Bachelor of Economics
THAMMASAT UNIVERSITY

FN 211 Financial Markets

Class 2:
Interest Rates and their Determinants

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Today's Outline

1. Determinants of Asset Demand
2. Supply & Demand in the Bond Market

Determinants of Asset Demand

- An **asset** is a piece of property that is a store of value. Facing the question of whether to buy and hold an asset or whether to buy one asset rather than another, an individual must consider the following factors:
  1. **Wealth**, the total resources owned by the individual, including all assets
  2. **Expected return** (the return expected over the next period) on one asset relative to alternative assets
  3. **Risk** (the degree of uncertainty associated with the return) on one asset relative to alternative assets
  4. **Liquidity** (the ease and speed with which an asset can be turned into cash) relative to alternative assets

Determinants of Asset Demand

The quantity demanded of an asset differs by factor.

1. **Wealth:** Holding everything else constant, an increase in wealth **raises** the quantity demanded of an asset
2. **Expected return:** An increase in an asset's expected return relative to that of an alternative asset, holding everything else unchanged, **raises** the quantity demanded of the asset
3. **Risk:** Holding everything else constant, if an asset's risk (measured by *standard deviation*) rises relative to that of alternative assets, its quantity demanded will **fall.** Since most people are risk averse, we prefer to hold less risky asset.
4. **Liquidity:** The more liquid an asset is relative to alternative assets, holding everything else unchanged, the more desirable it is, and the **greater** will be the quantity demanded

Determinants of Asset Demand

TABLE 4.1 SUMMARY Summary 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	↑	↑

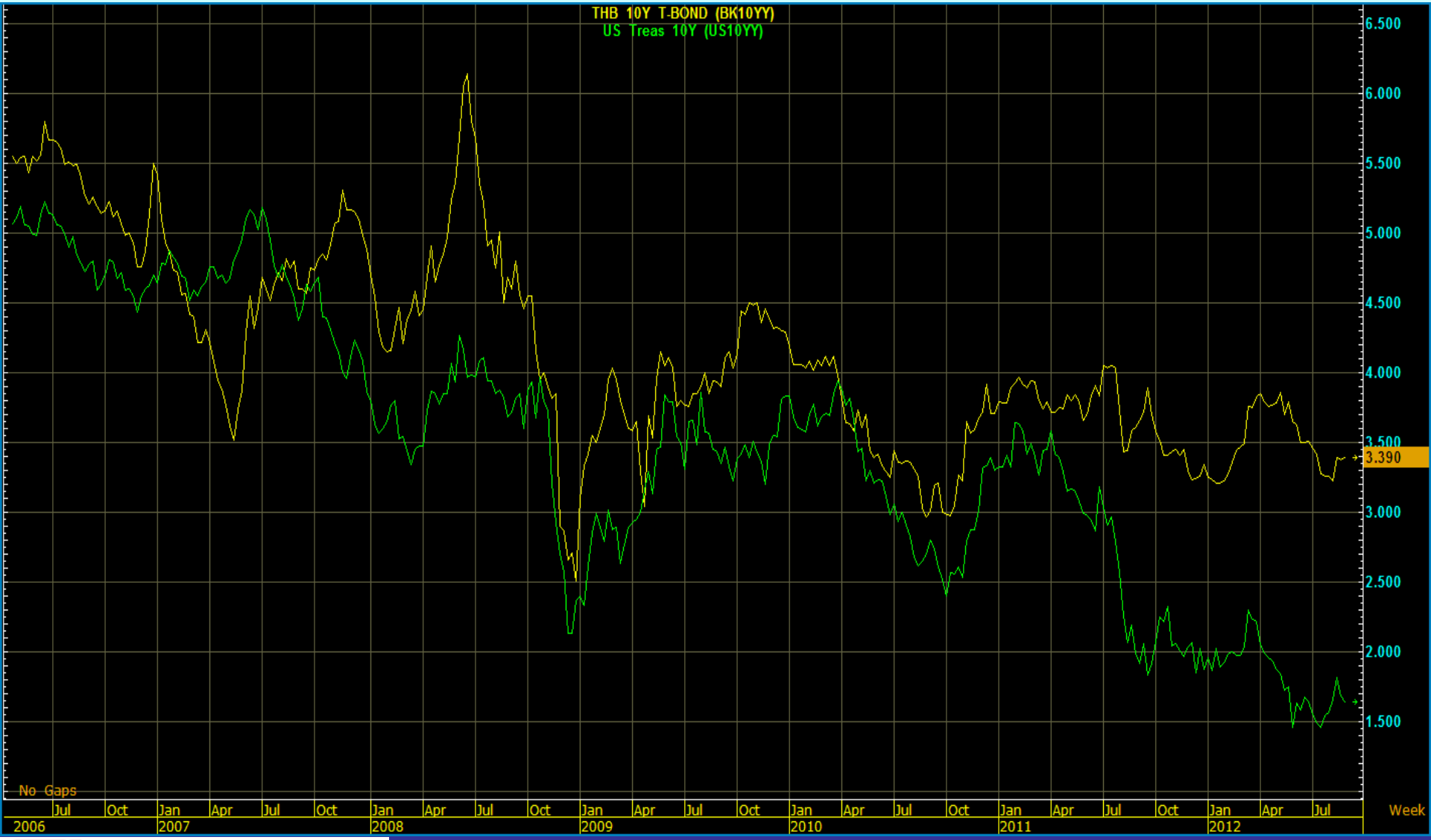
Note: Only increases in the variables are shown. The effect of decreases in the variables on the change in quantity demanded would be the opposite of those indicated in the far-right column.

