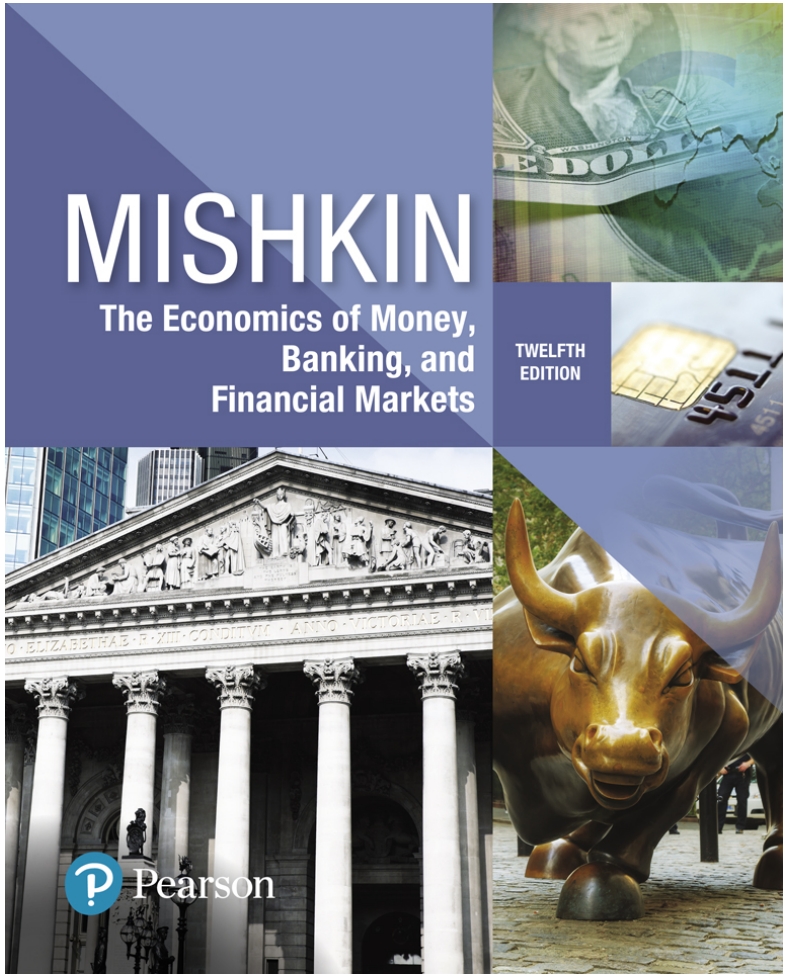
The Economics of Money, Banking, and Financial Markets

Twelfth Edition



Chapter 5

The Behavior of Interest Rates

Preview

- In this chapter, we examine how the overall level of nominal interest rates is determined and which factors influence their behavior.

Learning Objectives (1 of 2)

- Identify the factors that affect the demand for assets.
- Draw the demand and supply curves for the bond market and identify the equilibrium interest rate.
- List and describe the factors that affect the equilibrium interest rate in the bond market.

Learning Objectives (2 of 2)

- Describe the connection between the bond market and the money market through the liquidity preference framework.
- List and describe the factors that affect the money market and the equilibrium interest rate.
- Identify and illustrate the effects on the interest rate of changes in money growth over time.

Determinants of Asset Demand (1 of 2)

- Economic agents hold a variety of different assets. What are the primary assets you hold?
- An **asset** is anything that can be owned and has value.

Determinants of Asset Demand (2 of 2)

- **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 (1 of 2)

Holding all other factors constant:

1. The quantity demanded of an asset is positively related to wealth
2. The quantity demanded of an asset is positively related to its expected return relative to alternative assets
3. The quantity demanded of an asset is negatively related to the risk of its returns relative to alternative assets
4. The quantity demanded of an asset is positively related to its liquidity relative to alternative assets

Theory of Portfolio Choice (2 of 2)

Summary Table 1

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

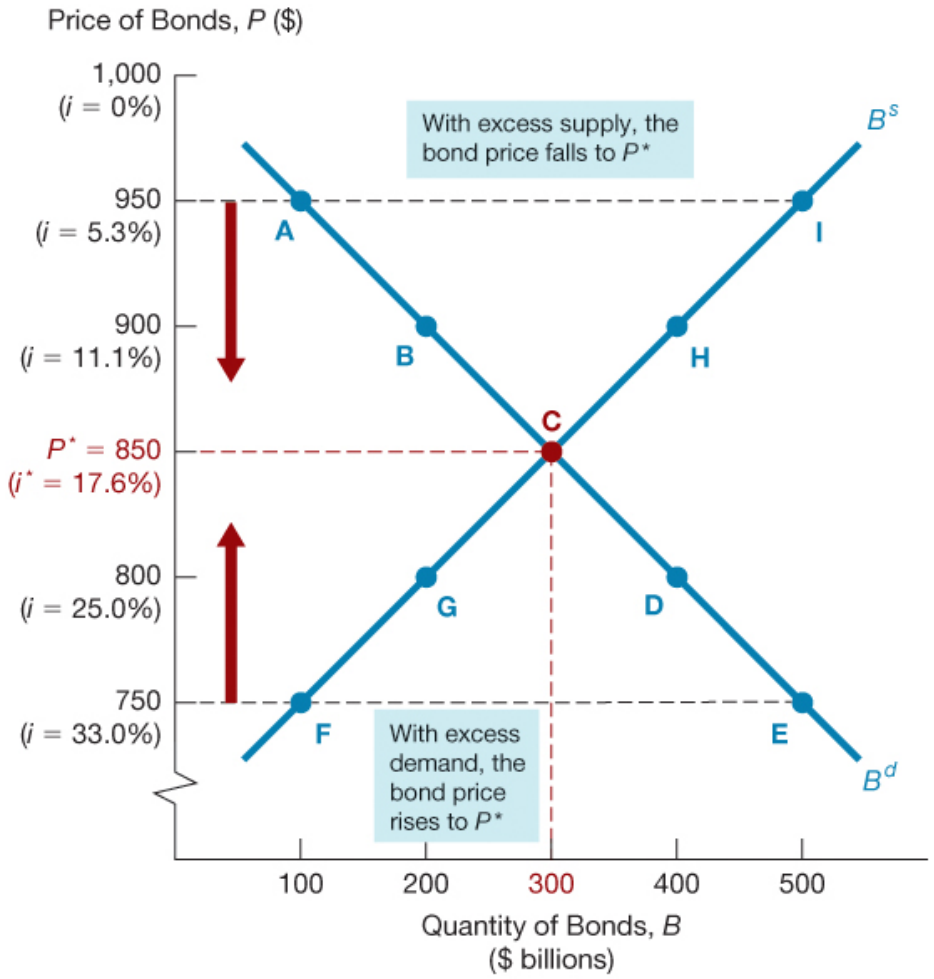
Variable	Change in Variable	Change in Quantity Demanded
Wealth	↑	↑
Expected return relative to other assets	↑	↑
Risk relative to other assets	↑	↓
Liquidity relative to other assets	↑	↑

