The Behavior of Interest Rates

Chapter 5 of Mishkin

Determinants of Asset Demand

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 effect of decreases in the variables on the change in demand would be the opposite of those indicated in the rightmost column.

Derivation of Bond Demand Curve

$$i = RET^{e} = \frac{(F - P)}{P}$$

Point A:

P = \$950

$$i = \frac{(\$1000 - \$950)}{\$950} = 0.053 = 5.3\%$$

B^{d} = \$100 billion

Derivation of Bond Demand Curve

Point B:

$P = \$900$

$$i = \frac{(\$1000 - \$900)}{\$900} = 0.111 = 11.1\%$$

$B^d = \$200$ billion

Point C: $P = \$850$, $i = 17.6\%$ $B^d = \$300$ billion

Point D: $P = \$800$, $i = 25.0\%$ $B^d = \$400$ billion

Point E: $P = \$750$, $i = 33.0\%$ $B^d = \$500$ billion

Demand Curve is B^d in Figure 1 which connects points A, B, C, D, E.

Has usual downward slope

Derivation of Bond Supply Curve

Point F: $P = \$750$, $i = 33.0\%$, $B^S = \$100$ billion

Point G: $P = \$800$, $i = 25.0\%$, $B^S = \$200$ billion

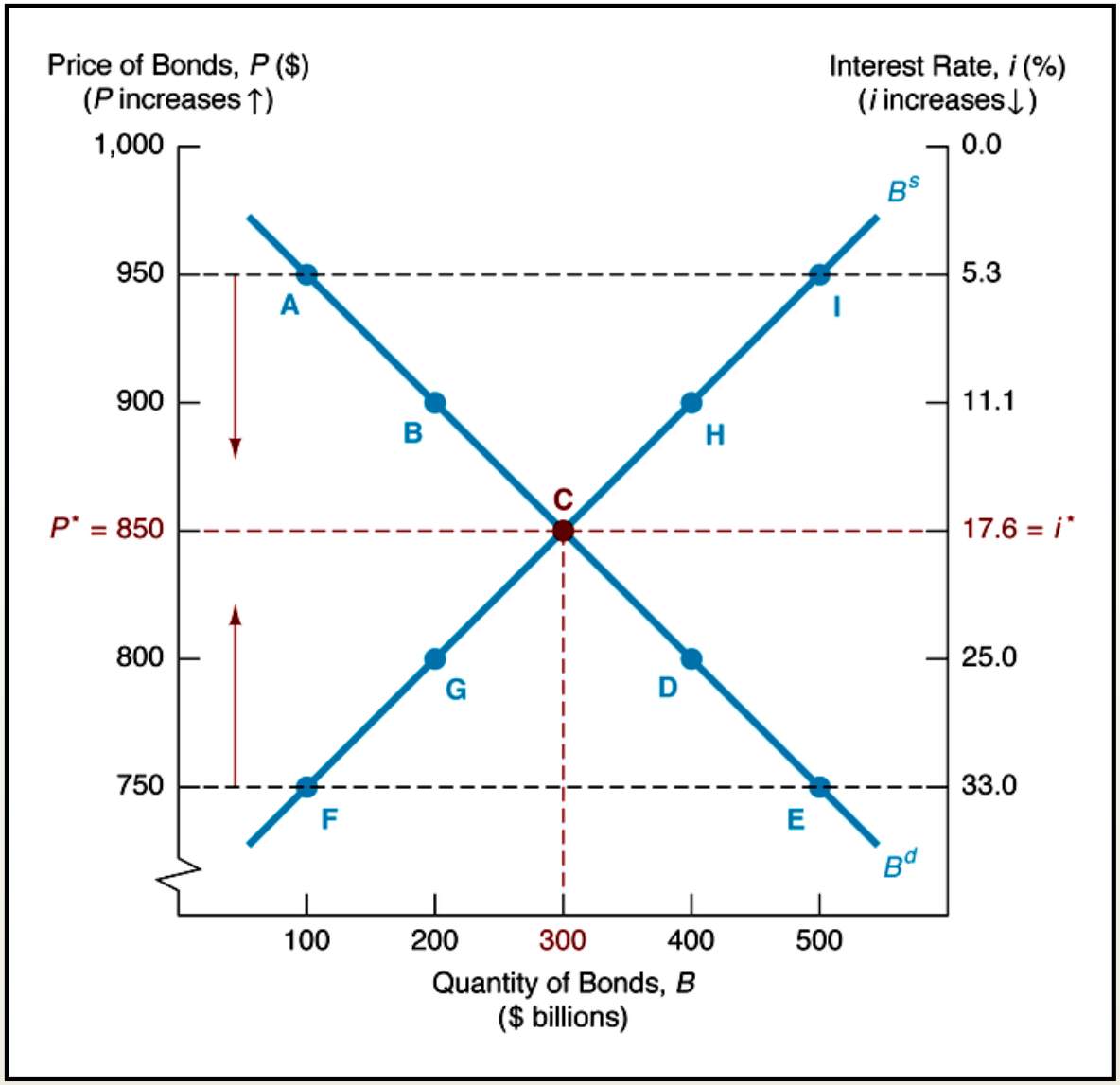
Point C: $P = \$850$, $i = 17.6\%$, $B^S = \$300$ billion

Point H: $P = \$900$, $i = 11.1\%$, $B^S = \$400$ billion

Point I: $P = \$950$, $i = 5.3\%$, $B^S = \$500$ billion

Supply Curve is B^S that connects points F, G, C, H, I, and has upward slope

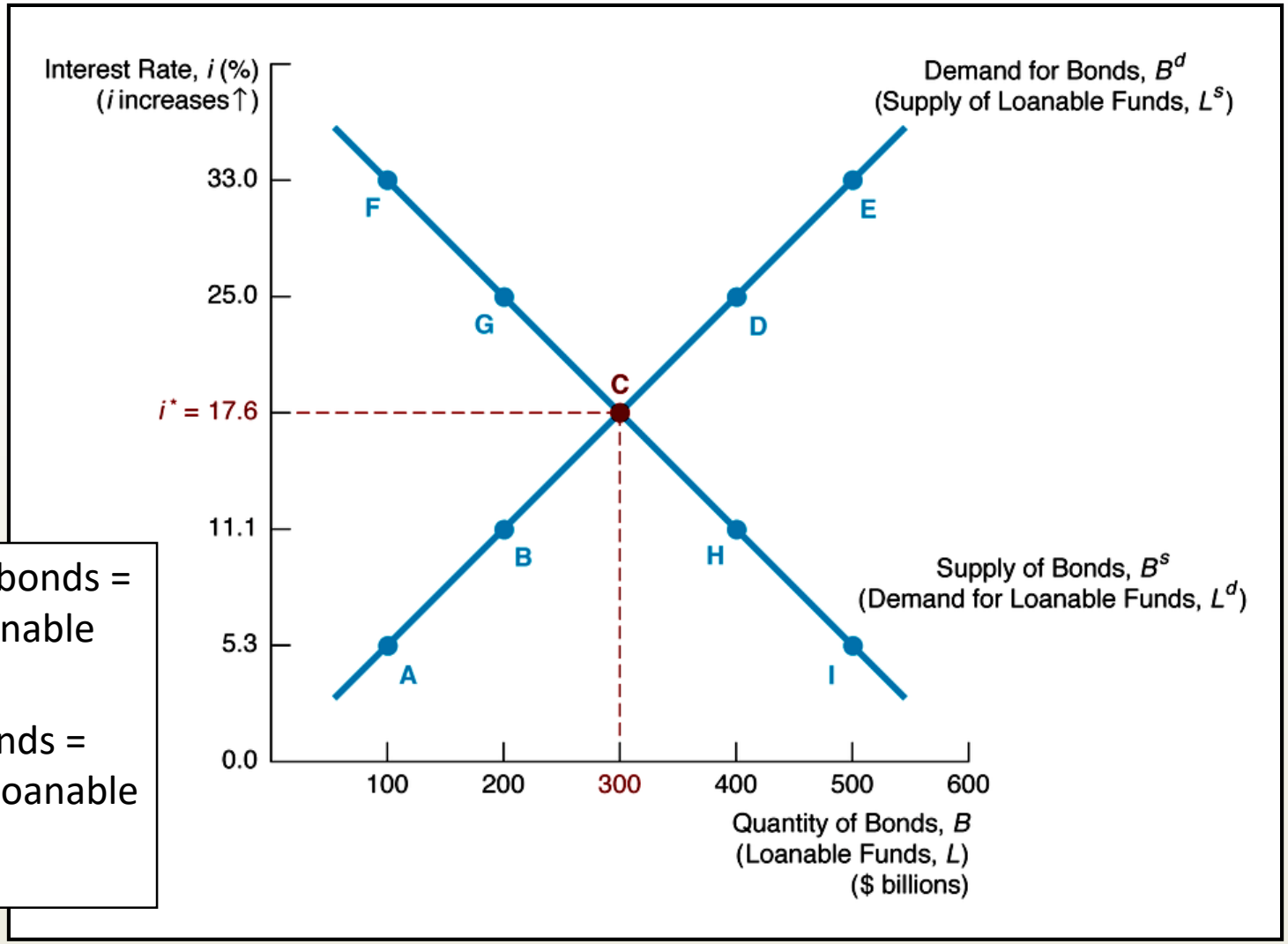
Supply and Demand Analysis of the Bond Market