Supply & Demand in the Bond Market

- We now turn our attention to the mechanics of interest rates. That is, we are going to examine how interest rates are determined—from a demand and supply perspective.
- Keep in mind that these forces act differently in different bond markets. That is, current supply/demand conditions in the corporate bond market are not necessarily the same as, say, in the mortgage market.
- However, because rates tend to move together, we will proceed as if there is one interest rate for the entire economy.

Movements of the Actual Interest Rates

Movements of the Actual Interest Rates



Today's Outline

1. Determinants of Asset Demand
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Supply & Demand in the Bond Market

- Let's start with the demand curve.
- Let's consider a one-year discount bond with a face value of $1,000. In this case, the return on this bond is entirely determined by its price. The return is, then, the bond's yield to maturity.

Supply & Demand in the Bond Market

- Point A: if the bond was selling for $950.

$$P = \$950$$

$$i = \frac{(\$1000 - \$950)}{\$950} = .053 = 5.3\%$$

$$B^d = 100$$

- Point B: if the bond was selling for $900.

$$P = \$900$$

$$i = \frac{(\$1000 - \$900)}{\$900} = .111 = 11.1\%$$

$$B^d = 200$$

Supply & Demand in the Bond Market

To continue …

- Point C: $P = \$850$ $i = 17.6\%$ $B^d = 300$
- Point D: $P = \$800$ $i = 25.0\%$ $B^d = 400$
- Point E: $P = \$750$ $i = 33.0\%$ $B^d = 500$
- Demand Curve is B^d in Figure 4.1 which connects points A, B, C, D, E.
  - Has usual downward slope

Supply & Demand in the Bond Market

Derivation of Supply Curve

- Point F: $P = \$750$ $i = 33.0\%$ $B^s = 100$
- Point G: $P = \$800$ $i = 25.0\%$ $B^s = 200$
- Point C: $P = \$850$ $i = 17.6\%$ $B^s = 300$
- Point H: $P = \$900$ $i = 11.1\%$ $B^s = 400$
- Point I: $P = \$950$ $i = 5.3\%$ $B^s = 500$
- Supply Curve is B^s that connects points F, G, C, H, I, and has upward slope