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

Supply and Demand in the Bond Market

- 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

Figure 1 Supply and Demand for Bonds



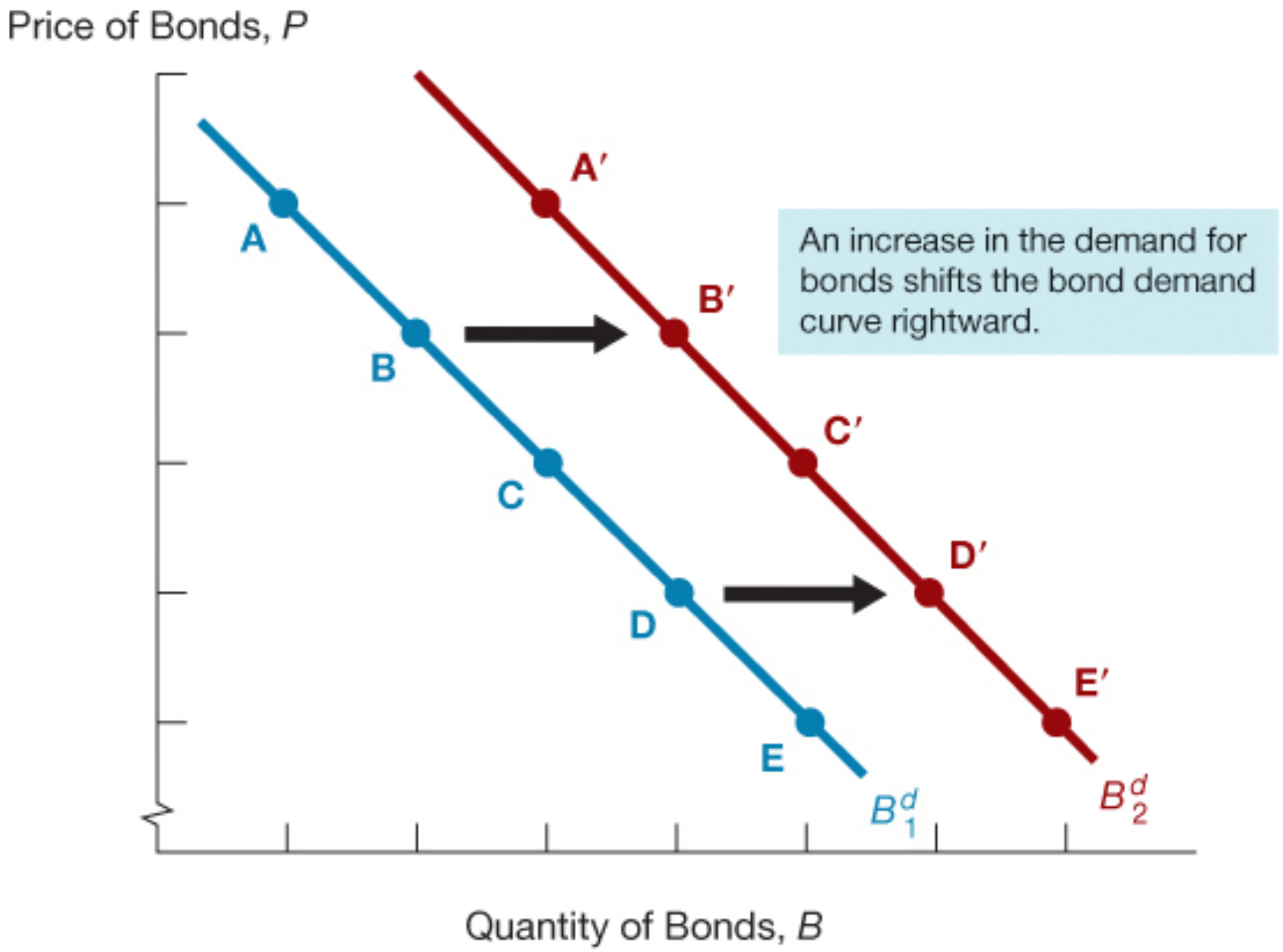
Market Equilibrium

- Occurs when the amount that people are willing to buy (demand) equals the amount that people are willing to sell (supply) at a given price.
- $B^d = B^s$ defines the equilibrium (or market clearing) price and interest rate.
- When $B^d > B^s$, there is excess demand, price will rise and interest rate will fall.
- When $B^d < B^s$, there is excess supply, price will fall and interest rate will rise.

Changes in Equilibrium Interest Rates

- Shifts in the demand for bonds:
  - Wealth: in an expansion with growing wealth, the demand curve for bonds shifts to the right
  - Expected Returns: 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

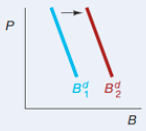
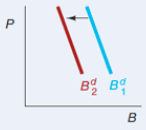
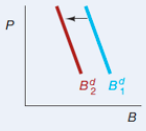
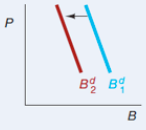
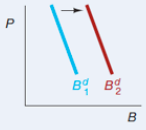
Figure 2 Shift in the Demand Curve for Bonds



Shifts in the Demand for Bonds

Summary Table 2

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 effects of decreases in the variables on demand would be the opposite of those indicated in the remaining columns.

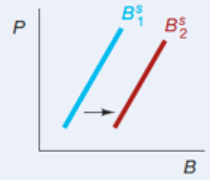
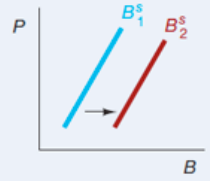
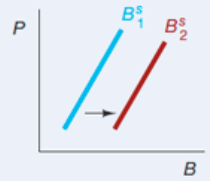
Shifts in the Supply of Bonds (1 of 2)

- 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 of Bonds (2 of 2)

