

CHAPTER 5

THE OPEN ECONOMY

Objectives:

- To analyse the long-run determinants of an economy's international **trade balance** and the level of its **international borrowing or lending**.

I. The Nature of the Open Economy.

- An **open economy** is linked to other economies by two types of flows:
 - international **flows of goods and services** resulting from international trade [exports and imports];
 - international **flows of [financial] capital** resulting from international borrowing and lending.

- Our economy is the most open of all G8 countries: exports and imports are each around 40% of GDP but most (80% +) of our trade is with the US; we trade little with other countries.

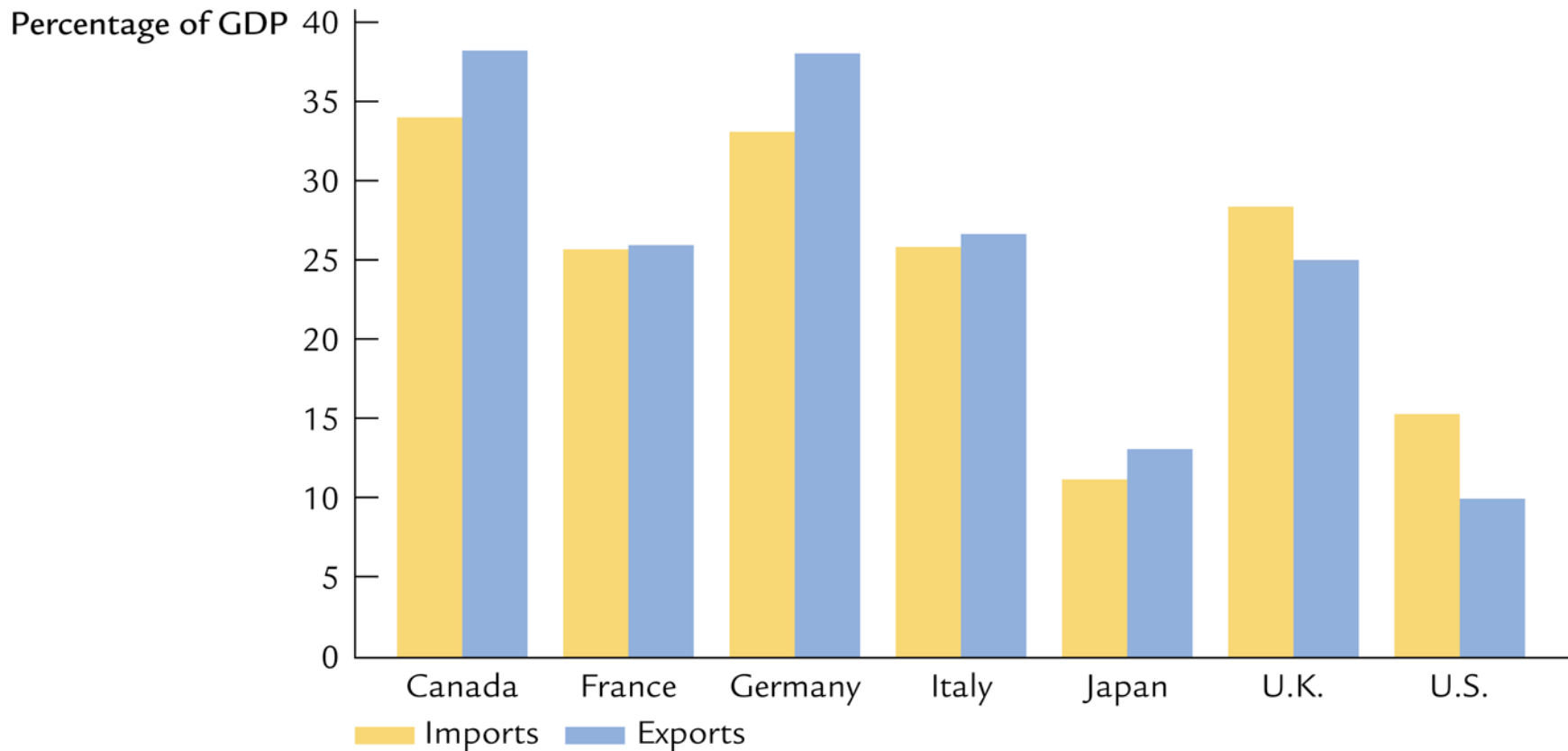


Figure 5.1 Imports and Exports as a Percentage of Output: 2004
 Mankiw and Scarth: Macroeconomics, Canadian Third Edition

