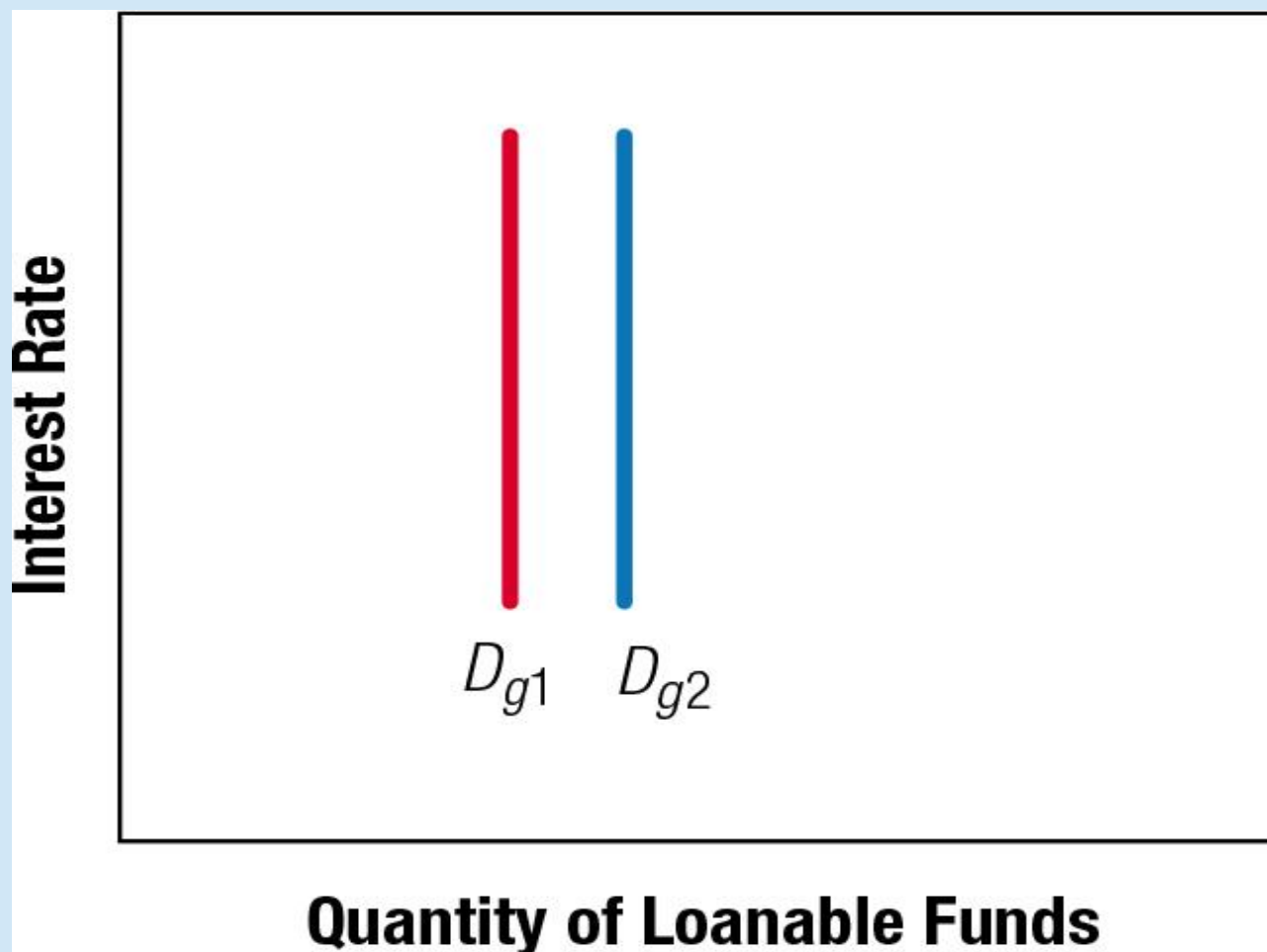


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- **Government demand**

- Governments demand funds when planned expenditures are not covered by incoming revenues
- Government demand for loanable funds is **interest-inelastic**

Exhibit 2.3 Impact of Increased Government Deficit on the Government Demand for Loanable Funds



Loanable Funds Theory (cont.)