Summary Table 3

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	↑	↑	

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

Figure 3 Shift in the Supply Curve for Bonds

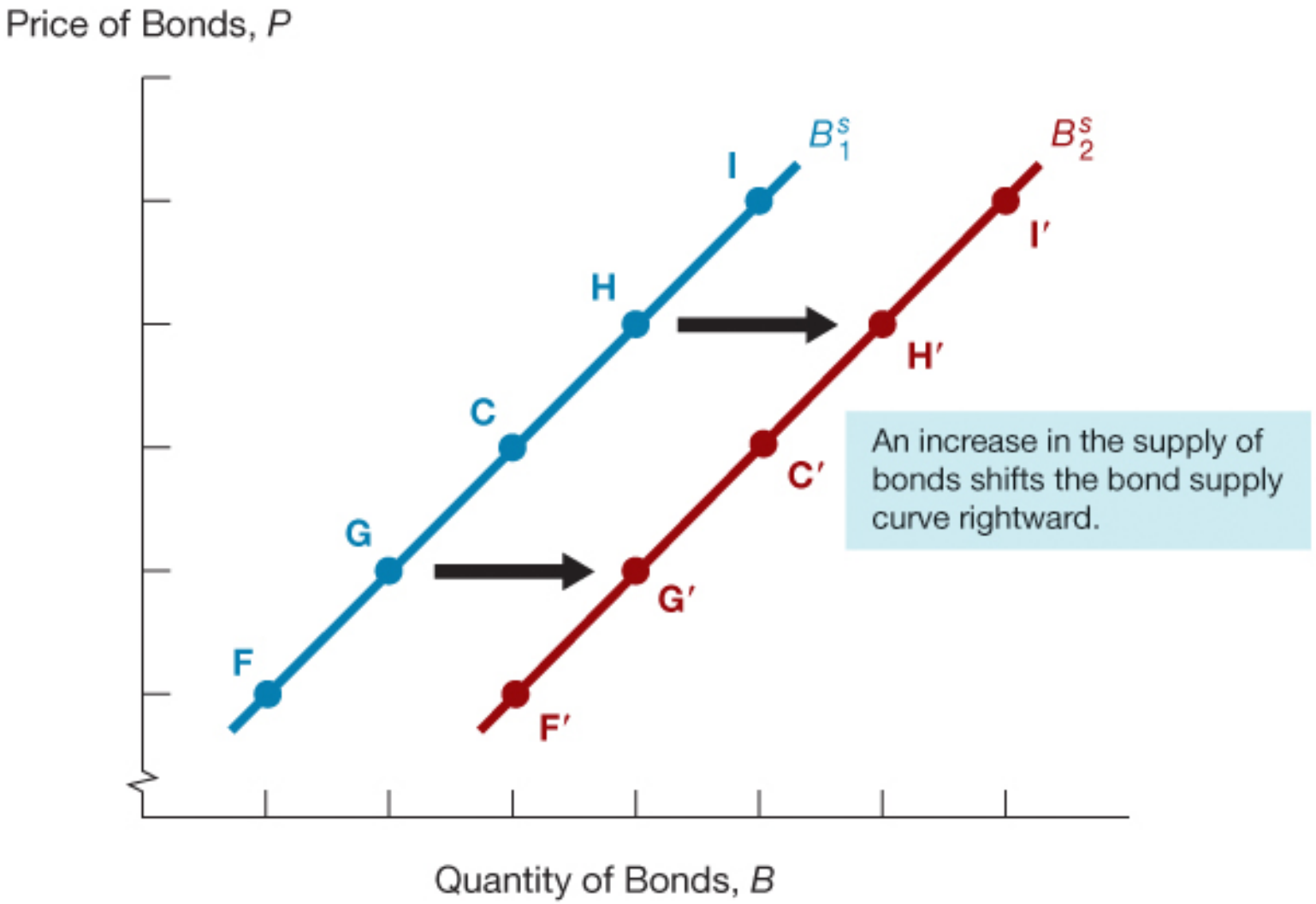


Figure 4 Response to a Change in Expected Inflation

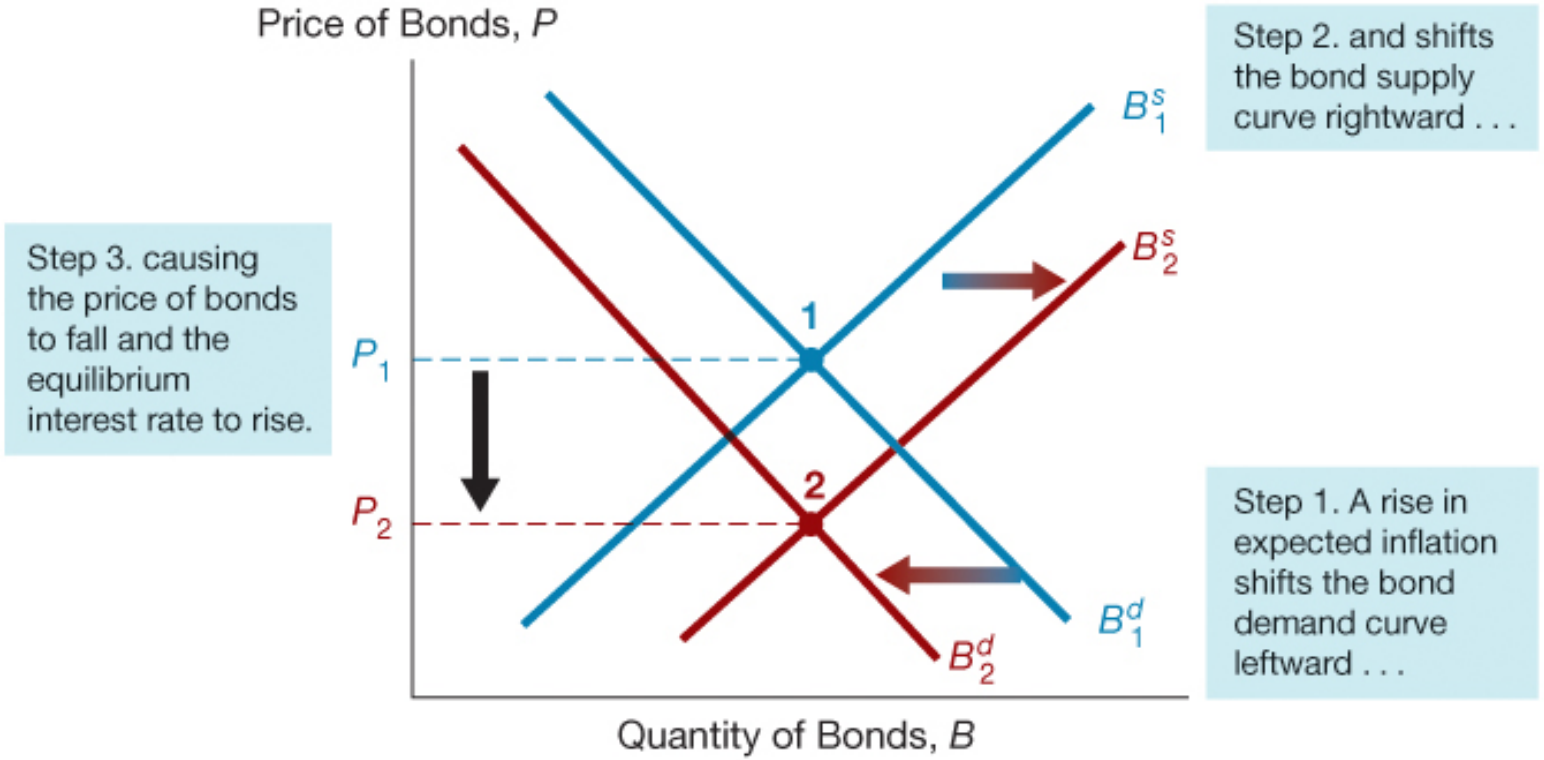
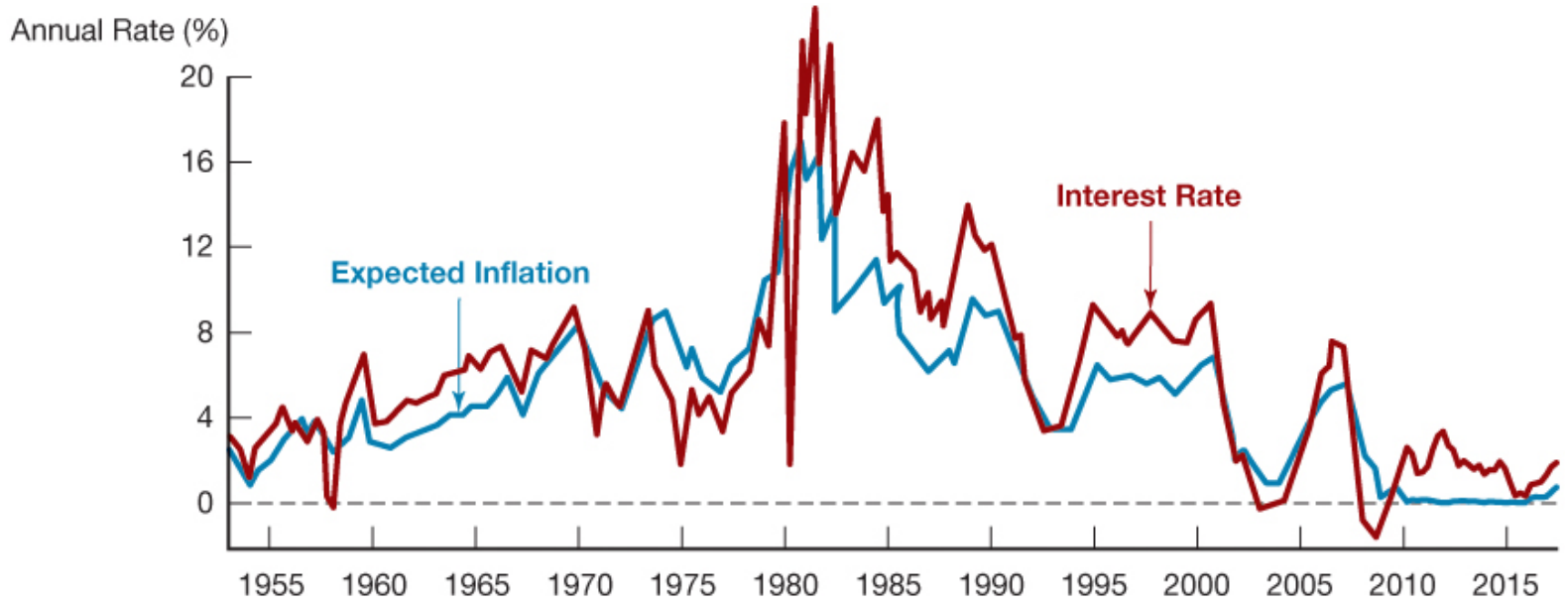


Figure 5 Expected Inflation and Interest Rates (Three-Month Treasury Bills), 1953–2017



Sources: Federal Reserve Bank of St. Louis FRED database: https://fred.stlouisfed.org/series/TB3M; https://fred.stlouisfed.org/series/CPIAUCSL.S. Expected inflation calculated using procedures outlined in Frederic S. Mishkin, "The Real Interest Rate: An EmpiricalInvestigation," *Carnegie-Rochester Conference Series on Public Policy* 15 (1981): 151–200. These procedures involve estimating expected inflation as a function of past interest rates, inflation, and time trends.