II. The Goods Market in the Open Economy.

1. Closed vs open economies.

- In the **closed** economy all domestically-produced output is sold domestically and all spending by domestic residents is on domestically-produced goods and services. Thus, aggregate expenditure on domestic output (E) must equal the sum of spending by domestic consumers, firms and government:

$$E = C + I + G$$

- In the **open** economy part of domestically-produced output is sold in foreign markets (exports, EX) and part of spending by domestic consumers, firms and government is on foreign-produced output (imports, IM). Thus, in an open economy aggregate expenditure on domestic output is equal to total spending by domestic consumers, firms and government, *plus* exports (EX) and *minus* imports (IM):

$$E = C + I + G + EX - IM$$

- The difference between exports and imports is termed *net exports* (NX) or the *trade balance*:

$$NX = EX - IM = \text{the trade balance}$$

2. Output, expenditure, and the trade balance.

- In goods market equilibrium in the **open** economy:

$$Y = E$$

Or,

$$Y = C + I + G + NX$$

- Thus,

$$NX = Y - (C+I+G)$$

Net exports = domestic output - total domestic spending

- Whatever part of domestic output is not bought by **domestic buyers** is **exported**; whatever part of domestic spending not supplied from domestic production is **imported**.

□ Three cases:

- $NX = Y - (C + I + G) > 0$
 - ➔ output > domestic spending
 - ➔ a trade surplus

- $NX = Y - (C + I + G) < 0$
 - ➔ output < domestic spending
 - ➔ a trade deficit

- $NX = Y - (C + I + G) = 0$
 - ➔ output = domestic spending
 - ➔ balanced trade

III. Financial Markets and the Determination of Interest rates in the Open Economy.

1. Closed vs open economies

- ❑ In the **closed** economy **all** domestic investment spending must be financed by domestic national savings and **all** domestic national savings must be used to finance domestic investment spending.

- ❑ In the **open** economy domestic investment spending may be financed in part by **foreign** borrowing and some part of domestic national savings may be used to make **foreign** loans.

- **Def:** *Net Capital Outflow is equal to the difference between domestic national saving (domestic supply of loanable funds) and domestic investment spending (domestic demand for loanable funds.)*

$$S - I = \text{Net Capital Outflow} = \text{Net foreign lending}$$

□ Three cases:

- **$S - I > 0$**
 - ➔ domestic saving > domestic investment
 - ➔ economy is a net foreign lender
 - ➔ positive net capital outflow

- **$S - I < 0$**
 - ➔ domestic saving < domestic investment
 - ➔ economy is a net foreign borrower
 - ➔ negative net capital outflow (net capital inflow)

- **$S - I = 0$**
 - ➔ domestic saving = domestic investment
 - ➔ economy not a net foreign lender or borrower
 - ➔ zero net capital outflow/inflow

2. The interest rate in the small open economy.

- In the **closed** economy the domestic real interest rate (r) adjusts to the level required to equate domestic investment spending (or the domestic demand for loanable funds) to domestic national savings (or the domestic supply of loanable funds.)
- In the **open** economy the domestic real interest rate (r) adjusts to the level of the **world interest rate (r^*)** which need not coincide with the interest rate which equates domestic savings and investment.