Supply & Demand in the Bond Market

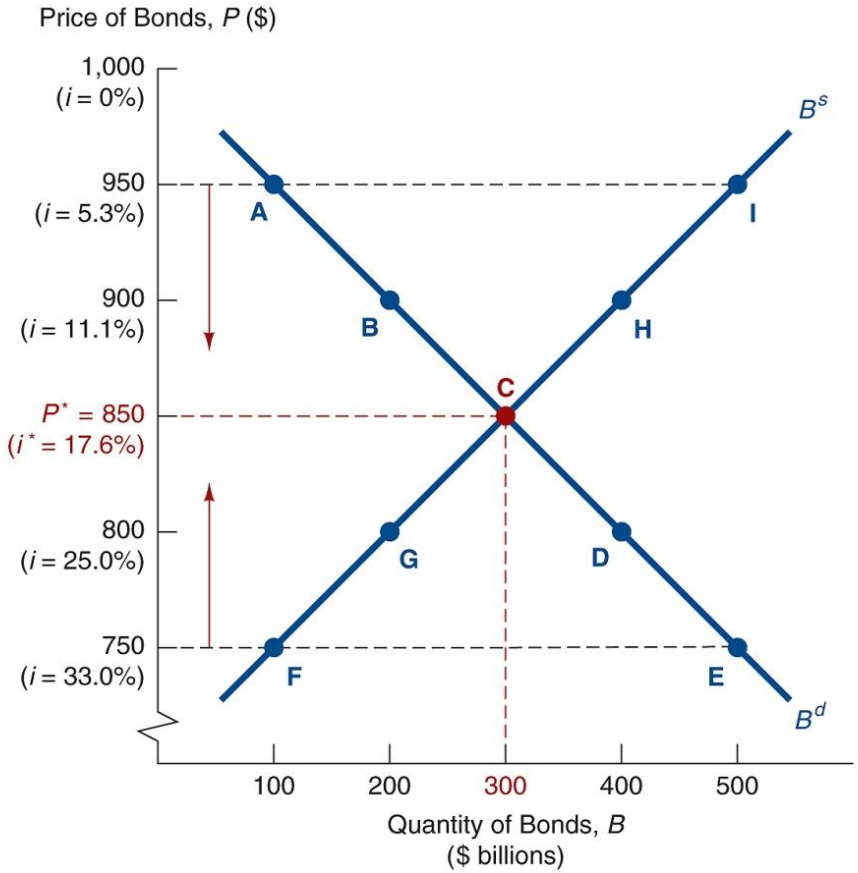


FIGURE 4.1 Supply and Demand for Bonds

Equilibrium in the bond market occurs at point C, the intersection of the demand curve B^d and the bond supply curve B^s. The equilibrium price is P^* = \$850, and the equilibrium interest rate is i^* = 17.6%.

Supply & Demand in the Bond Market

The equilibrium follows what we know from supply-demand analysis:

- Occurs when $B^d = B^s$, at $P^* = 850$, $i^* = 17.6\%$
- When $P = \$950$, $i = 5.3\%$, $B^s > B^d$ (excess supply): $P \downarrow$ to P^*, $i \uparrow$ to i^*
- When $P = \$750$, $i = 33.0$, $B^d > B^s$ (excess demand): $P \uparrow$ to P^*, $i \downarrow$ to i^*

Supply & Demand in the Bond Market

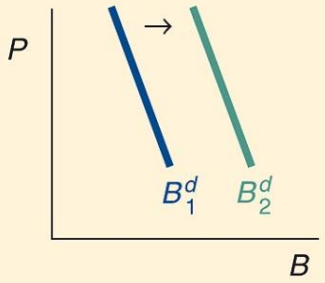
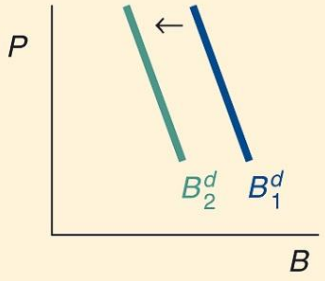
Market equilibrium occurs when the amount that people are willing to buy (*demand*) equals the amount that people are willing to sell (*supply*) at a given price

Excess supply occurs when the amount that people are willing to sell (*supply*) is greater than the amount people are willing to buy (*demand*) at a given price

Excess demand occurs when the amount that people are willing to buy (*demand*) is greater than the amount that people are willing to sell (*supply*) at a given price

Factors that Shift Demand Curve

TABLE 4.2 SUMMARY Summary 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	↑	↓	

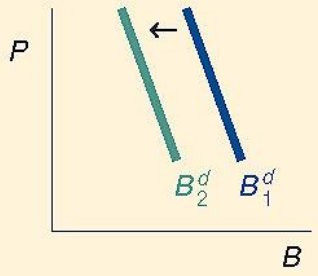
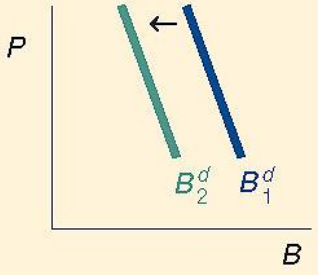
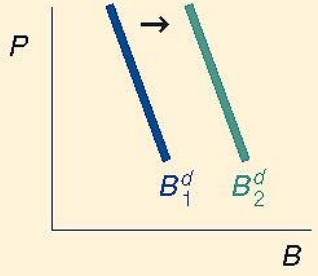
Expansion, Wealth ⇑
=> Shift right