Figure 6 Response to a Business Cycle Expansion

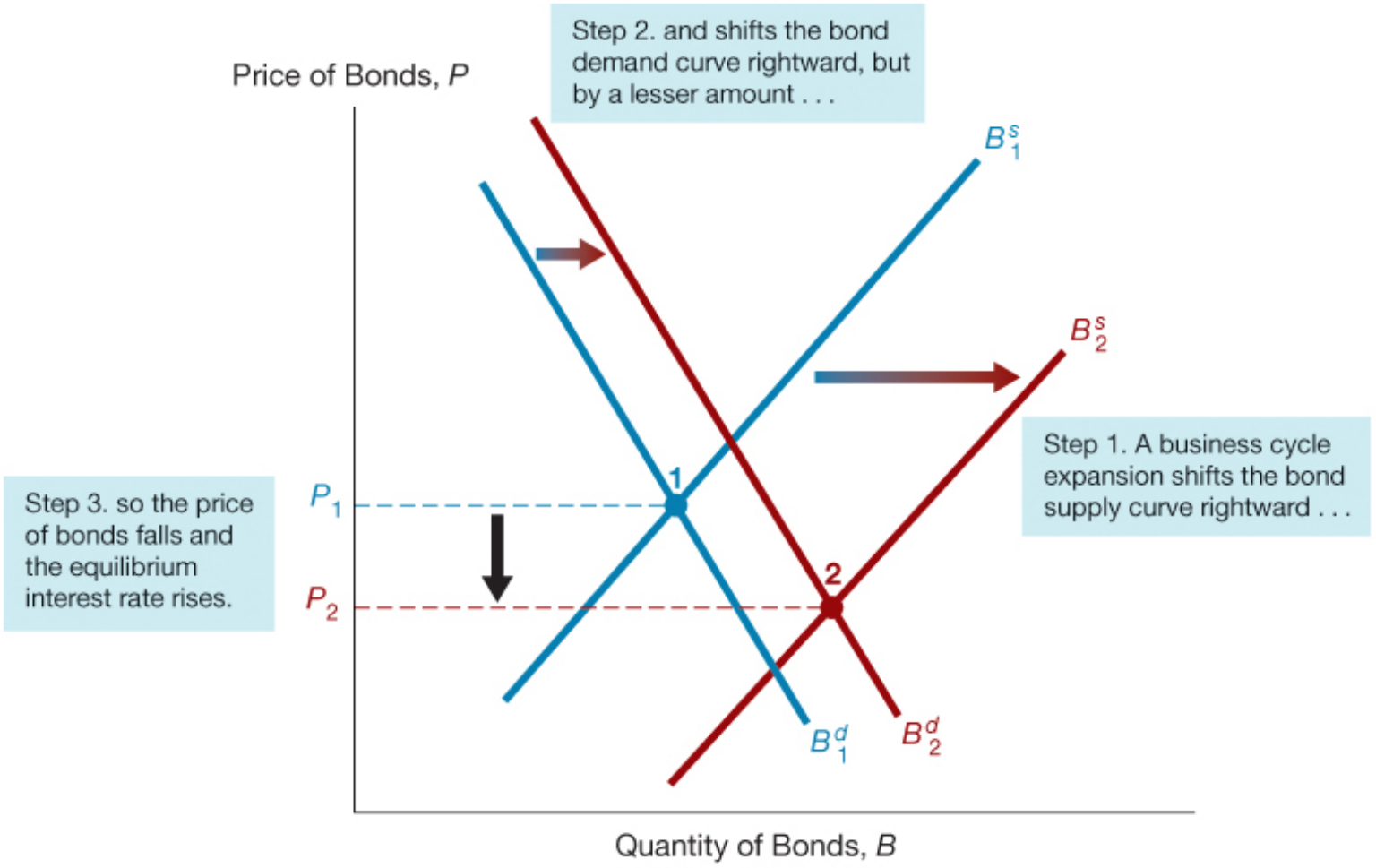
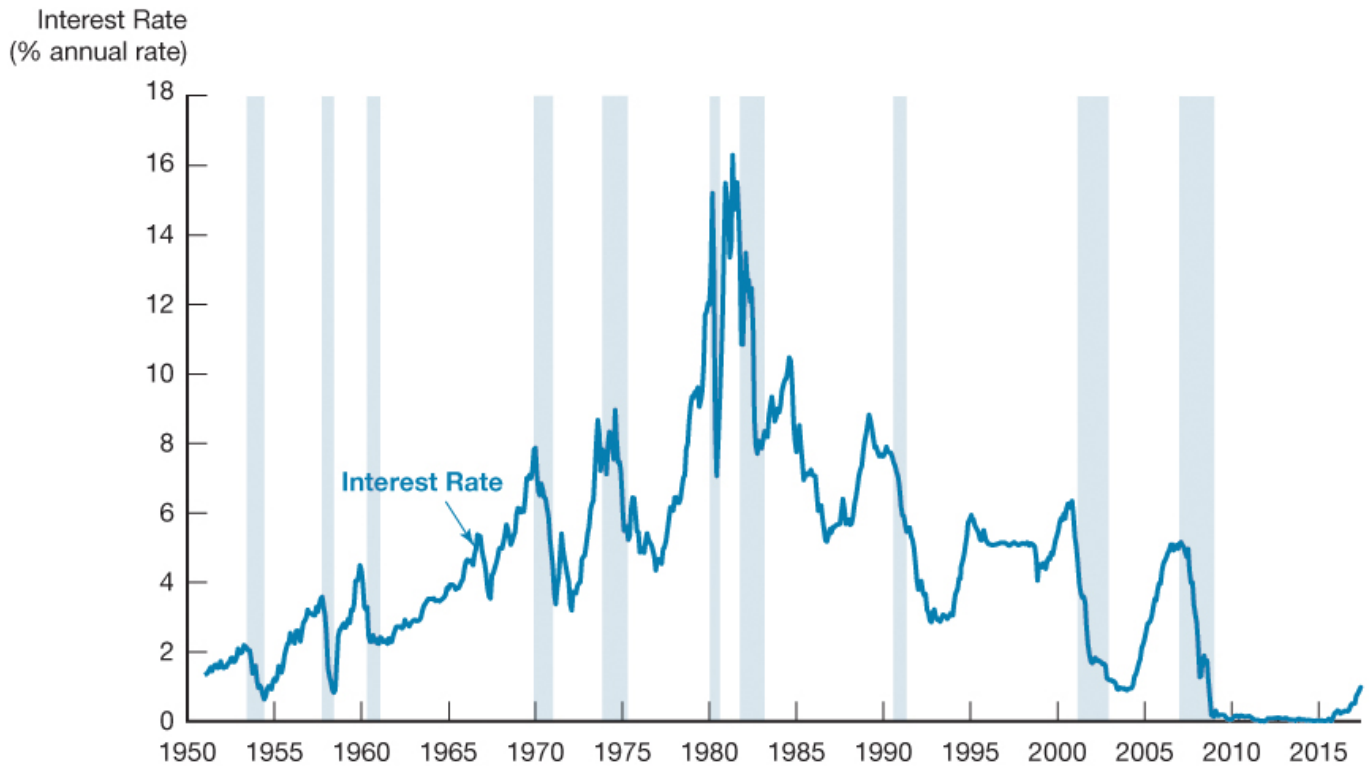


Figure 7 Business Cycle and Interest Rates (Three-Month Treasury Bills), 1951–2017



Source: Federal Reserve Bank of St. Louis FRED database: https://fred.stlouisfed.org/series/TB3MS

Supply and Demand in the Market for Money: The Liquidity Preference Framework (1 of 2)