□ Key Assumptions:

1. domestic bonds and foreign bonds are **perfect substitutes** → same risk, maturity etc.
2. **perfect capital mobility** → no restrictions on international borrowing/lending
3. the domestic economy is **small** → cannot influence the world interest rate (r^*)

□ Consequences:

- Given 1 & 2, the domestic interest rate must equal the world interest rate:

$$r = r^*$$

- Given 3, the world interest rate (r^*) is **exogenous.**

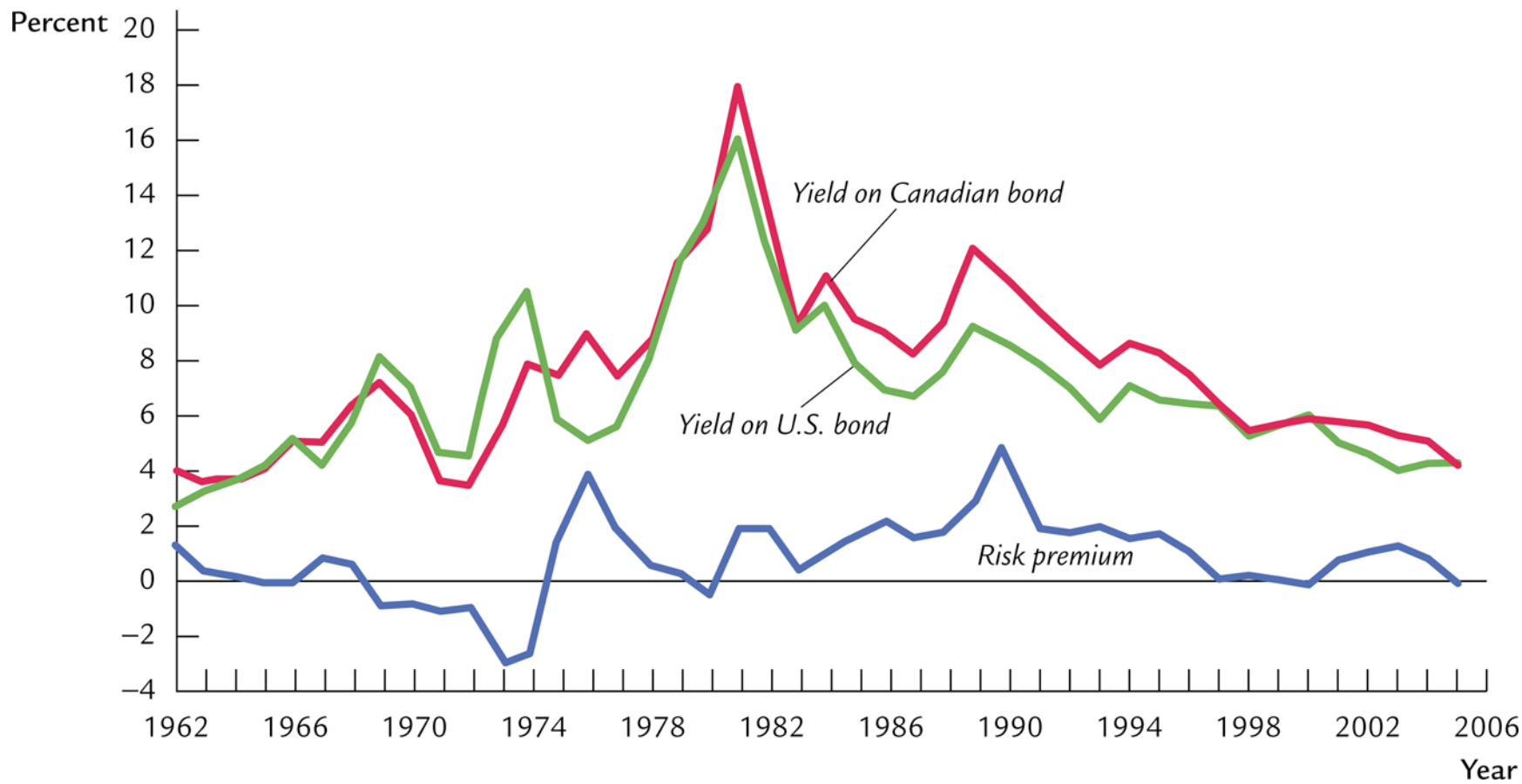


Figure 5.2 Canadian and U.S. Interest Rates

Mankiw and Scarth: Macroeconomics, Canadian Third Edition

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IV. The Complete Model of the Small Open Economy.