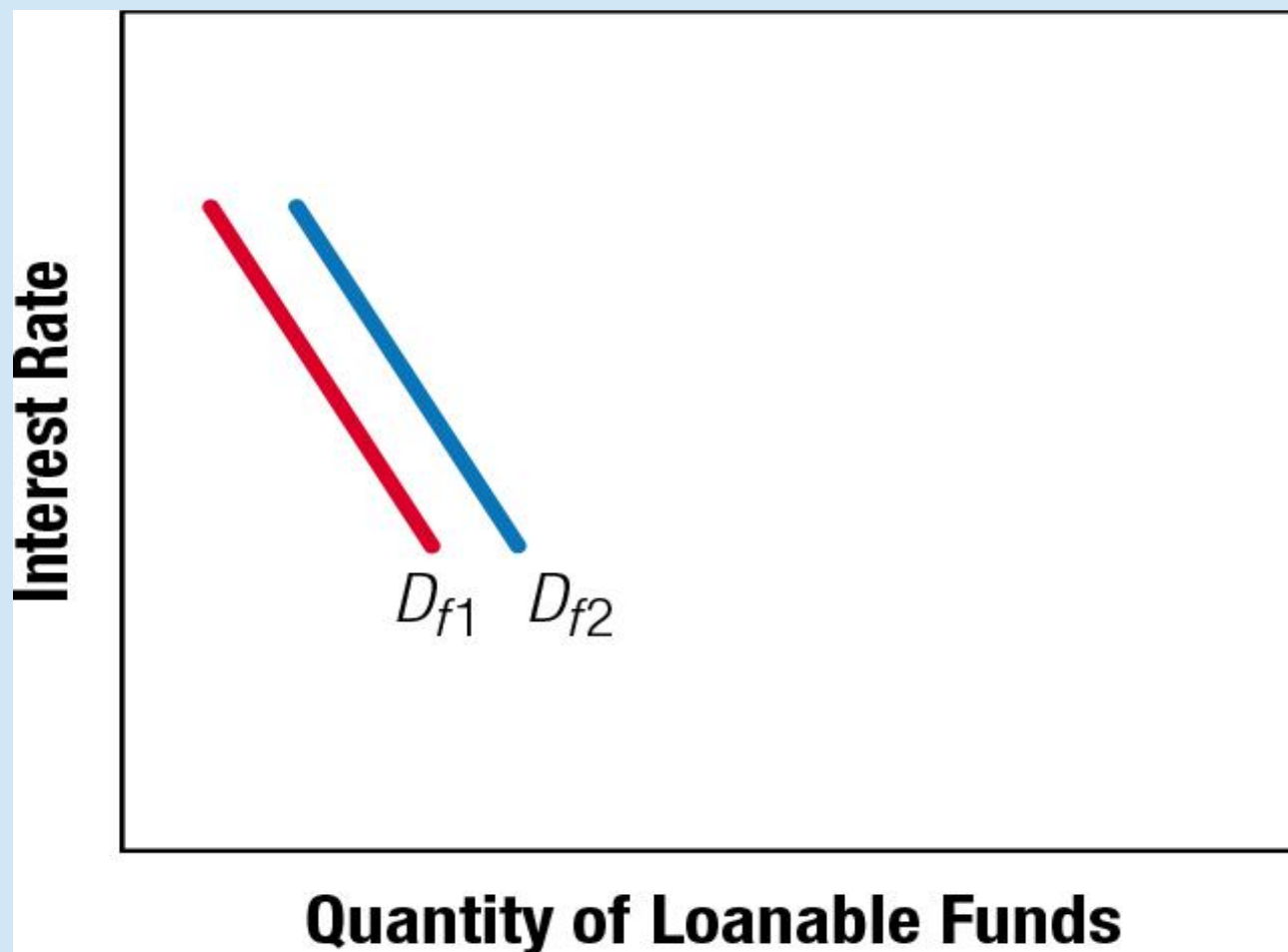


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- **Foreign Demand**

- Foreign demand for loanable funds is influenced by the interest rate differential between countries.
- The quantity of loanable funds demanded by foreign governments or firms is inversely related to local interest rates.
- The quantity of U.S. loanable funds demanded by foreign governments will be inversely related to U.S. interest rates. (Exhibit 2.4)

Exhibit 2.4 Impact of **Increased Foreign Interest Rates** on the **Foreign Demand** for U.S. Loanable Funds



Loanable Funds Theory (cont.)