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

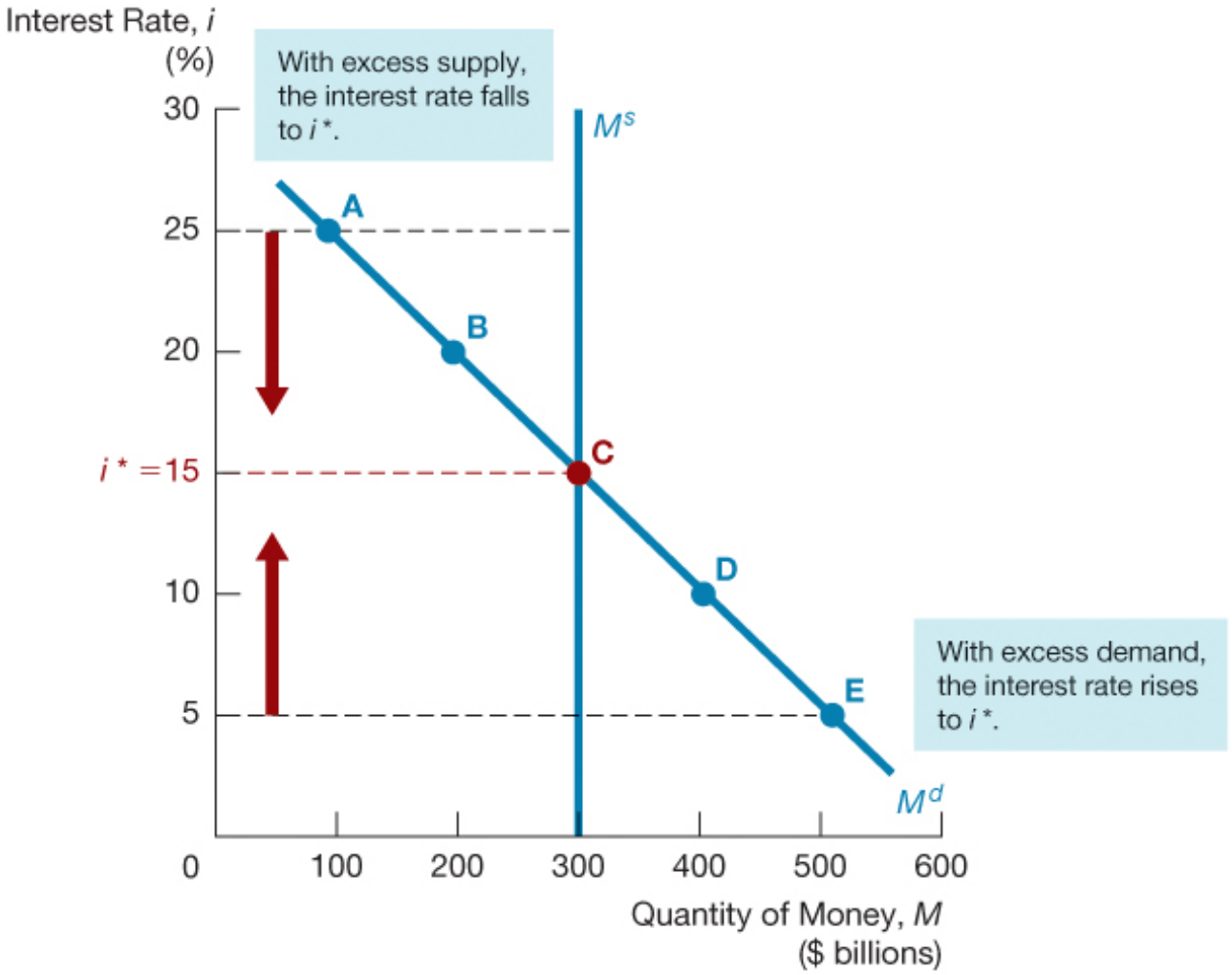
There are two main categories of assets that people use to store their wealth: money and bonds.

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 ($B^s = B^d$).

Figure 8 Equilibrium in the Market for Money



Supply and Demand in the Market for Money: The Liquidity Preference Framework (2 of 2)

- Demand for money in the liquidity preference framework:
  - As the interest rate increases:
    - The opportunity cost of holding money increases…
    - The relative expected return of money decreases…
  - …and therefore the quantity demanded of money decreases.

Changes in Equilibrium Interest Rates in the Liquidity Preference Framework (1 of 3)

- 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

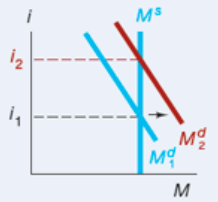
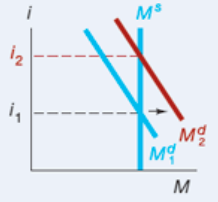
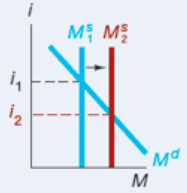
Changes in Equilibrium Interest Rates in the Liquidity Preference Framework (2 of 3)

- Shifts in the supply of money:
  - Assume that the supply of money is controlled by the central bank.
  - An increase in the money supply engineered by the Federal Reserve will shift the supply curve for money to the right.

Changes in Equilibrium Interest Rates in the Liquidity Preference Framework (3 of 3)