Recession, Wealth ⇓
=> Shift left

Rates ⇓ Exp. Return ⇑
=> Shift right

Rates ⇑ Exp. Return ⇓
=> Shift left

Factors that Shift Demand Curve

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.

Exp. Inflation ⇓ Real Return ⇑
=> Shift right

Exp. Inflation ⇑ Real Return ⇓
=> Shift left

Lower Risk (relative to others)
=> Shift right

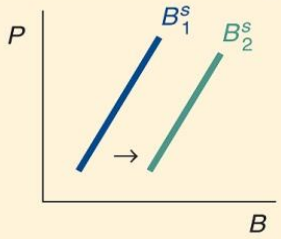
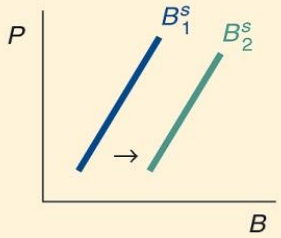
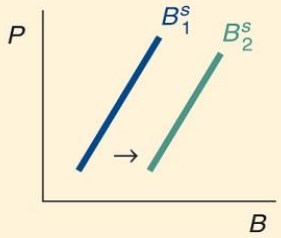
Higher Risk (relative to others)
=> Shift left

Higher Liquidity (relative to..)
=> Shift right

Lower Liquidity (relative to ..)
=> Shift left

Factors that Shift Supply Curve

TABLE 4.3 SUMMARY Summary 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 effect of decreases in the variables on the change in supply would be the opposite of those indicated in the remaining columns.

Expansion, Exp. Profitability ⇑
=> Shift right

Recession, Exp. Profitability ⇓
=> Shift left

Exp. Inflation ⇑ Real Cost of Borrow ⇓
=> Shift right

Exp. Inflation ⇓ Real Cost of Borrow ⇑
=> Shift left

Higher Government Deficits
=> Shift right

Lower Deficits (or Surpluses)
=> Shift left

Case 1: The Fischer Effect

- If expected inflation rises from 5% to 10%, the expected return on bonds relative to real assets falls and, as a result, the demand for bonds falls
- The rise in expected inflation also means that the real cost of borrowing has declined, causing the quantity of bonds supplied to increase
- When the demand for bonds falls and the quantity of bonds supplied increases, the equilibrium bond price falls
- Since the bond price is negatively related to the interest rate, this means that the interest rate will rise