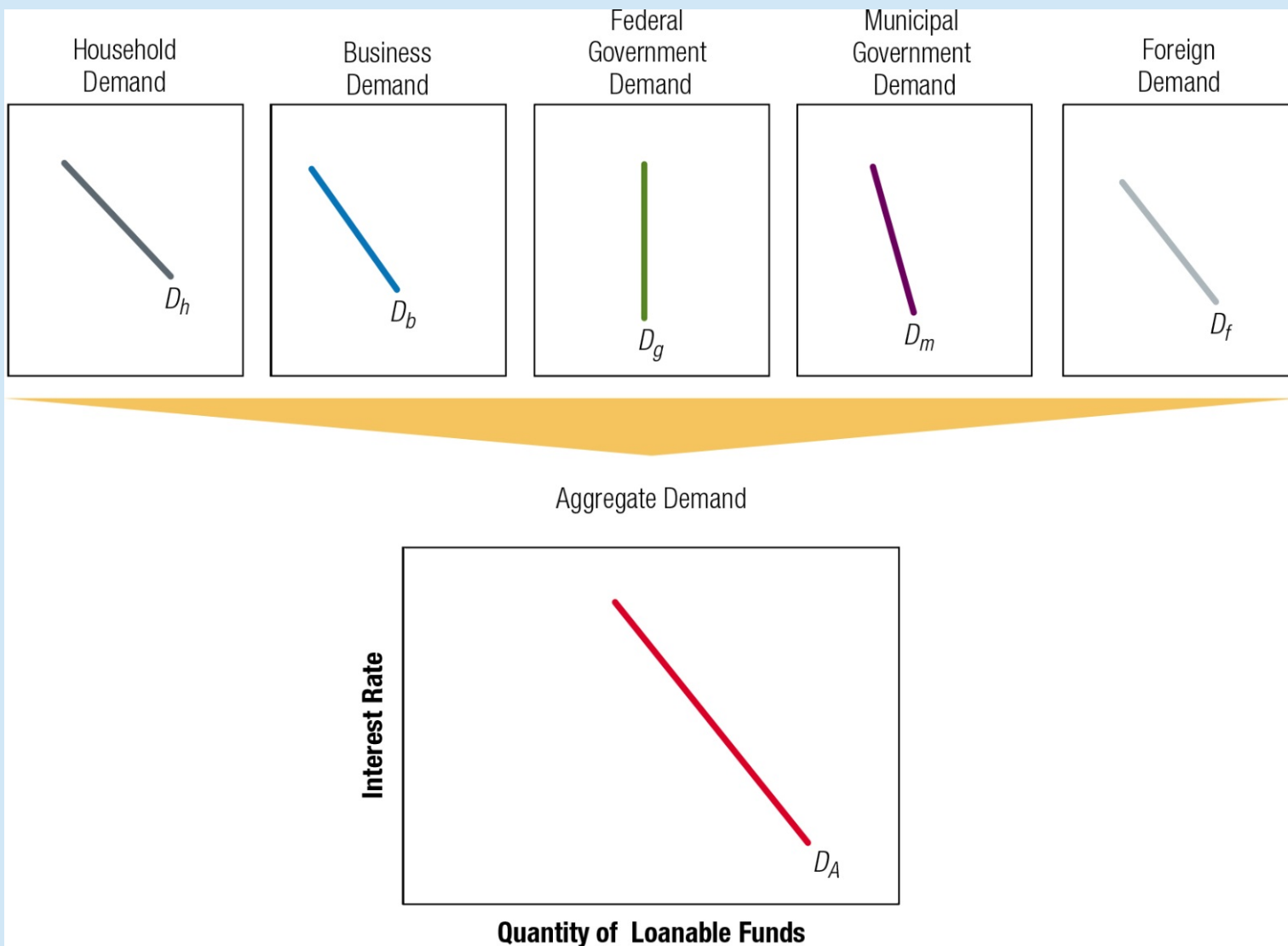


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- **Aggregate demand for loanable funds**
 - The sum of the quantities demanded by the separate sectors at any given interest rate is the aggregate demand for loanable funds

$$D_A = D_h + D_b + D_g + D_f$$

Exhibit 2.5 Determination of the Aggregate Demand Curve for Loanable Funds



Loanable Funds Theory (cont.)



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- Supply of loanable funds
 - Funds are provided to financial markets by
 - Households (net suppliers of funds)
 - Government units and businesses (net borrowers of funds)
 - Foreign countries
 - Suppliers of loanable funds supply more funds at higher interest rates
 - Supply by buying securities.
 - **Effects of the Fed** — By affecting the supply of loanable funds, the Fed's monetary policy affects interest rates.

Loanable Funds Theory (cont.)



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- **Aggregate supply for loanable funds**
 - The sum of the quantities supplied by the separate sectors at any given interest rate is the aggregate supply for loanable funds

$$S_A = S_h + S_b + S_g + S_f$$

Loanable Funds Theory (cont.)

Equilibrium interest rate



Aggregate Demand = Aggregate Supply

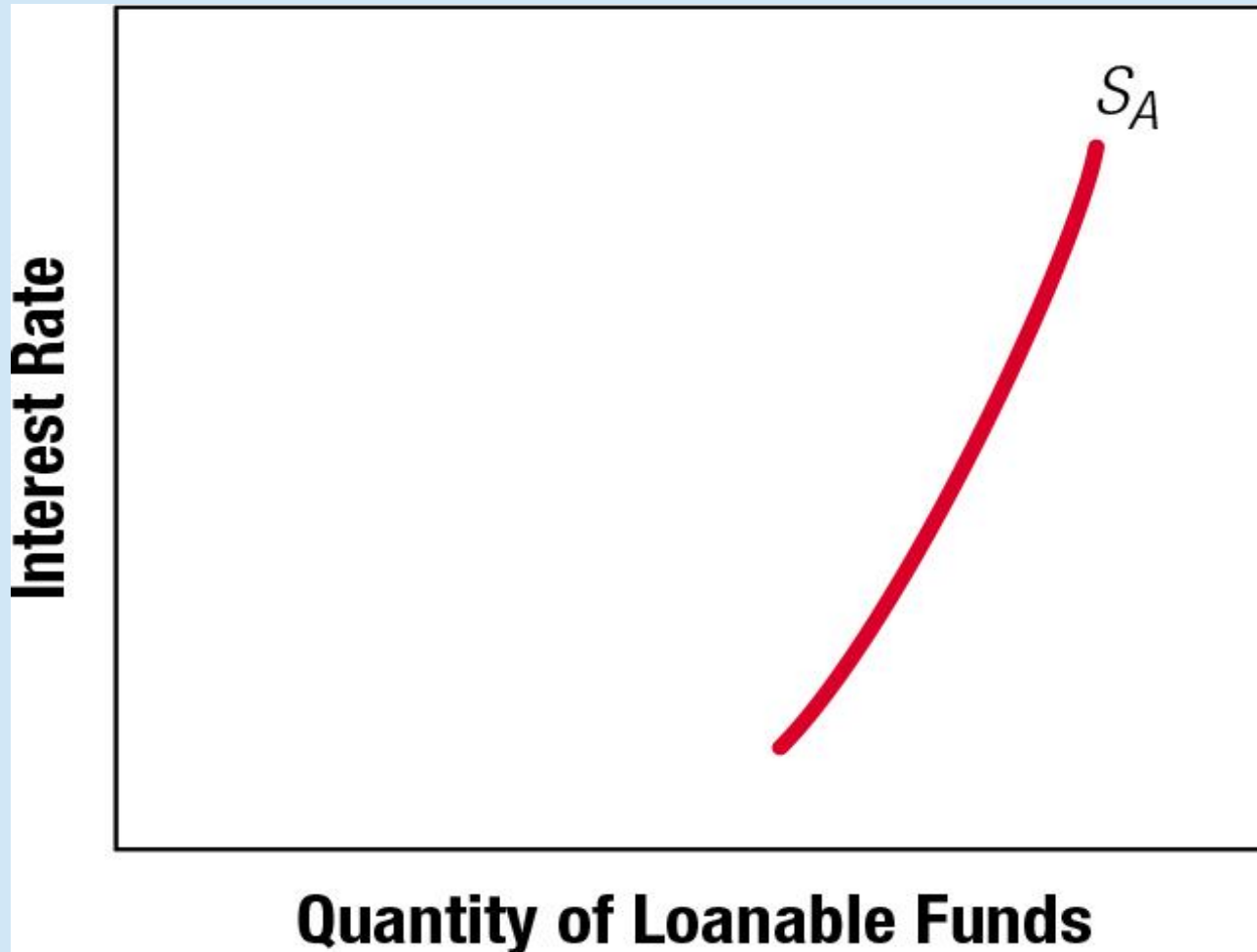
- The aggregate demand can be written as