Summary Table 4

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↑	↓	

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

Figure 9 Response to a Change in Income or the Price Level

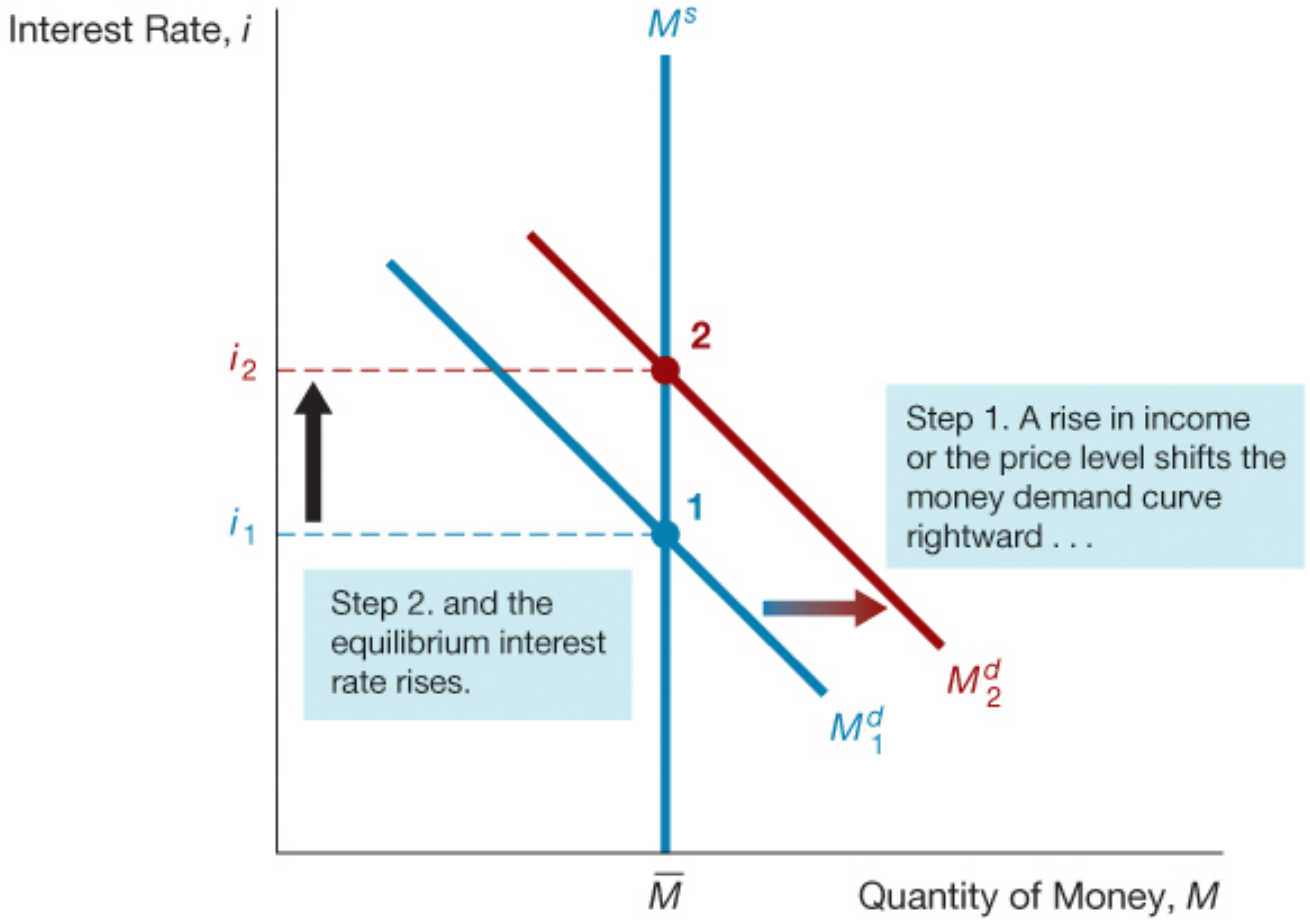
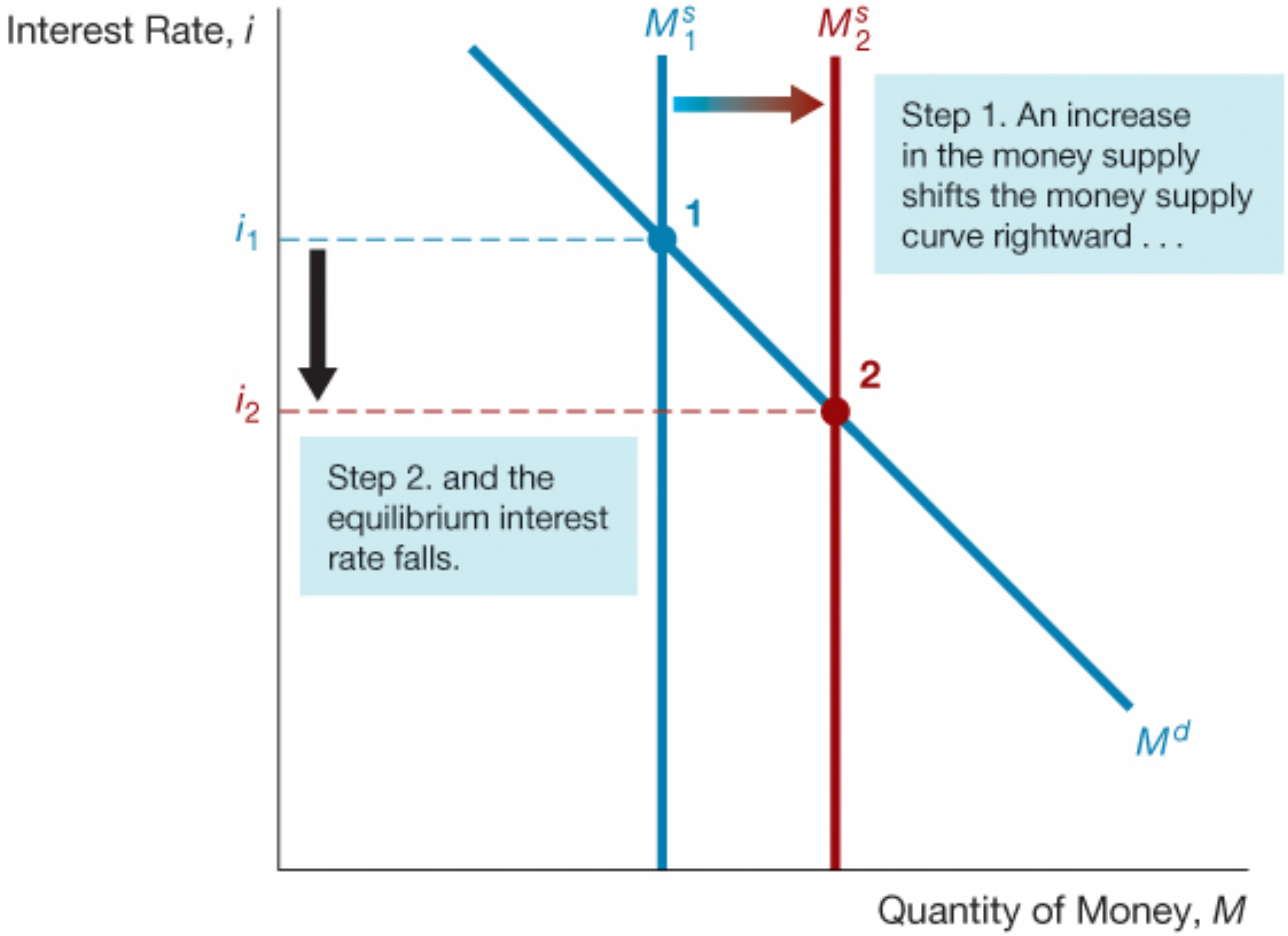


Figure 10 Response to a Change in the Money Supply



Money and Interest Rates

- A one time increase in the money supply will cause prices to rise to a permanently higher level by the end of the year. The interest rate will rise via the increased prices.
- **Price-level effect** remains even after prices have stopped rising.
- A rising price level will raise interest rates because people will expect inflation to be higher over the course of the year. When the price level stops rising, expectations of inflation will return to zero.
- **Expected-inflation effect** persists only as long as the price level continues to rise.

Does a Higher Rate of Growth of the Money Supply Lower Interest Rates? (1 of 2)

- Liquidity preference framework leads to the conclusion that an increase in the money supply will lower interest rates: the liquidity effect.
- Income effect finds interest rates rising because increasing the money supply is an expansionary influence on the economy (the demand curve shifts to the right).

Does a Higher Rate of Growth of the Money Supply Lower Interest Rates? (2 of 2)

- Price-Level effect predicts an increase in the money supply leads to a rise in interest rates in response to the rise in the price level (the demand curve shifts to the right).
- Expected-Inflation effect shows an increase in interest rates because an increase in the money supply may lead people to expect a higher price level in the future (the demand curve shifts to the right).