1. The structure of the model.

- Output is fixed by the available factors of production:

$$Y = \bar{Y} = F(\bar{K}, \bar{L})$$

- Aggregate expenditure is the sum of consumption, investment, government spending and net exports

$$E = C + I + G + NX$$

- Consumption depends positively on disposable income:

$$C = C(Y-T)$$

- Investment is negatively affected by the domestic real interest rate:

$$I = I(r)$$

- Both government spending and taxes are exogenous:

$$G = \bar{G}, T = \bar{T}$$

- The domestic and world interest rates are equal:

$$r = r^*$$

- Thus, by substitution, in goods market equilibrium:

$$\bar{Y} = C(\bar{Y} - \bar{T}) + I(r^*) + \bar{G} + NX$$

2. The link between trade flows and capital flows.

$$\bar{Y} = C(\bar{Y} - \bar{T}) + I(r^*) + \bar{G} + NX$$

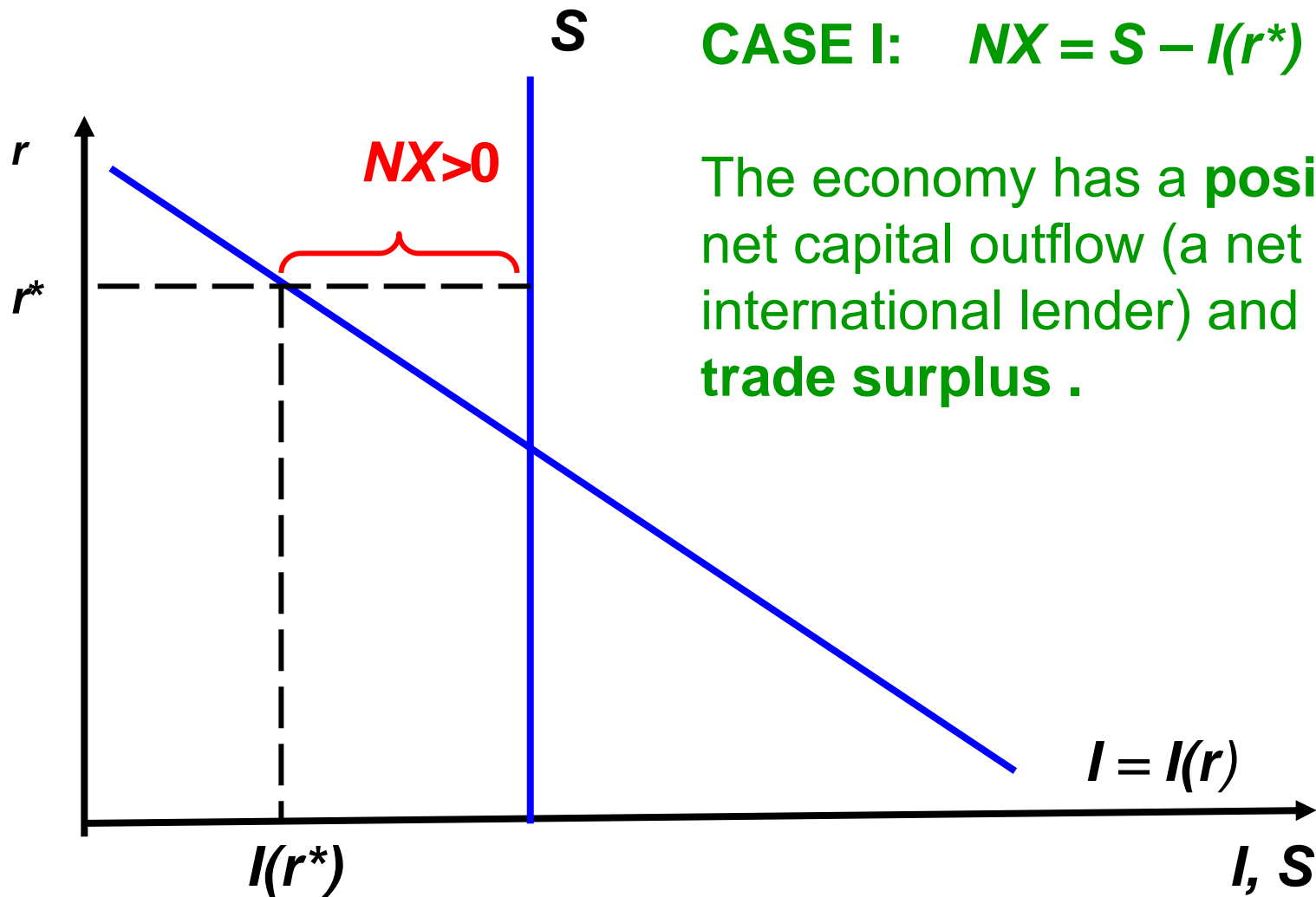
$$NX = [\bar{Y} - C(\bar{Y} - \bar{T}) - \bar{G}] - I(r^*)$$