$$D_A = D_h + D_b + D_g + D_f$$

- The aggregate supply can be written as

$$S_A = S_h + S_b + S_g + S_f$$

Exhibit 2.6 Aggregate Supply Curve for Loanable Funds

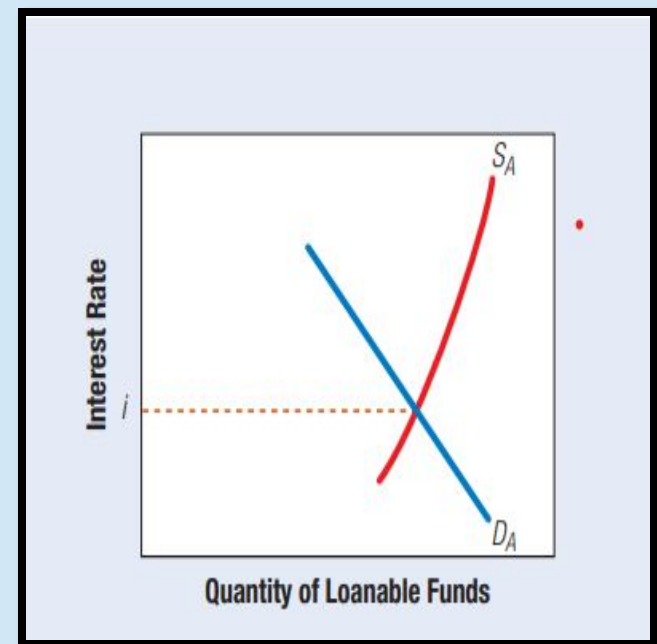


Equilibrium Interest Rate

By combining the aggregate demand and aggregate supply curves of loanable funds the equilibrium interest rate can be determined.

If the interest rate is above $i\%$ there is a surplus of loanable funds.

If the prevailing interest rate is below $i\%$, there will be a shortage of loanable funds.



Loanable Funds Theory

Equilibrium Interest Rate – Algebraic Presentation

Aggregate Demand for funds (D_A)

$$D_A = D_h + D_b + D_g + D_m + D_f$$

D_h = household demand for loanable funds

D_b = business demand for loanable funds

D_g = federal government demand for loanable funds

D_m = municipal government demand for loanable funds

D_f = foreign demand for loanable funds

- **Aggregate Supply of funds (SA)**

$$S_A = S_h + S_b + S_g + S_m + S_f$$

S_h = household supply for loanable funds

S_b = business supply for loanable funds

S_g = federal government supply for loanable funds

S_m = municipal government supply for loanable funds

S_f = foreign supply for loanable funds

Loanable Funds Theory

Equilibrium Interest Rate — Graphical Presentation

- Combining aggregate demand and aggregate supply curves (Exhibits 2.5 and 2.6) allows comparison of total amount demanded to total amount supplied
- At equilibrium interest rate i , the supply of loanable funds is equal to the demand for loanable funds. (Exhibit 2.7)
- At interest rate above i , there is a surplus of loanable funds.
- At interest rate below i , there is a shortage of loanable funds.

Factors that Affect Interest Rate



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- Economic Growth
- Inflation
- Monetary Policy
- Budget Deficit
- Foreign Flow of Funds

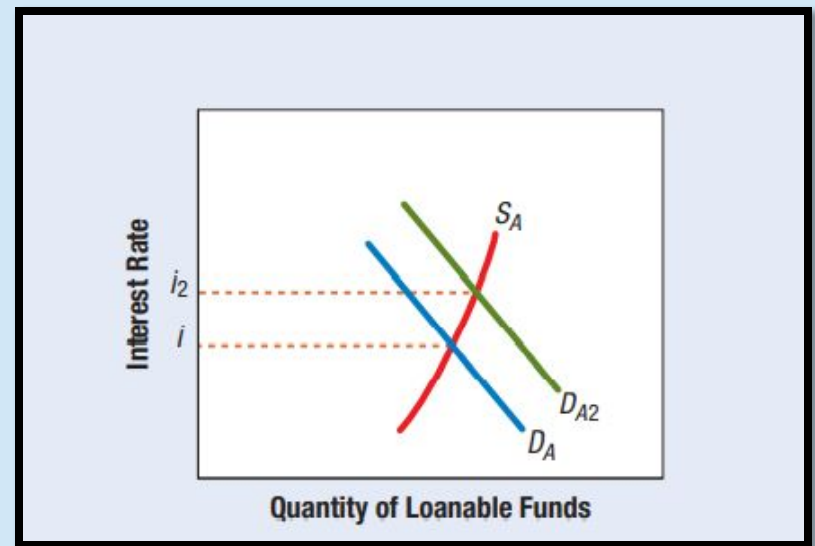
Factors that Affect Interest Rate (Cont.)