Figure 11 Response over Time to an Increase in Money Supply Growth

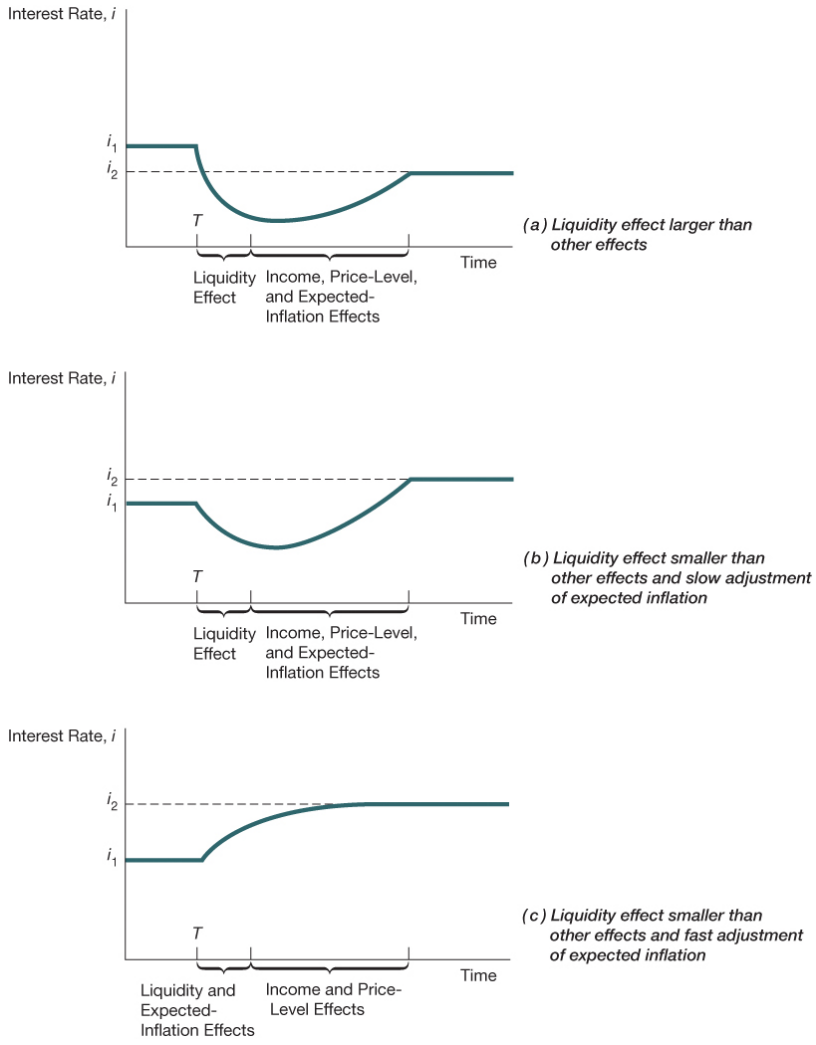
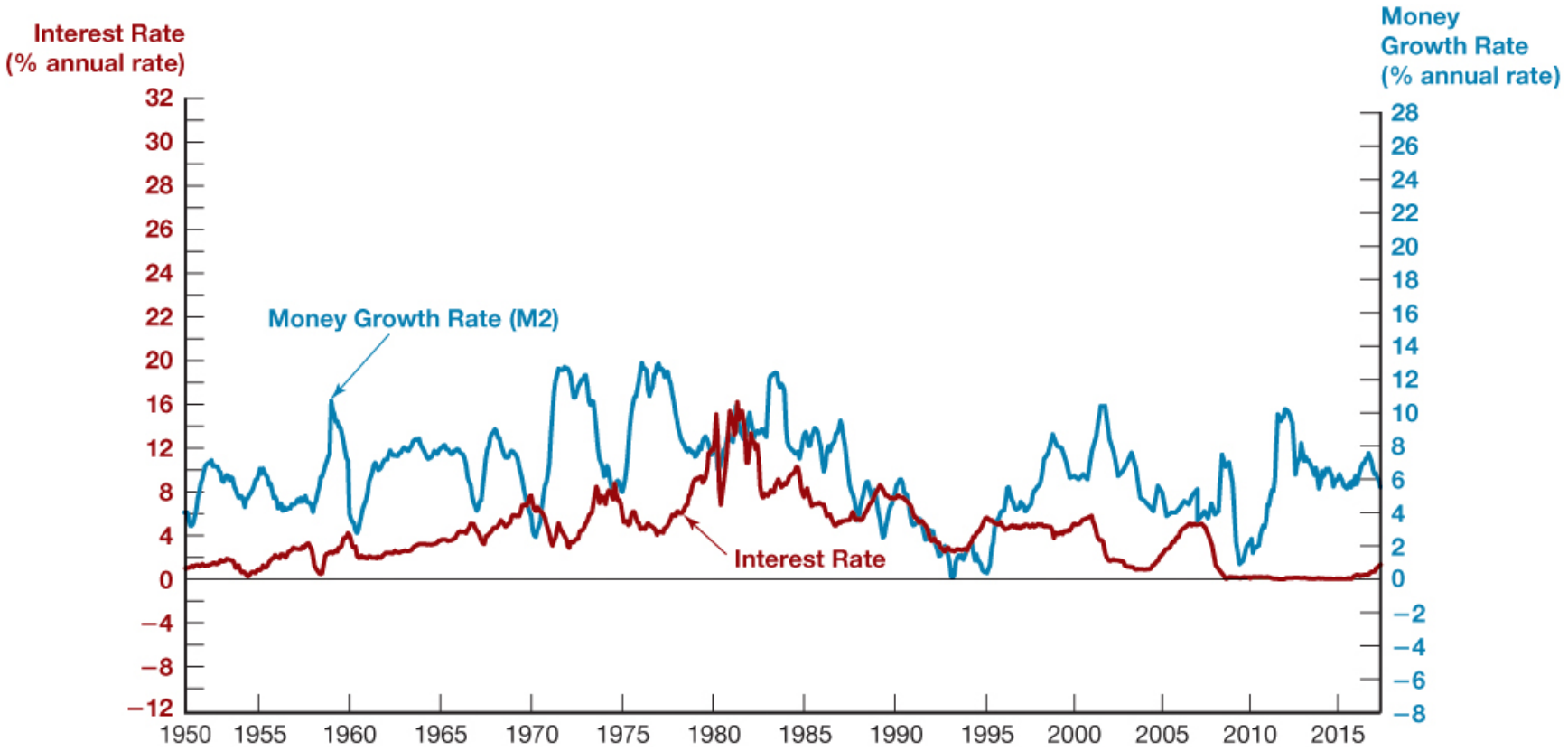


Figure 12 Money Growth (M2, Annual Rate) and Interest Rates (Three-Month Treasury Bills), 1950–2017



Source: Federal Reserve Bank of St. Louis FRED database: https://fred.stlouisfed.org/series/M2SL; https://fred.stlouisfed.org/series/TB3MS

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