Market Equilibrium

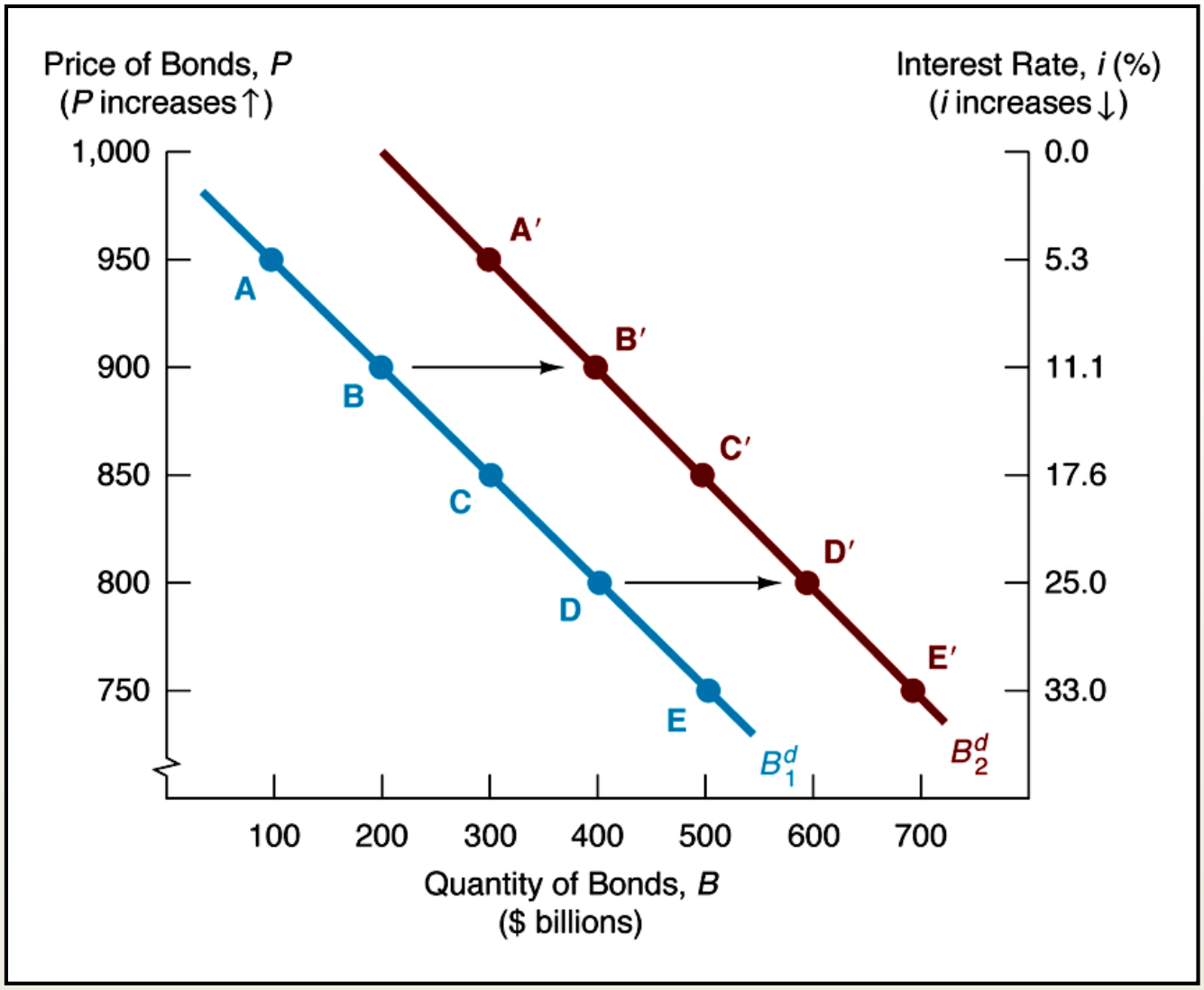
1. Occurs when $B^d = B^s$, at $P^* = \$850$, $i^* = 17.6\%$
2. When $P = \$950$, $i = 5.3\%$, $B^s > B^d$ (excess supply): $P \downarrow$ to P^*, $i \uparrow$ to i^*
3. When $P = \$750$, $i = 33.0$, $B^d > B^s$ (excess demand): $P \uparrow$ to P^*, $i \downarrow$ to i^*

Loanable Funds Terminology



1. Demand for bonds = supply of loanable funds
2. Supply of bonds = demand for loanable funds

Shifts in the Bond Demand Curve



Factors that Shift the Bond Demand Curve

1. Wealth

A. Economy grows, wealth ↑, B^d ↑, B^d shifts out to right

2. Expected Return

A. i ↓ in future, R^e for long-term bonds ↑, B^d shifts out to right

B. π^e ↓, Relative R^e ↑, B^d shifts out to right

C. Expected return of other assets ↓, B^d ↑, B^d shifts out to right

3. Risk

A. Risk of bonds ↓, B^d ↑, B^d shifts out to right

B. Risk of other assets ↑, B^d ↑, B^d shifts out to right

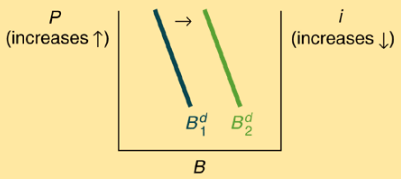
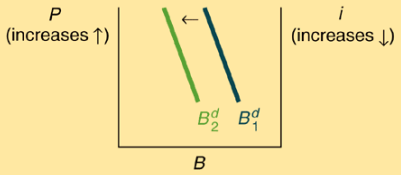
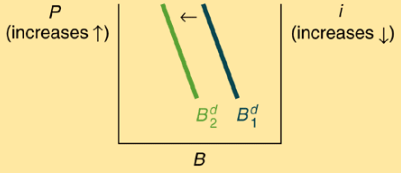
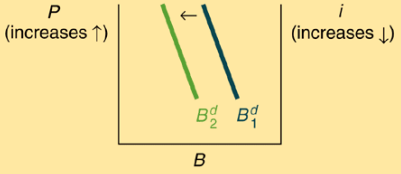
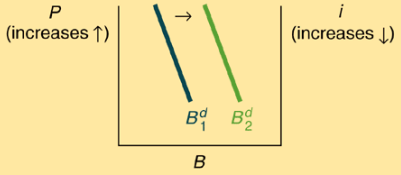
4. Liquidity