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Economic Growth

- Changes in economic conditions cause a shift in the demand curve for loanable funds, which affects the equilibrium interest rate.
- Economic growth puts upward pressure on interest rates, an economic slowdown puts downward pressure on the equilibrium interest rate.



Factors that Affect Interest Rate (Cont.)

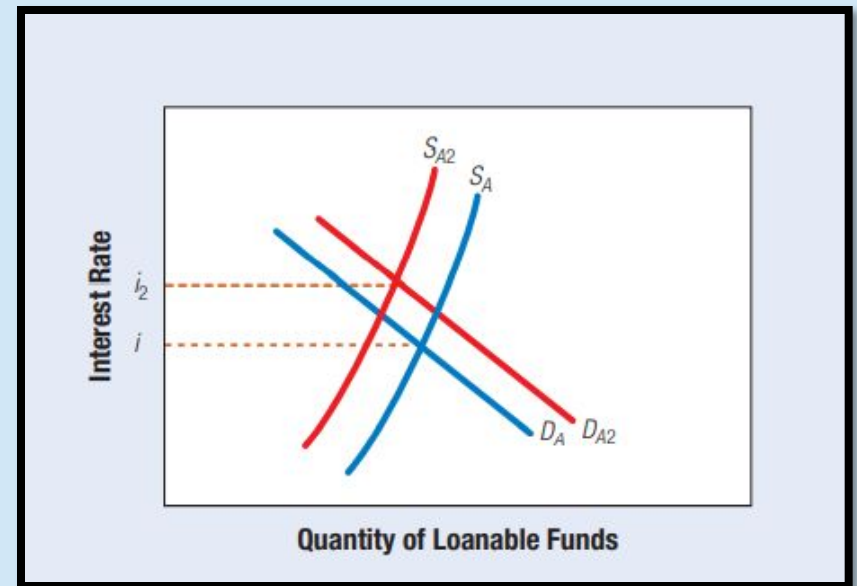


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Inflation

Changes in inflationary expectations can affect interest rates by affecting the amount of spending by households or businesses.

Decisions to spend affect the amount saved (supply of funds) and the amount borrowed (demand for funds).



Impact of inflation on interest rates:

- Puts upward pressure on interest rates by shifting supply of funds inward and demand for funds outward. (Exhibit 2.10)
- **Fisher effect:** $i = E(INF) + i_R$

where i = nominal or quoted rate of interest

$E(INF)$ = expected inflation rate

i_R = real interest rate

Factors that Affect Interest Rates

Impact of Monetary Policy on Interest Rates

When the Fed reduces (increases) the money supply, it reduces (increases) the supply of loanable funds, putting upward (downward) pressure on interest rates. (Exhibit 2.11)

Impact of the Budget Deficit on Interest Rates

Crowding-out Effect: Given a certain amount of loanable funds supplied to the market, excessive government demand for funds tends to “crowd out” the private demand for funds. (Exhibit 2.12)

Impact of Foreign Flows of Funds on Interest Rates

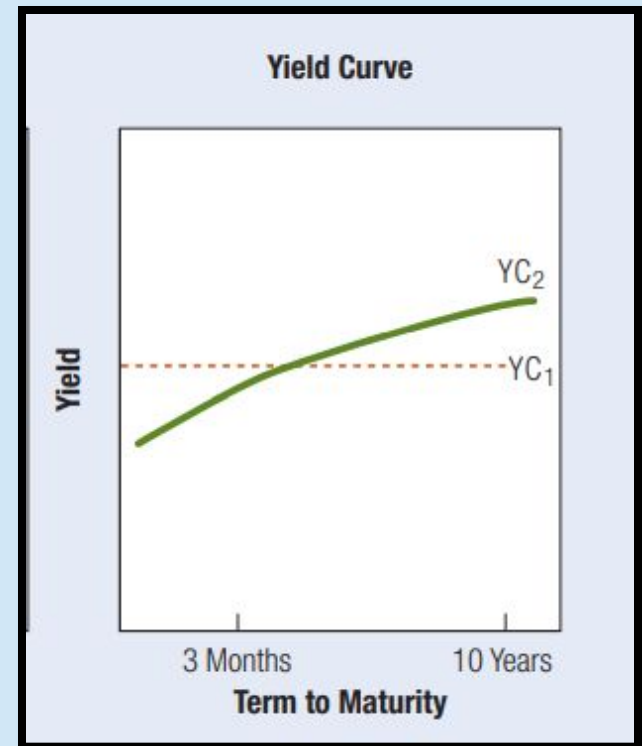
Interest rate for a certain currency is determined by the demand for funds in that currency and the supply of funds available in that currency. (Exhibit 2.13)

Factors that Affect Interest Rate (Cont.)

- Monetary Policy
- Budget Deficit
- Foreign Flow of Funds

Yield Curve

- The graphical representation of the relationship between bond's maturity and interest rates is called the yield curve.
- Yield curves are constructed based on treasury securities to eliminate business risk considerations.
- The yield of the corporate issue at any particular term to maturity would be higher to reflect the risk premium.
- Generally yield curve is positively sloped.