Case 1: The Fischer Effect

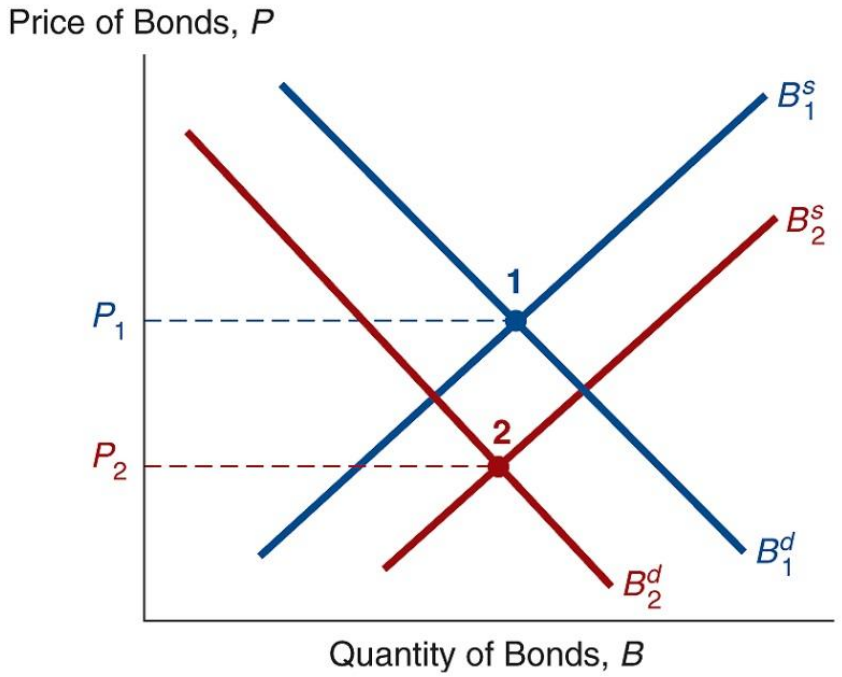


FIGURE 4.4 Response to a Change in Expected Inflation

When expected inflation rises, the supply curve shifts from B_1^s to B_2^s, and the demand curve shifts from B_1^d to B_2^d. The equilibrium moves from point 1 to point 2, with the result that the equilibrium bond price falls from P_1 to P_2 and the equilibrium interest rate rises.

Case 1: The Fischer Effect

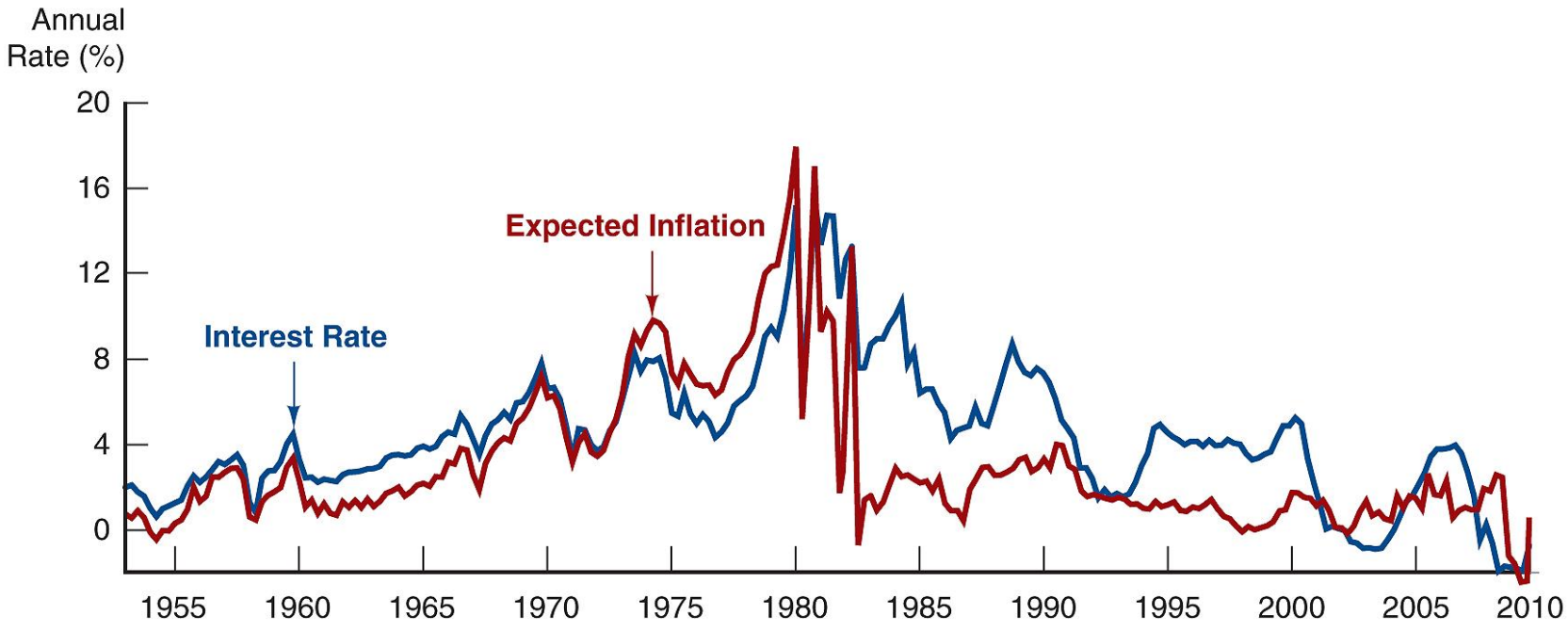


FIGURE 4.5 Expected Inflation and Interest Rates (Three-Month Treasury Bills), 1953–2010

Source: Expected inflation calculated using procedures outlined in Frederic S. Mishkin, "The Real Interest Rate: An Empirical Investigation," *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.