A. Liquidity of Bonds ↑, B^d ↑, B^d shifts out to right

B. Liquidity of other assets ↓, B^d ↑, B^d shifts out to right

Factors that Shift Demand Curve for Bonds

SUMMARY **Table 2 Factors That Shift the Demand Curve for Bonds**

Variable	Change in Variable	Change in Quantity Demanded	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: *P* and *i* increase in opposite directions: *P* on the left vertical axis increases as we go up the axis, while *i* on the right vertical axis increases as we go down the axis. 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 Bond Supply Curve

1. **Profitability of Investment Opportunities**

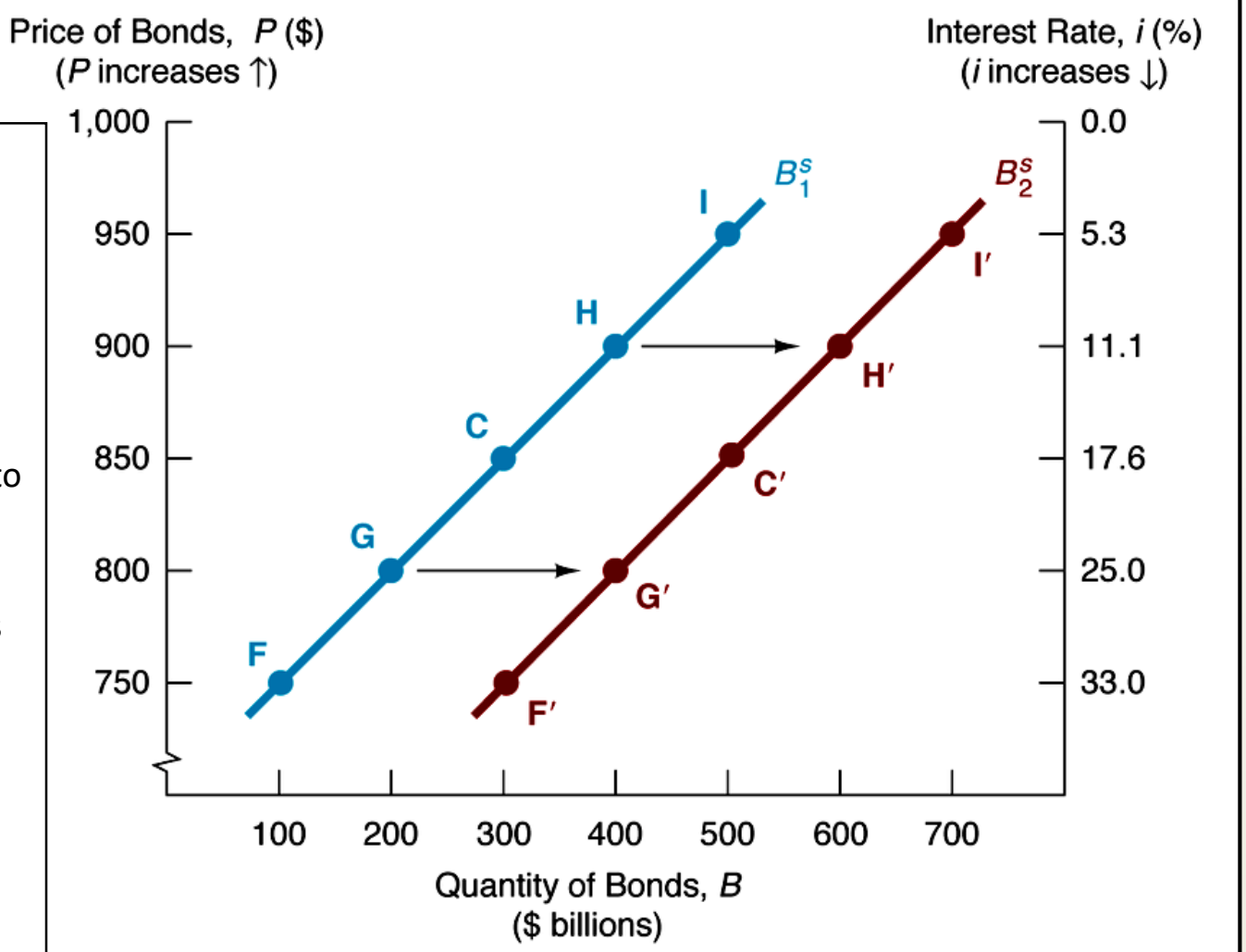
   Business cycle expansion, investment opportunities ↑, B^s ↑, B^s shifts out to right

2. **Expected Inflation**

   π^e ↑, B^s ↑, B^s shifts out to right

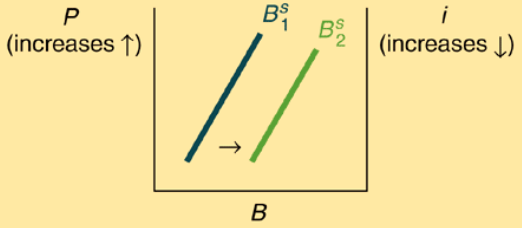
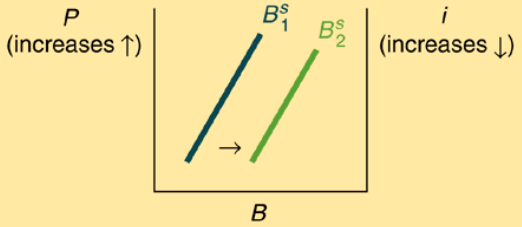
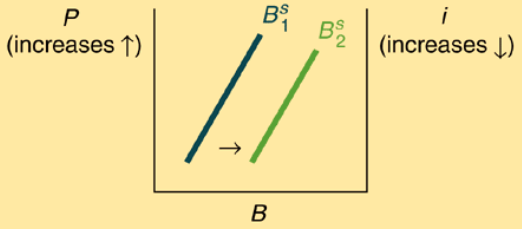
3. **Government Activities**