The Factors Influencing the Yield of Debt Securities

The yield on a debt security is based on the risk-free rate with adjustments to capture various characteristics:

$$Y_n = R_{f,n} + DP + LP + TA + CALLP + COND$$

Where,

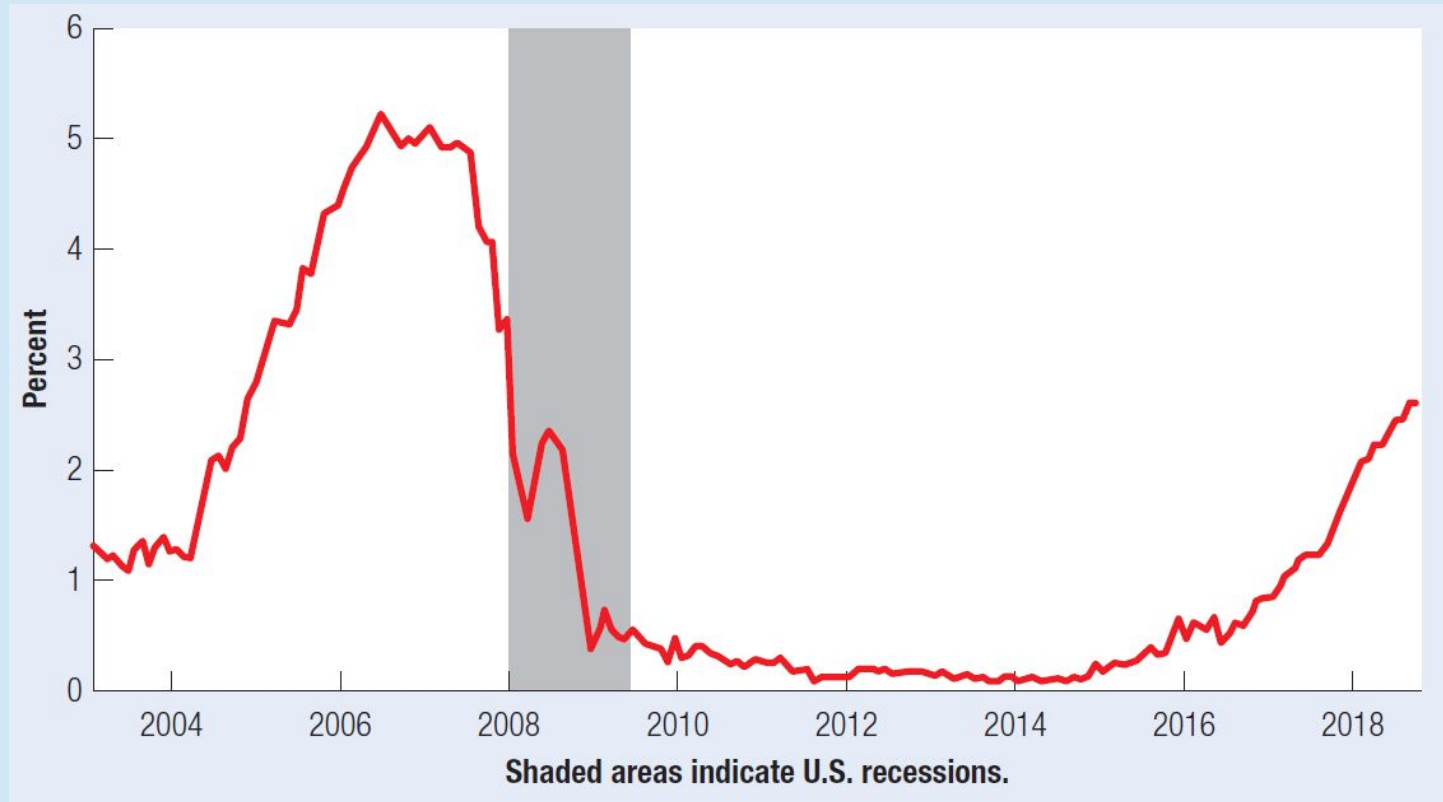
Beximco 10 Years (After 2 years I can call back my bond) Beacon
Pharma 10 Years

DP= Default Risk Premium LP= Liquidity Premium

TA= Tax Status CALLP = Call Provision

COND= Convertibility Feature

Exhibit 2.11 U.S. Interest Rates Over Time



Note: Rate shown is for Treasury bills with a one-year maturity. The shaded area represents a recession period.

Source: Board of Governors of the Federal Reserve.