Case 2: Business Cycle Expansion

- As an economy expands and income rises, wealth increases and the demand for bonds will rise as well.
- At the same time, as income rises, businesses will be more willing to borrow b/c they are likely to have many profitable investment opportunities for which they need financing.
- Given that both the supply and demand curves have shifted to the right, the new equilibrium must also move to the right.
- However, depending on whether the supply curve shifts more than the demand curve, or vice versa, the new equilibrium interest rate can either rise or fall.
- The actual data suggest that interest rate tends to rise during business cycle expansions and fall during recessions.

Case 2: Business Cycle Expansion

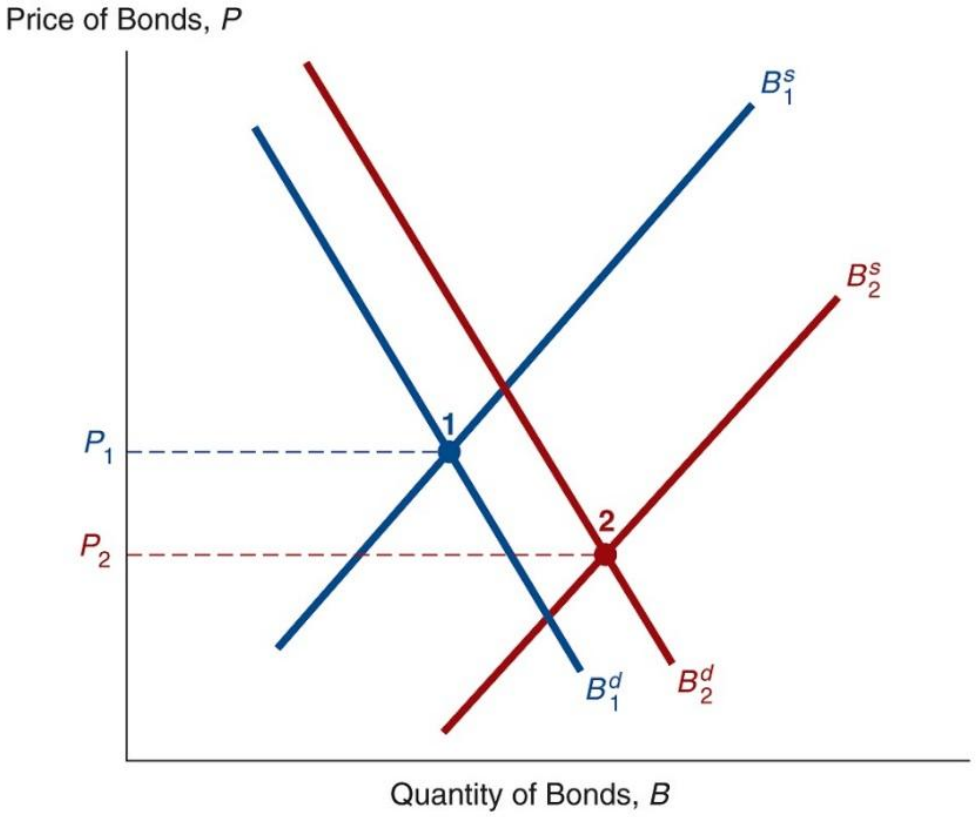


FIGURE 4.6 Response to a Business Cycle Expansion

In a business cycle expansion, when income and wealth are rising, the demand curve shifts rightward from B_1^d to B_2^d and the supply curve shifts rightward from B_1^s to B_2^s. If the supply curve shifts to the right more than the demand curve, as in this figure, the equilibrium bond price moves down from P_1 to P_2, and the equilibrium interest rate rises.

Case 2: Business Cycle Expansion

FIGURE 4.7 Business Cycle and Interest Rates (Three-Month Treasury Bills), 1951–2010

Shaded areas indicate periods of recession. The figure shows that interest rates rise during business cycle expansions and fall during contractions, which is what Figure 4.6 suggests would happen.

Source: Federal Reserve: www.federalreserve.gov/releases/H15/data.htm.