   Deficits ↑, B^s ↑, B^s shifts out to right



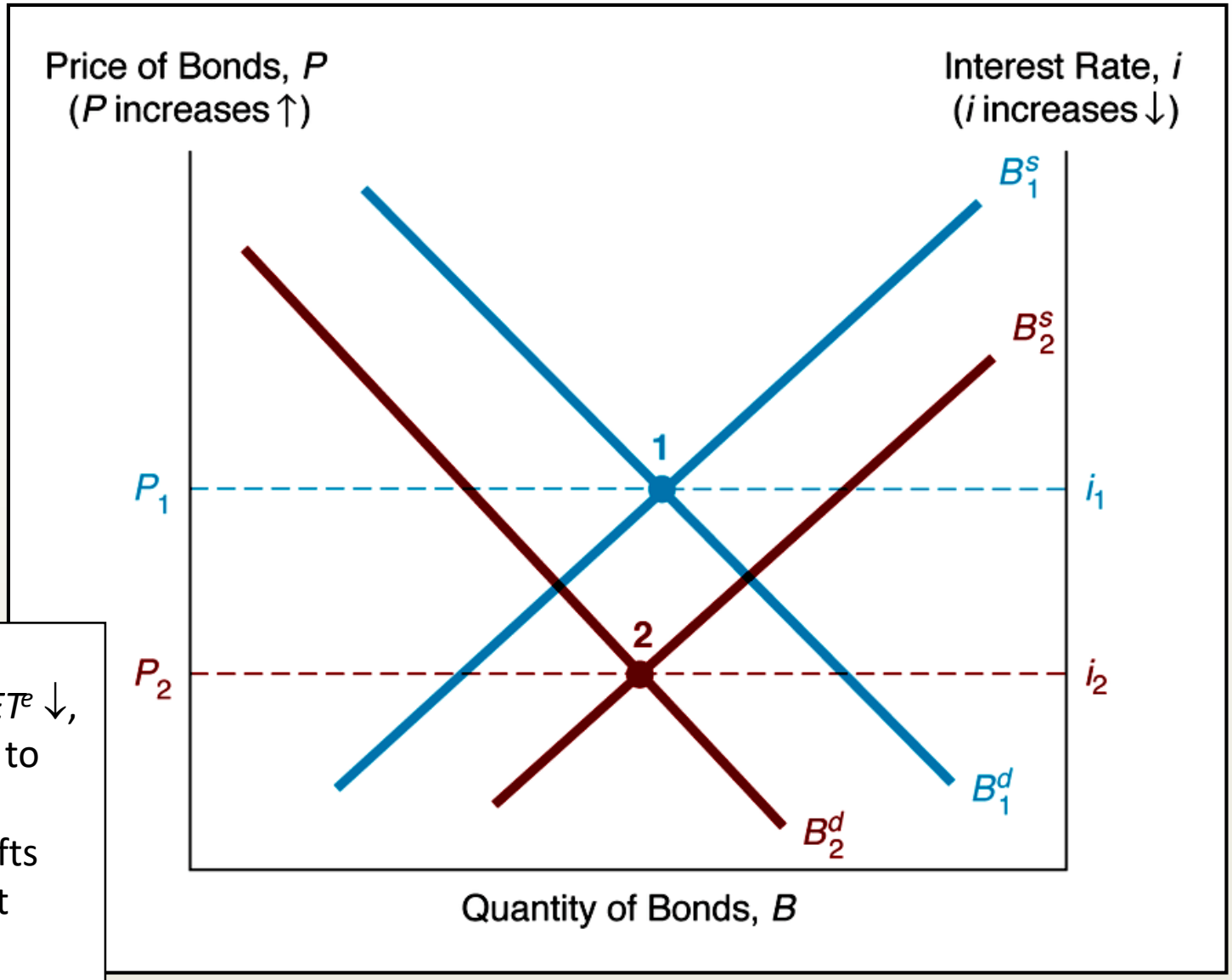
Factors that Shift Supply Curve for Bonds

SUMMARY **Table 3 Factors That Shift the Supply of Bonds**

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

Note: *P* and *i* increase in opposite directions: *P* on the left vertical axis increases as we go up the axis, while *i* on the right vertical axis increases as we go down the axis. 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.