Exhibit 2.12 Flow of Funds between the Federal Government and the Private Sector

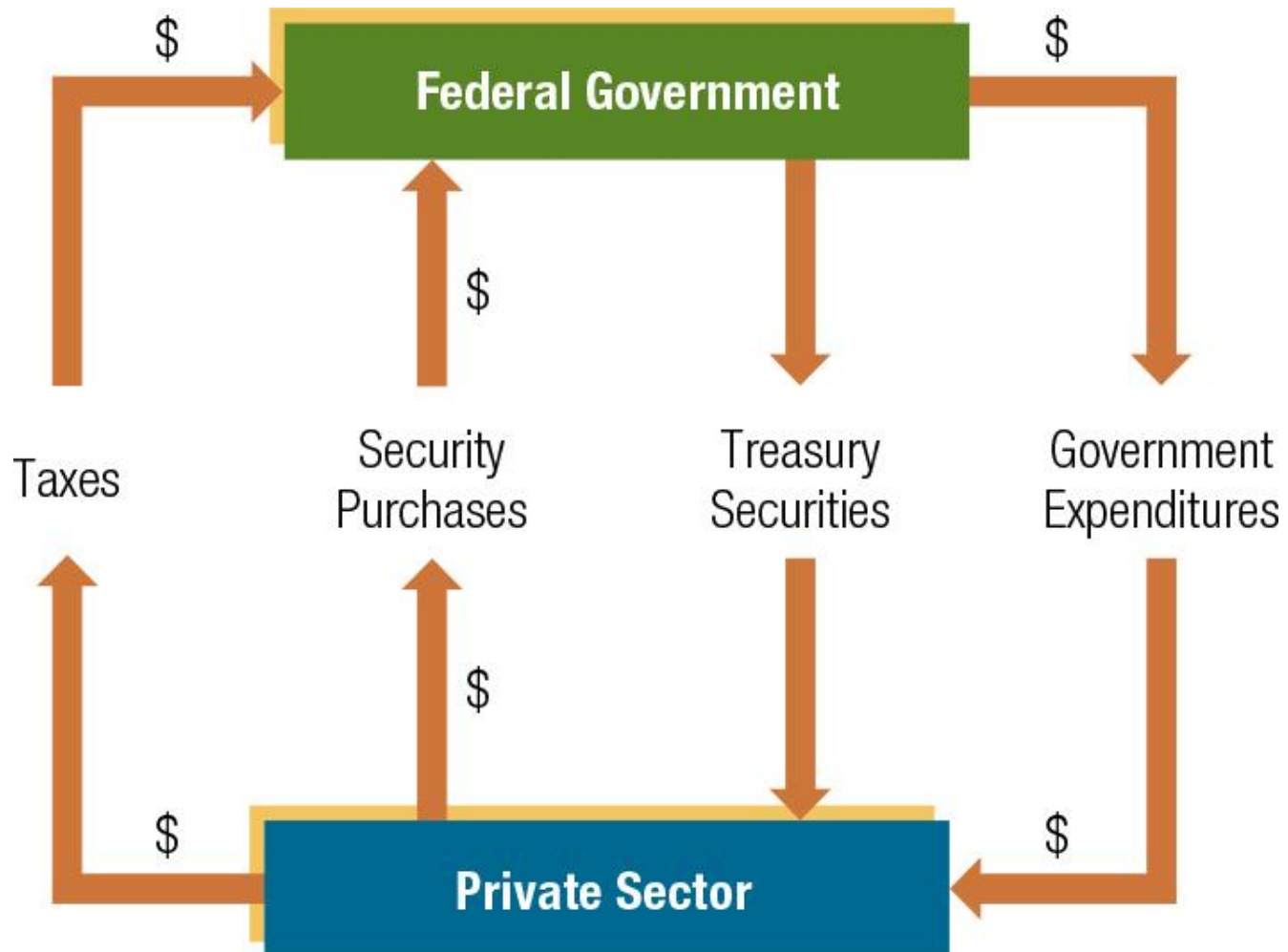
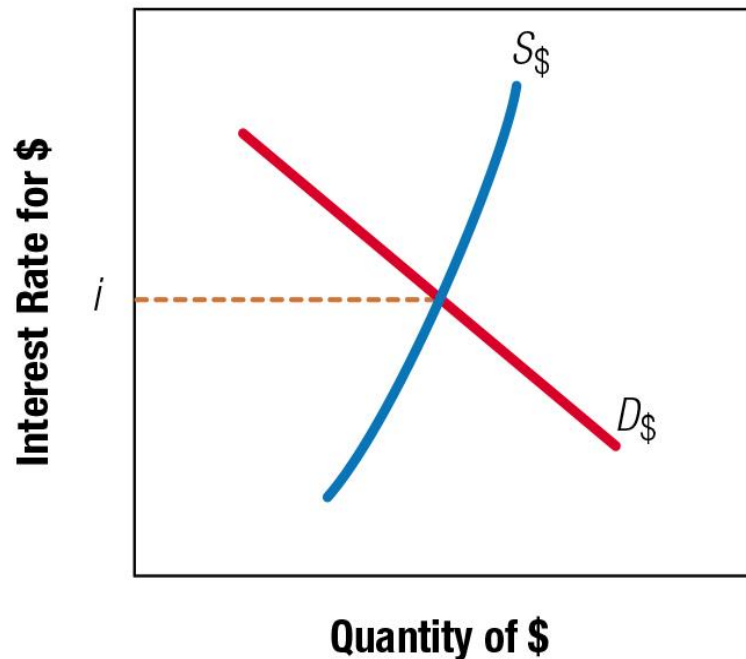
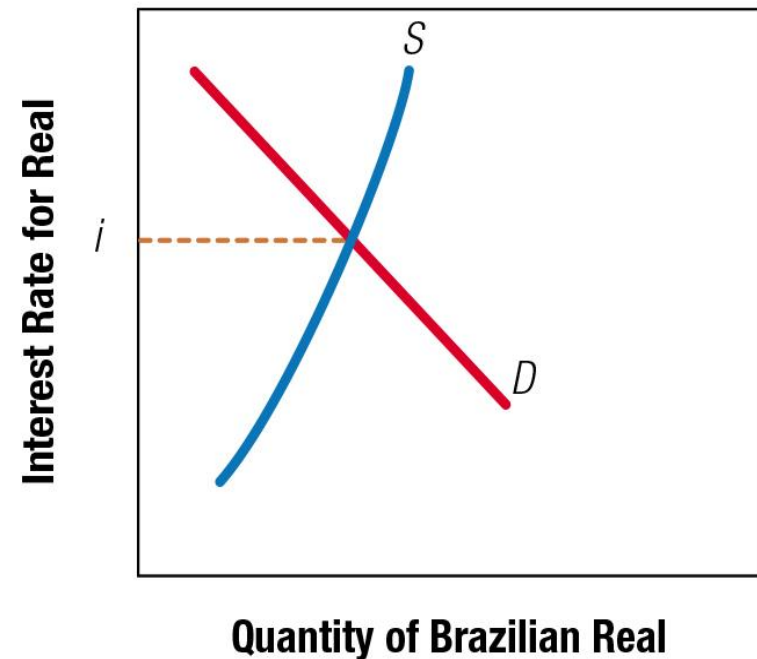