Case 3: Explaining Low Japanese Interest Rates

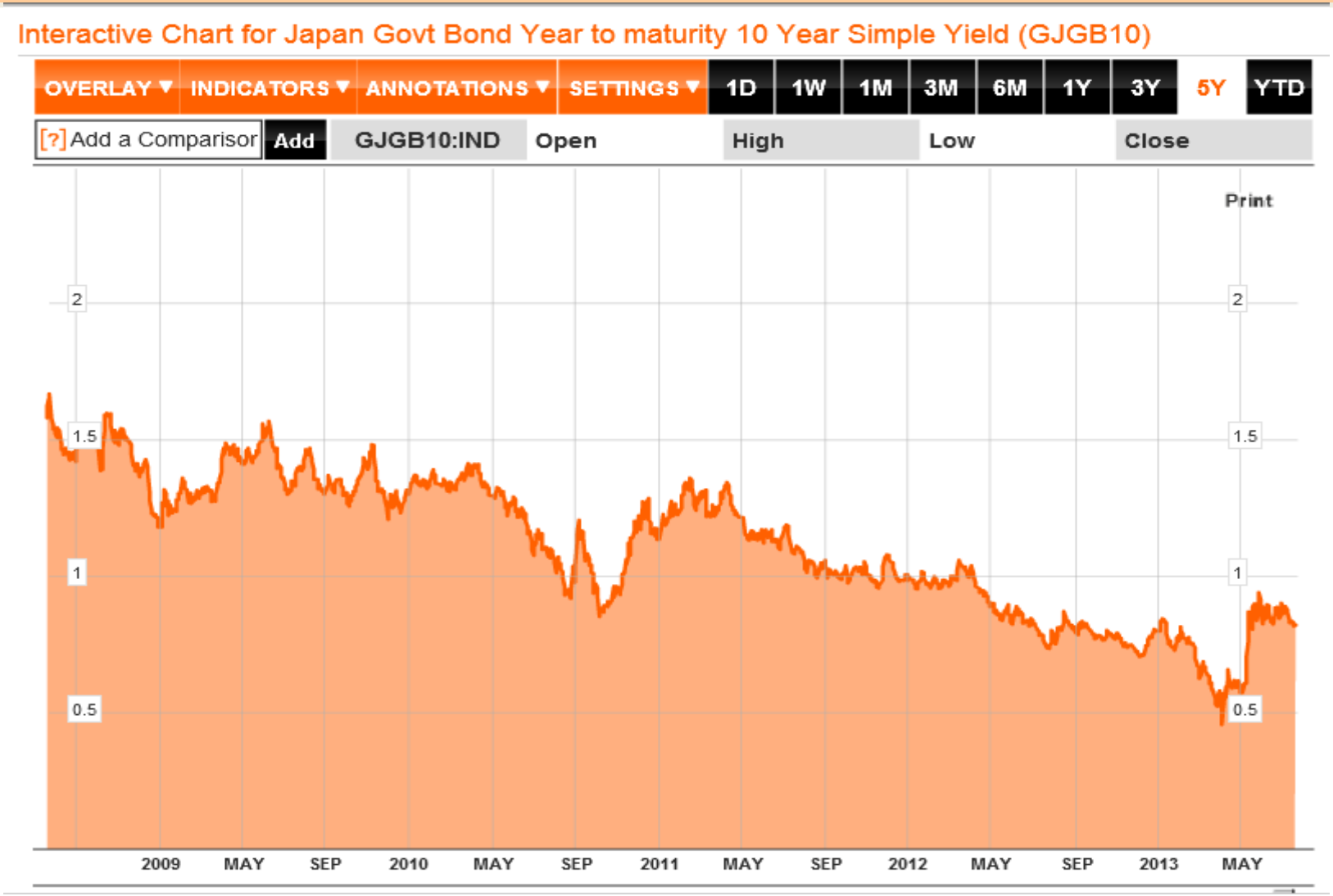
1. Negative inflation lead to $B^d \uparrow$
   - B^d shifts out to right
2. Negative inflation lead to $\downarrow$ in real rates
   - B^s shifts out to left

Net effect was an increase in bond prices ($\Downarrow$ interest rates).

3. Business cycle *contraction* lead to $\downarrow$ in interest rates
   - B^s shifts out to left
   - B^d shifts out to left

But the shift in B^d is less significant than the shift in B^s, so the net effect was also an increase in bond prices.

Case 3: Explaining Low Japanese Interest Rates



Following the Financial News

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