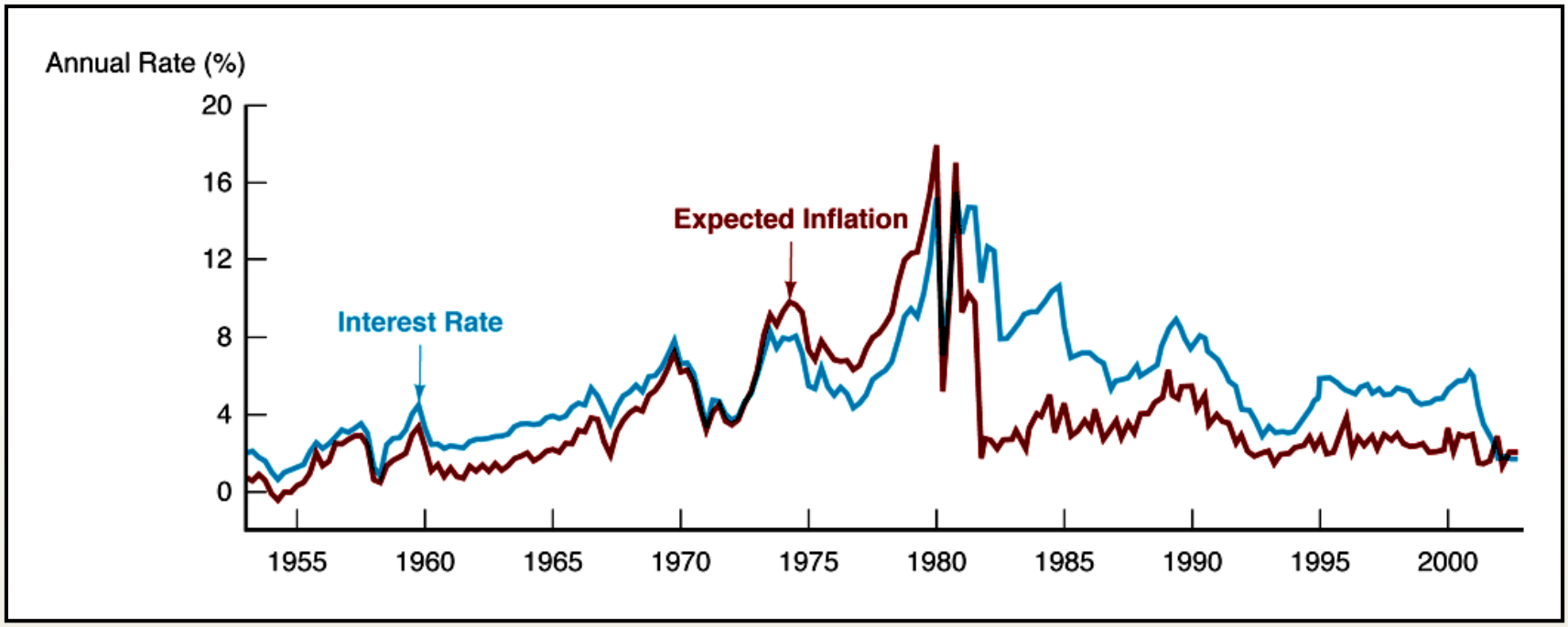
Changes in π^e: the Fisher Effect



If $\pi^e \uparrow$

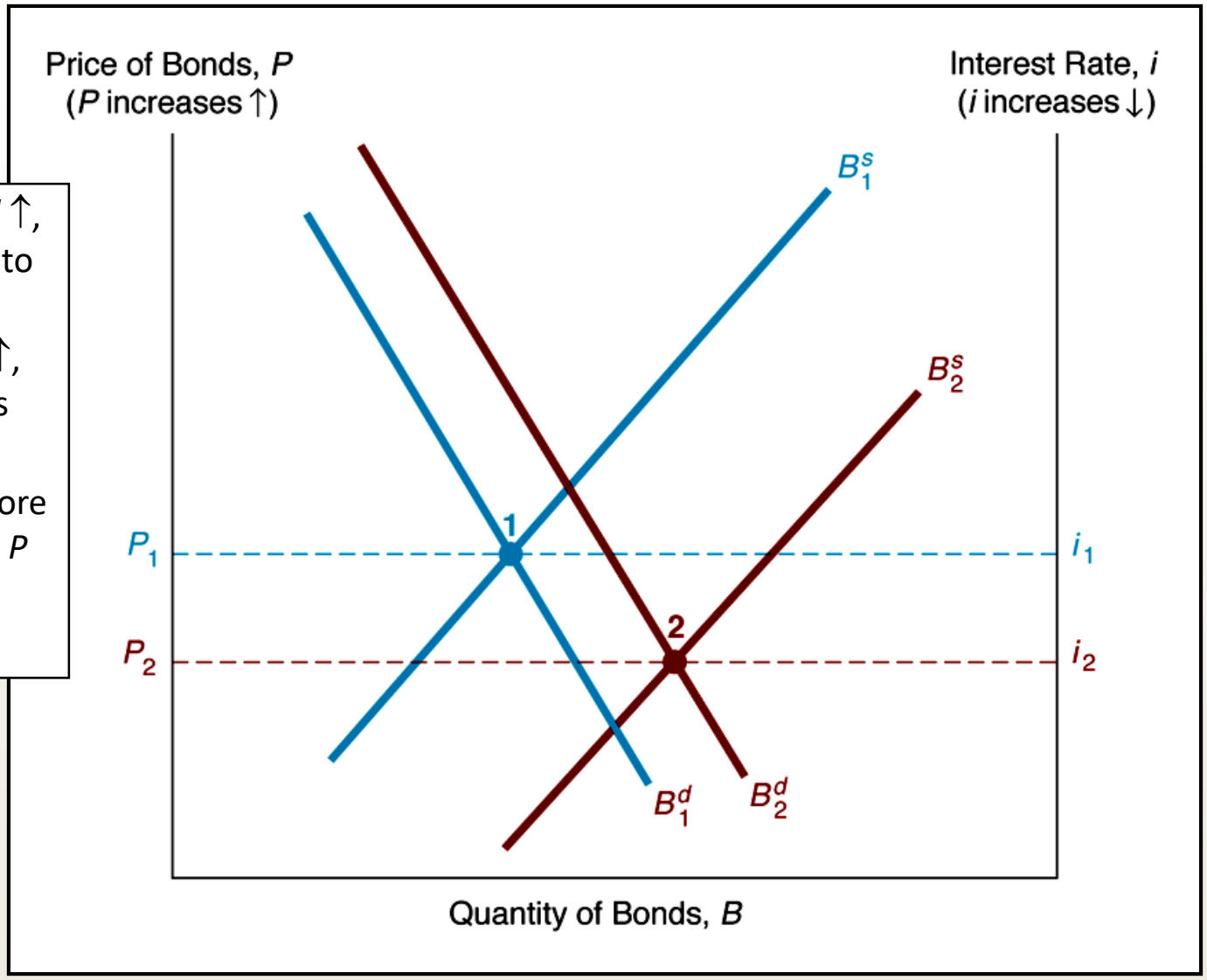
1. Relative $RET^e \downarrow$, B^d shifts in to left
2. $B^s \uparrow$, B^s shifts out to right
3. $P \downarrow$, $i \uparrow$

Evidence on the Fisher Effect in the United States

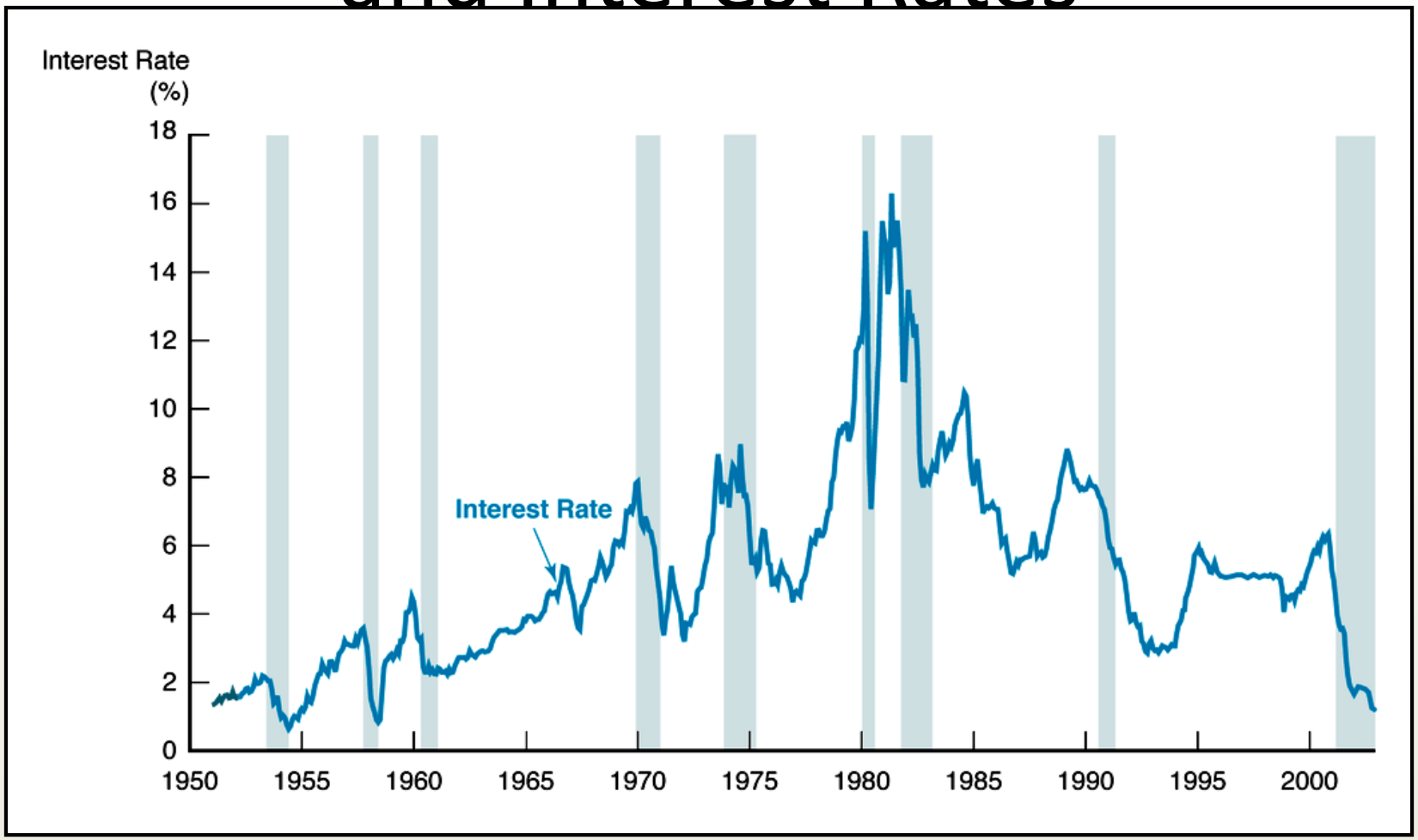


Business Cycle Expansion

1. Wealth ↑, B^d ↑, B^d shifts out to right
2. Investment ↑, B^s ↑, B^s shifts out to right
3. If B^s shifts more than B^d then P ↓, i ↑



Evidence on Business Cycles and Interest Rates



Relation of Liquidity Preference Framework to Loanable Funds

Keynes's Major Assumption

Two Categories of Assets in Wealth

Money

Bonds

1. Thus: $M^s + B^s$ = Wealth
2. Budget Constraint: $B^d + M^d$ = Wealth
3. Therefore: $M^s + B^s = B^d + M^d$
4. Subtracting M^d and B^s from both sides:

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

Money Market Equilibrium

5. Occurs when $M^d = M^s$
6. Then $M^d - M^s = 0$ which implies that $B^d - B^s = 0$, so that $B^d = B^s$ and bond market is also in equilibrium