Exhibit 2.13 Demand and Supply Curves for Loanable Funds Denominated in U.S. Dollars and Brazilian Real

Demand and Supply of Funds Denominated in U.S. \$



Demand and Supply of Funds Denominated in Brazilian Real



Forecasting Interest Rates (Exhibit 2.14)

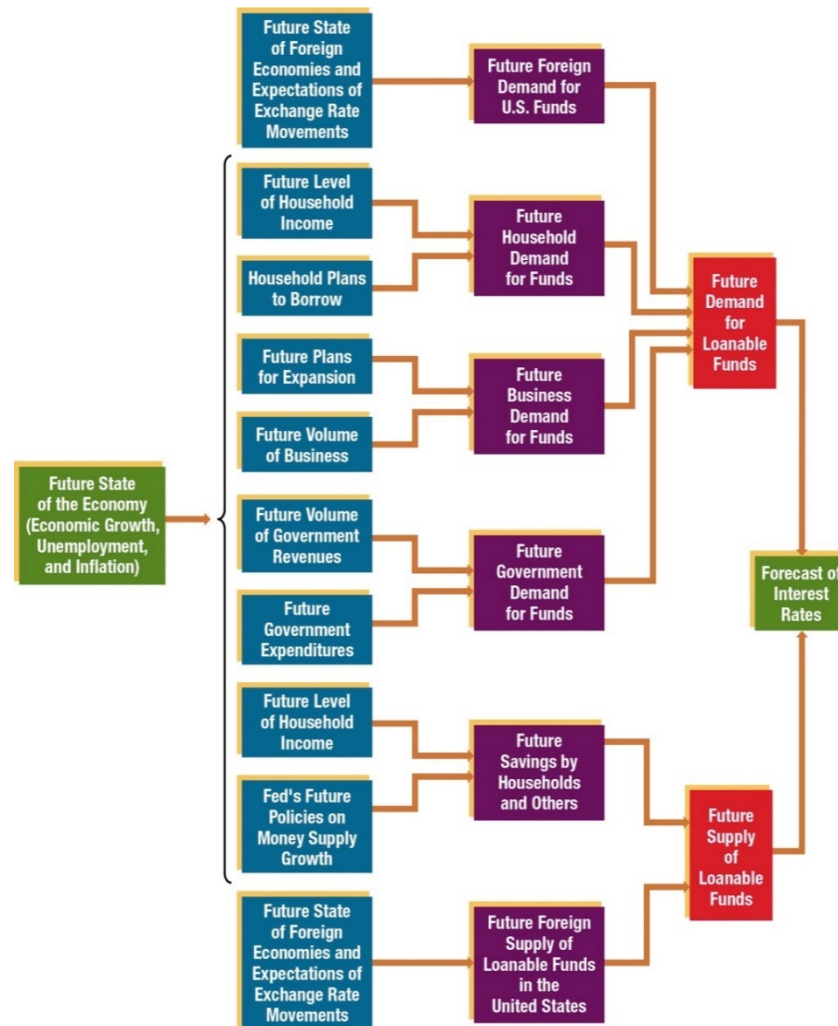
- Net Demand (ND) should be forecast:

$$ND = D_A - S_A$$

$$ND = (D_h + D_b + D_m + D_r) - (S_h + S_b + S_m + S_f)$$

- Future Demand for Loanable Funds depends on future:
 - Foreign demand for U.S. funds
 - Household demand for funds
 - Business demand for funds
 - Government demand for funds
- Future Supply of Loanable Funds depends on:
 - Future supply by households and others
 - Future foreign supply of loanable funds in the U.S.

Exhibit 2.14 Framework for Forecasting Interest Rates



SUMMARY (1 of 3)

- The loanable funds framework shows how the equilibrium interest rate depends on the aggregate supply of available funds and the aggregate demand for funds. As conditions cause the aggregate supply or demand schedules to change, interest rates gravitate toward a new equilibrium.

SUMMARY (2 of 3)

- Factors that affect interest rate movements include changes in economic growth, inflation, the budget deficit, foreign interest rates, and the money supply. These factors can have a strong impact on the aggregate supply of funds and/or the aggregate demand for funds, thereby affecting the equilibrium interest rate. In particular, economic growth has a strong influence on the demand for loanable funds, and changes in the money supply have a strong impact on the supply of loanable funds.

SUMMARY (3 of 3)

- Given that the equilibrium interest rate is determined by supply and demand conditions, changes in the interest rate can be forecasted by forecasting changes in the supply of and the demand for loanable funds. Thus, the factors that influence the supply of funds and the demand for funds must be forecast in order to forecast interest rates.



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Thank You