$$NX = \bar{S} - I(r^*)$$

Net Exports = Net Capital Outflow

- **Both the trade balance and the level of net capital outflow equal the difference between domestic national saving and domestic investment demand at the exogenous world interest rate.**

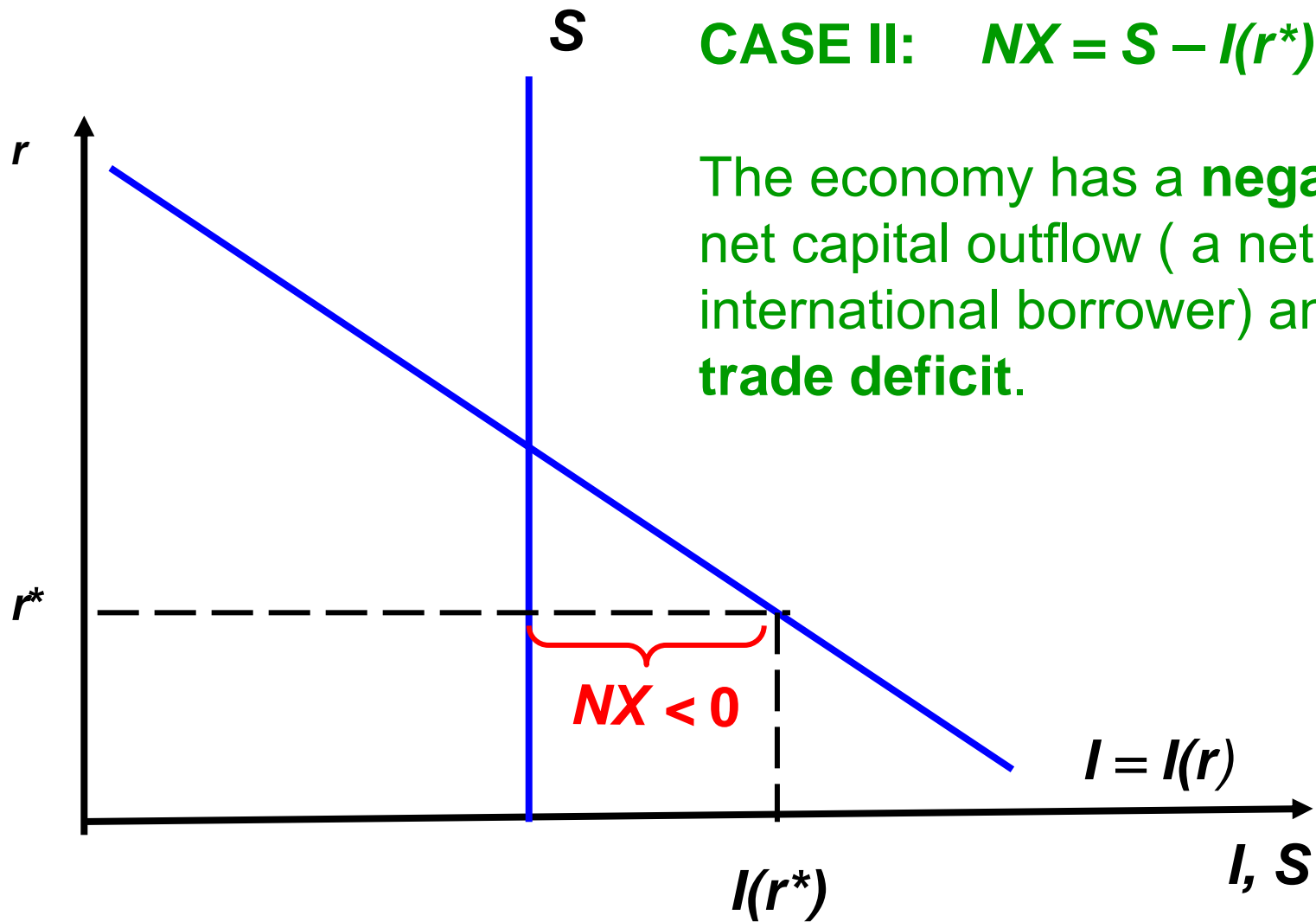
Fig. 5-3a



CASE I: $NX = S - I(r^*) > 0$

The economy has a **positive** net capital outflow (a net international lender) and a **trade surplus**.

Fig. 5-3b



CASE II: $NX = S - I(r^*) < 0$

The economy has a **negative** net capital outflow (a net international borrower) and a **trade deficit**.