1. Equating supply and demand for bonds as in loanable funds framework is equivalent to equating supply and demand for money as in liquidity preference framework
2. Two frameworks are closely linked, but differ in practice because liquidity preference assumes only two assets, money and bonds, and ignores effects on interest rates from changes in expected returns on real assets

Liquidity Preference Analysis

Derivation of Demand Curve

1. Keynes assumed money has $i = 0$
2. As $i \uparrow$, relative RET^e on money $\downarrow$ (equivalently, opportunity cost of money $\uparrow$) $\Rightarrow M^d \downarrow$
3. Demand curve for money has usual downward slope

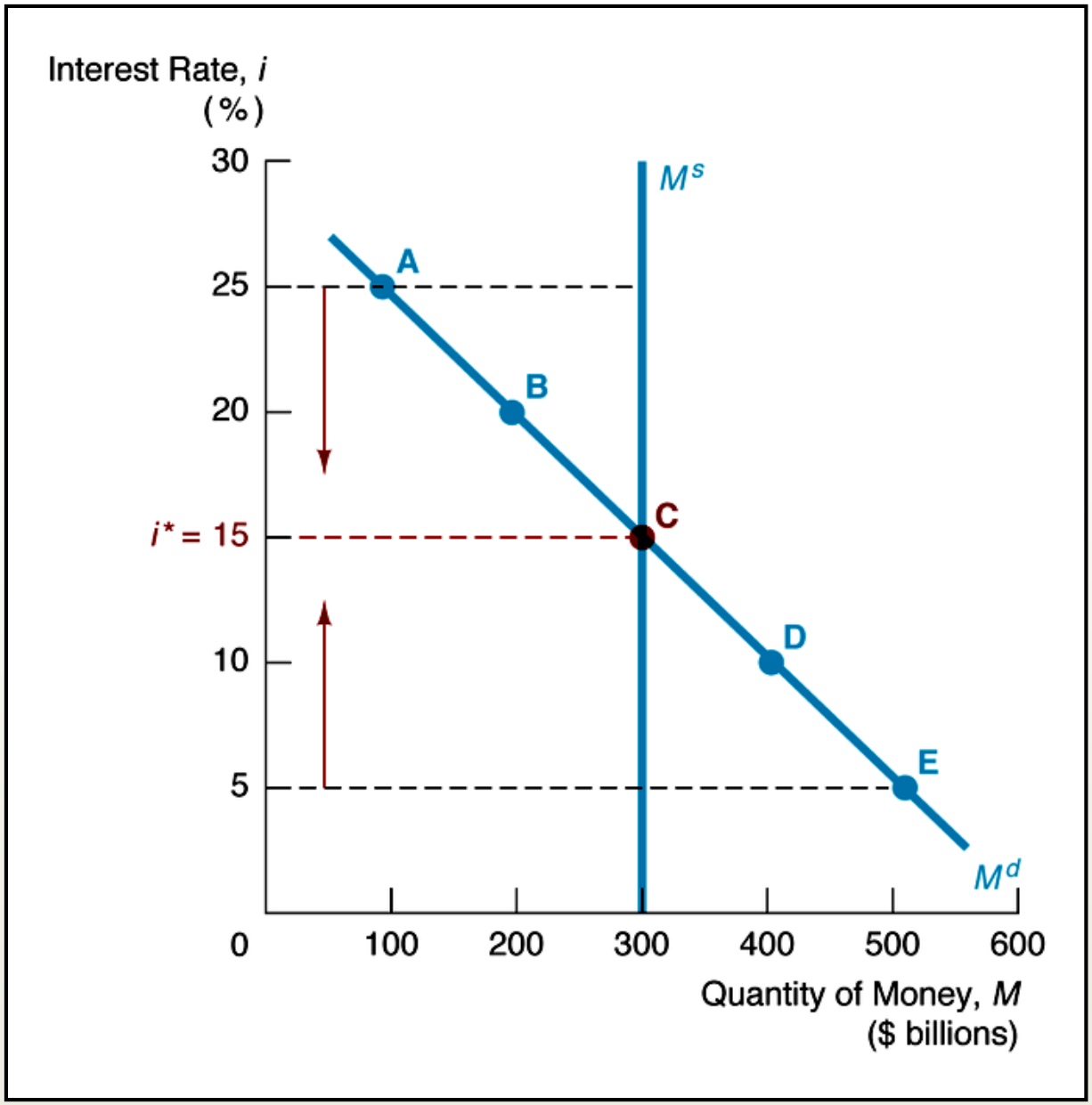
Derivation of Supply curve

1. Assume that central bank controls M^s and it is a fixed amount
2. M^s curve is vertical line

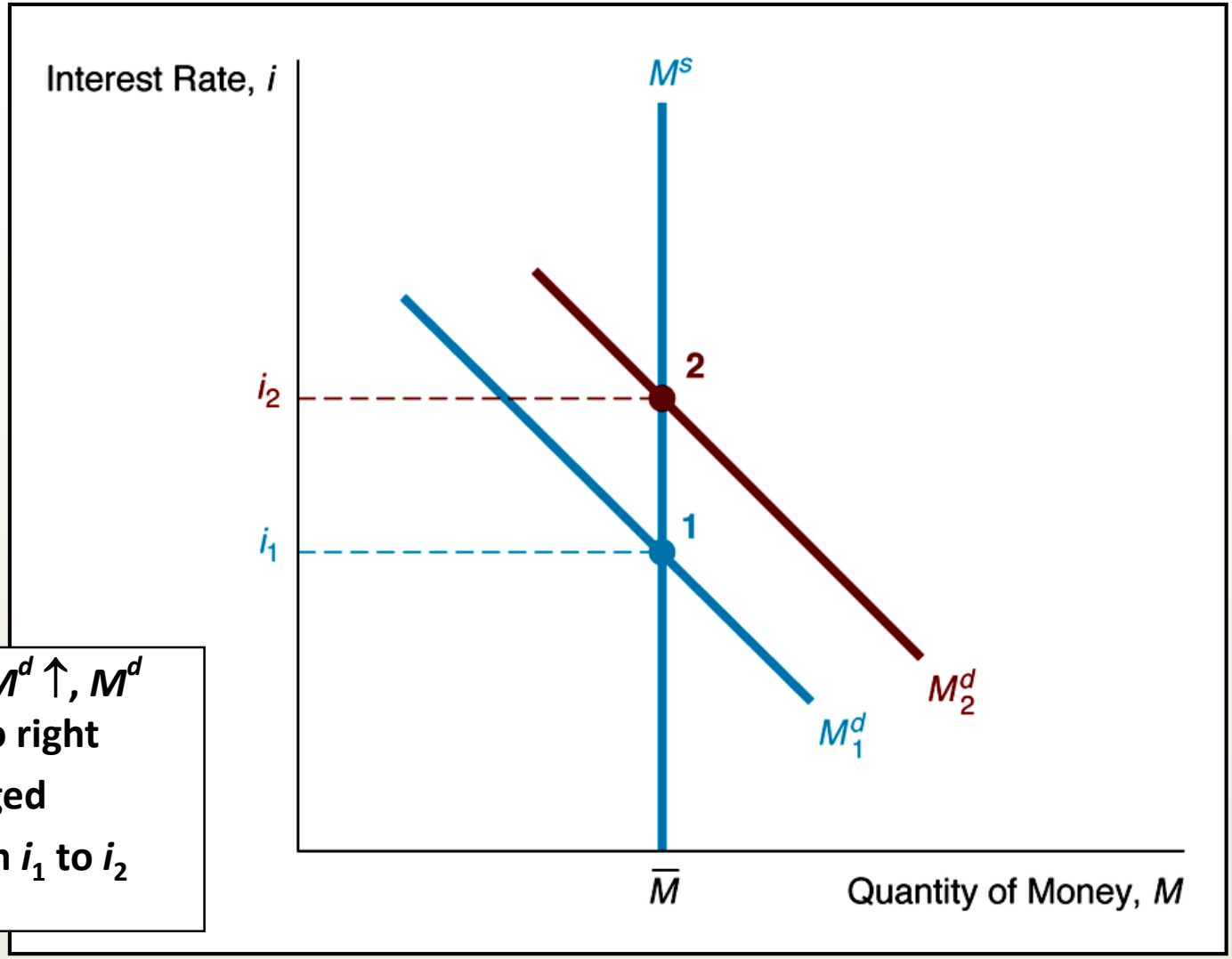
Market Equilibrium