Fig. 5-3c

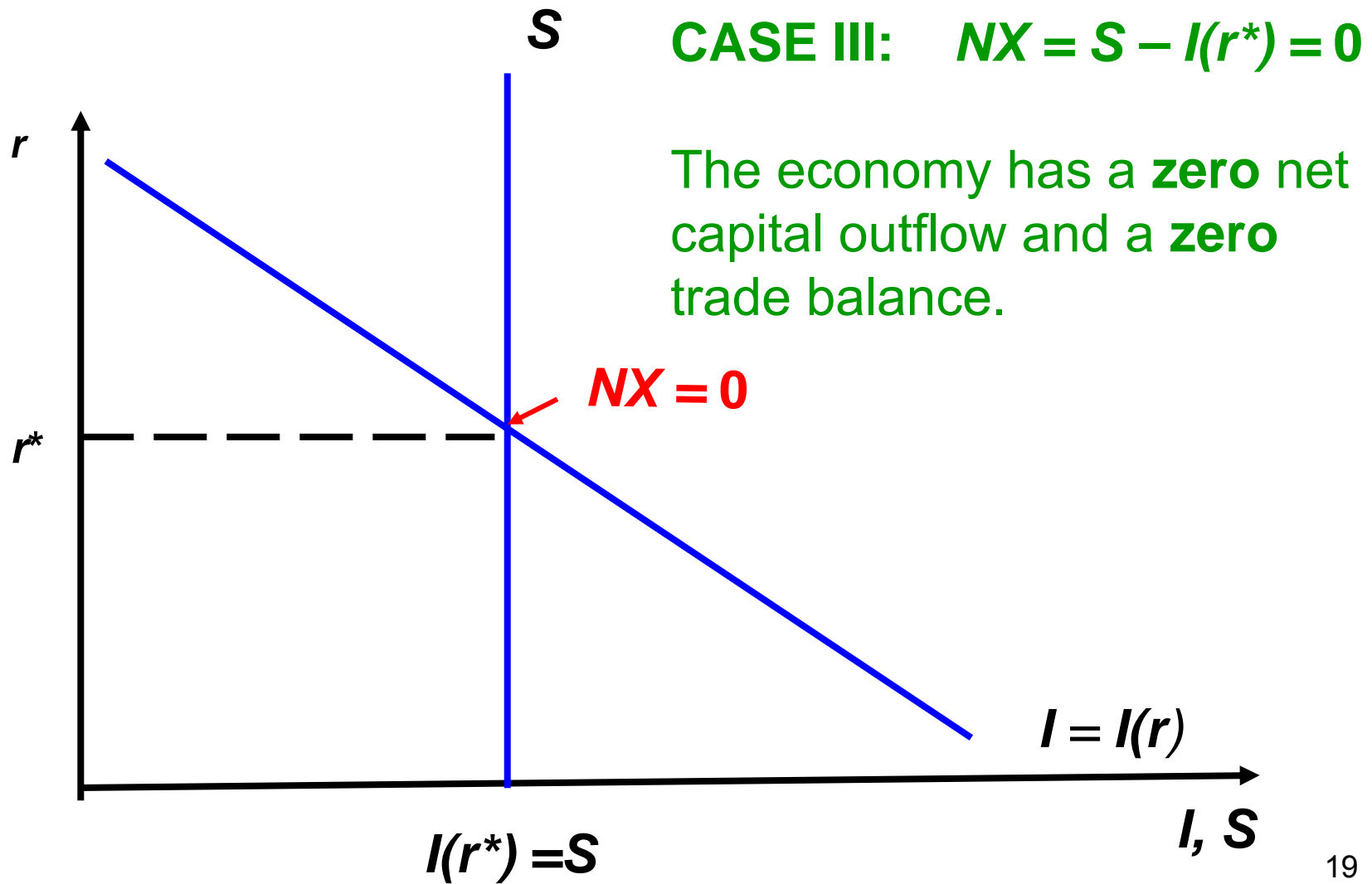


TABLE 5-1

International Flows of Goods and Capital: Summary of the Three Outcomes an Open Economy Can Experience

Trade Surplus	Balanced Trade	Trade Deficit
Exports > Imports	Exports = Imports	Exports < Imports
Net Exports > 0	Net Exports = 0	Net Exports < 0
$Y > C + I + G$	$Y = C + I + G$	$Y < C + I + G$
Saving > Investment	Saving = Investment	Saving < Investment
Net Capital Outflow > 0	Net Capital Outflow = 0	Net Capital Outflow < 0

v. Effects of various changes on the Trade Balance and Net Capital Outflow.

1a. Expansionary domestic fiscal policy

- Suppose that the level of domestic saving is initially S_1 and that both net capital outflow and the trade balance, are initially zero:

$$S_1 - I(r^*) = NX_1 = 0$$

- There is then an increase in govt. spending [$\uparrow G$], with no change in taxes.
- National saving **falls** by the amount of the increase in G :