1. Occurs when $M^d = M^s$, at $i^* = 15\%$
2. If i = 25%, $M^s > M^d$ (excess supply): Price of bonds $\uparrow$, $i \downarrow$ to $i^* = 15\%$
3. If $i = 5\%$, $M^d > M^s$ (excess demand): Price of bonds $\downarrow$, $i \uparrow$ to $i^* = 15\%$

Money Market Equilibrium

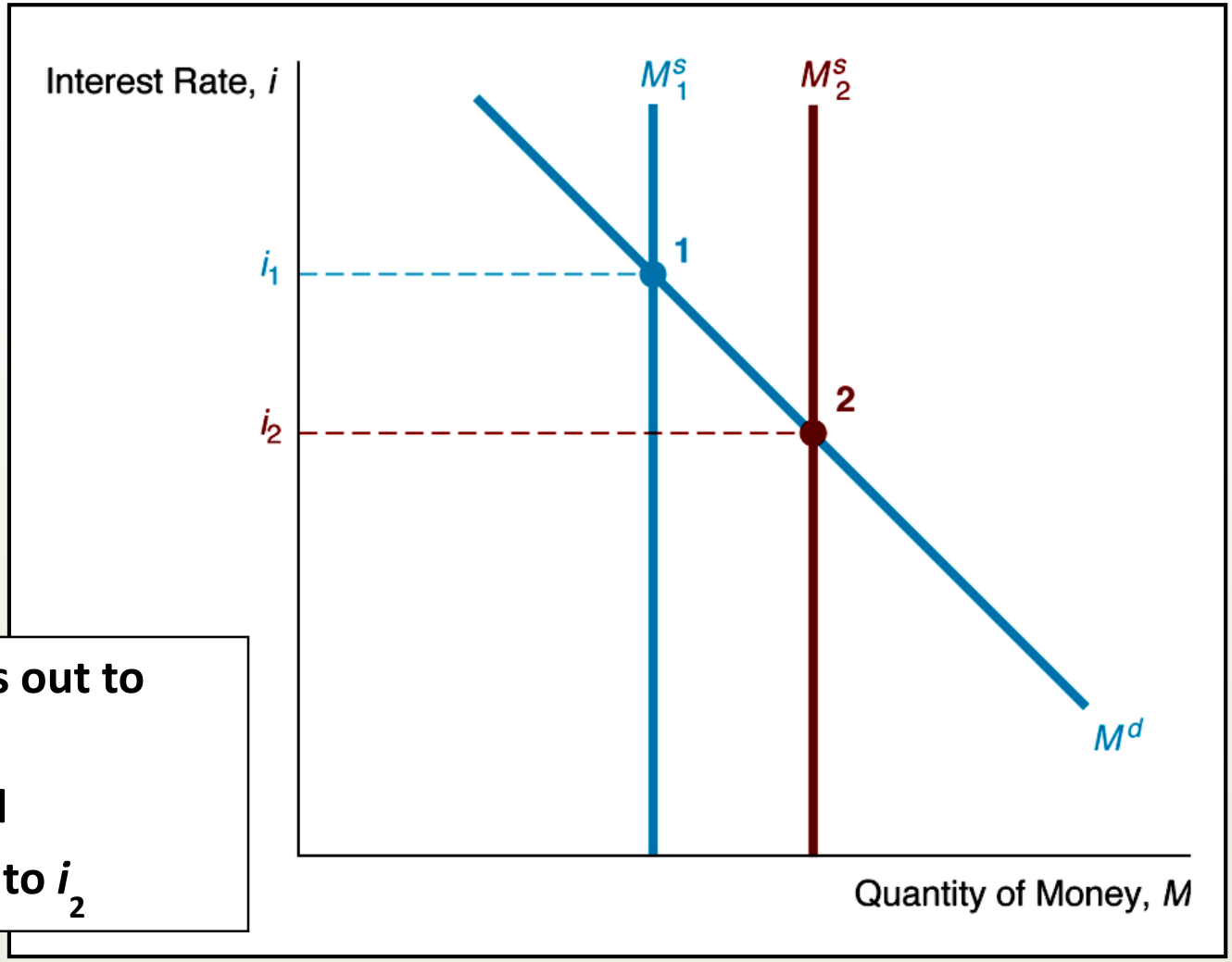


Rise in Income or the Price Level



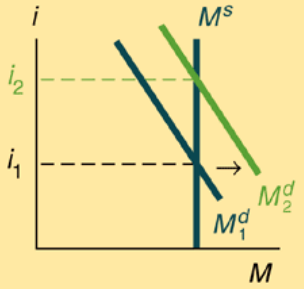
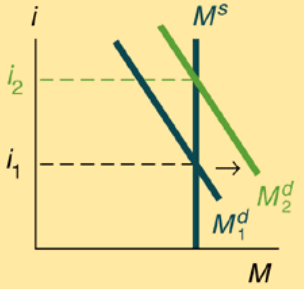
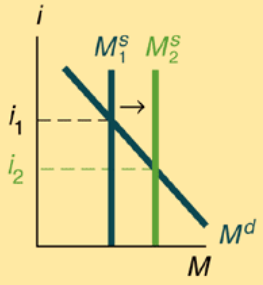
1. **Income ↑, M^d ↑, M^d shifts out to right**
2. **M^s unchanged**
3. **i* rises from i_1 to i_2**

Rise in Money Supply



1. $M^s \uparrow$, M^s shifts out to right
2. M^d unchanged
3. i^* falls from i_1 to i_2

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)	Change in Interest Rate	
Income	↑	M^d ↑	↑	
Price level	↑	M^d ↑	↑	
Money supply	↑	M^s ↑	↓	

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.

Money and Interest Rates

Effects of money on interest rates

1. Liquidity Effect

   $M^s \uparrow$, M^s shifts right, $i \downarrow$

2. Income Effect

   $M^s \uparrow$, Income $\uparrow$, $M^d \uparrow$, M^d shifts right, $i \uparrow$

3. Price Level Effect

   $M^s \uparrow$, Price level $\uparrow$, $M^d \uparrow$, M^d shifts right, $i \uparrow$

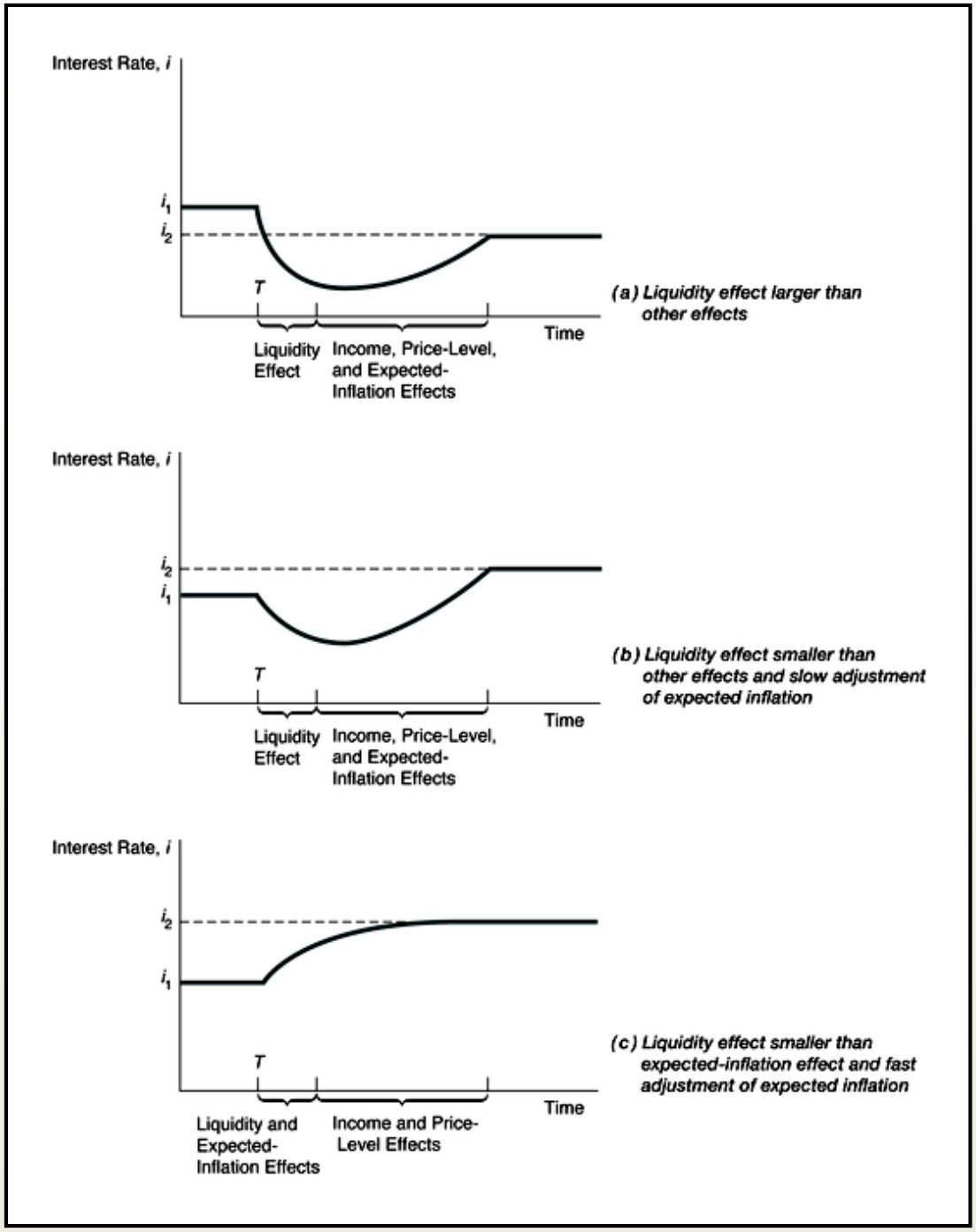
4. Expected Inflation Effect

   $M^s \uparrow$, $\pi^e \uparrow$, $B^d \downarrow$, $B^s \uparrow$, Fisher effect, $i \uparrow$

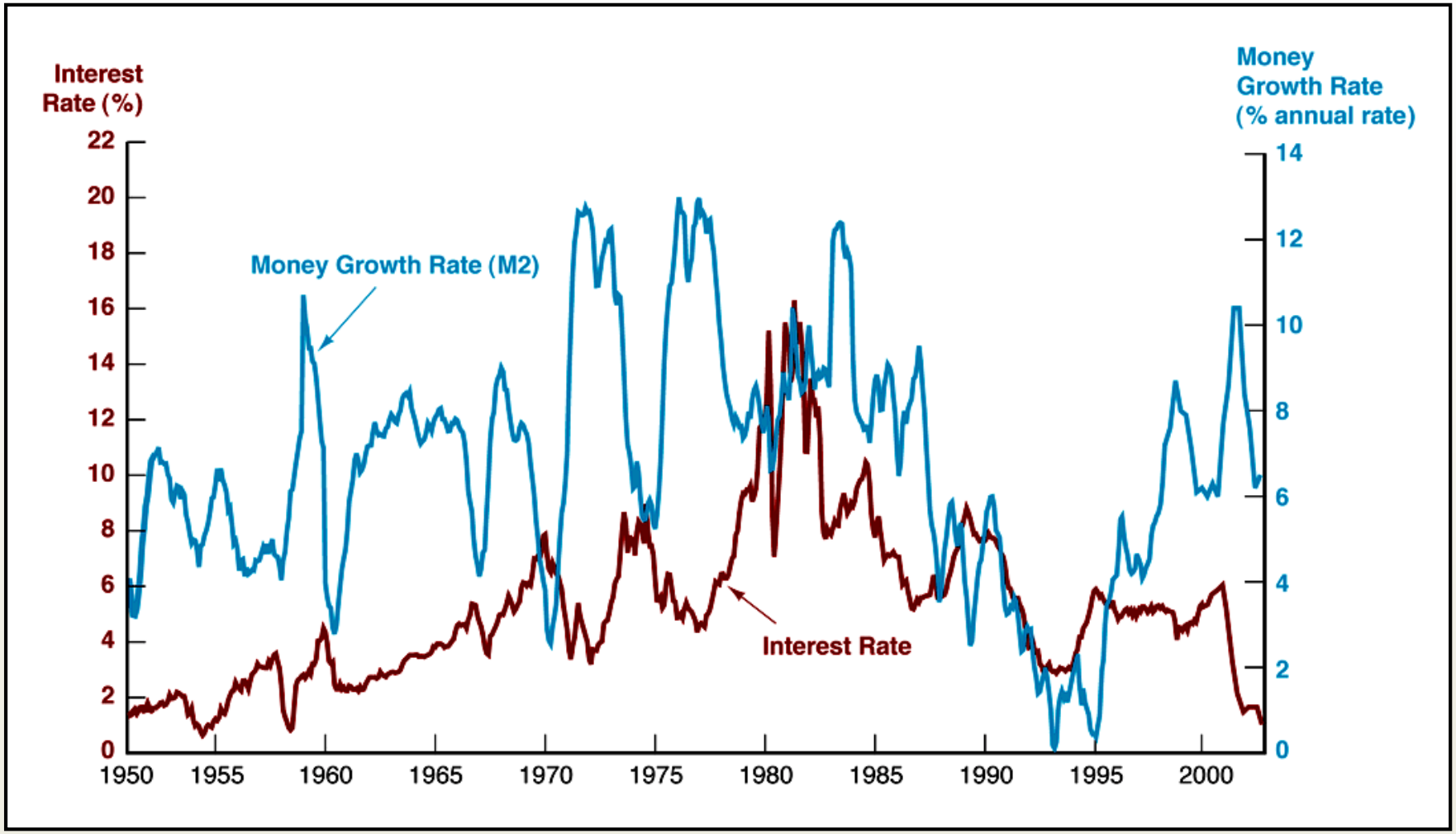
Effect of higher rate of money growth on interest rates is ambiguous

1. Because income, price level and expected inflation effects work in opposite direction of liquidity effect

Does Higher Money Growth Lower Interest Rates?



Evidence on Money Growth and Interest Rates



The case of Thailand