$$\text{Given: } \bar{S} = \bar{Y} - C(\bar{Y} - \bar{T}) - \bar{G}$$

$$\text{Then: } \Delta \bar{S} = -\Delta \bar{G}$$

Fig. 5-4

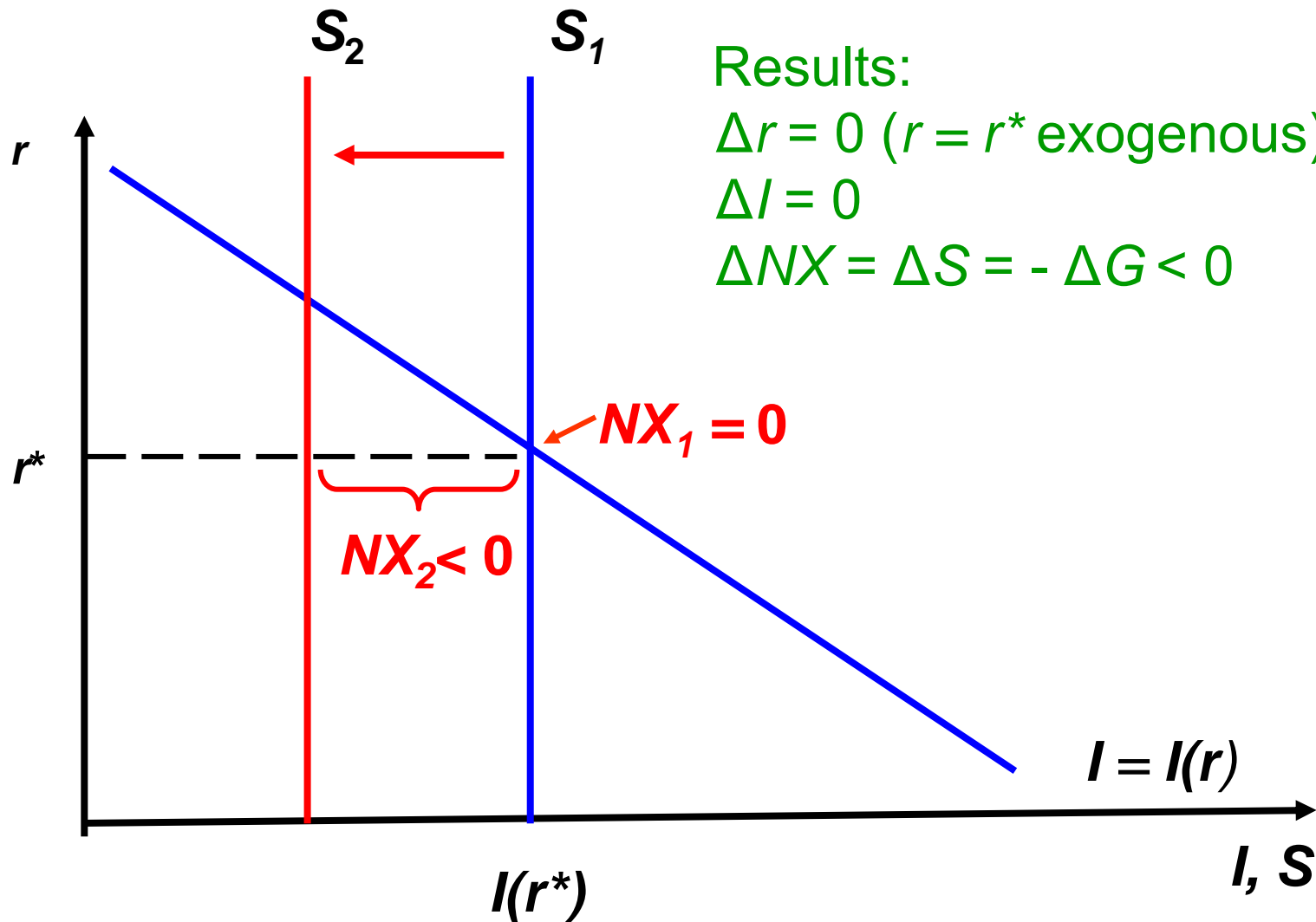
An increase in G reduces national saving: $\uparrow G \rightarrow \downarrow S$

Results:

$\Delta r = 0$ ($r = r^*$ exogenous)

$\Delta I = 0$

$\Delta NX = \Delta S = -\Delta G < 0$



□ Explanation:

$\bar{S} \downarrow$ from S_1 to S_2 , where $\Delta \bar{S} = - \Delta \bar{G}$

→ $\downarrow [S - I(r)]$ to $[S_2 - I(r)]$

→ $\downarrow NX$ from $NX_1 = 0$ to $NX_2 < 0$

□ Starting from a position of balanced trade, a change in fiscal policy which reduces national savings creates a negative net capital outflow and produces a trade deficit.

□ Unlike in the closed economy model of chapter 3, there is no change in the domestic interest rate, and, hence, domestic investment spending. Instead, net exports fall by the amount by which government spending rose to maintain an unchanged level of aggregate expenditure and output (an open-economy “crowding-out” effect).

1b. Contractionary domestic fiscal policy

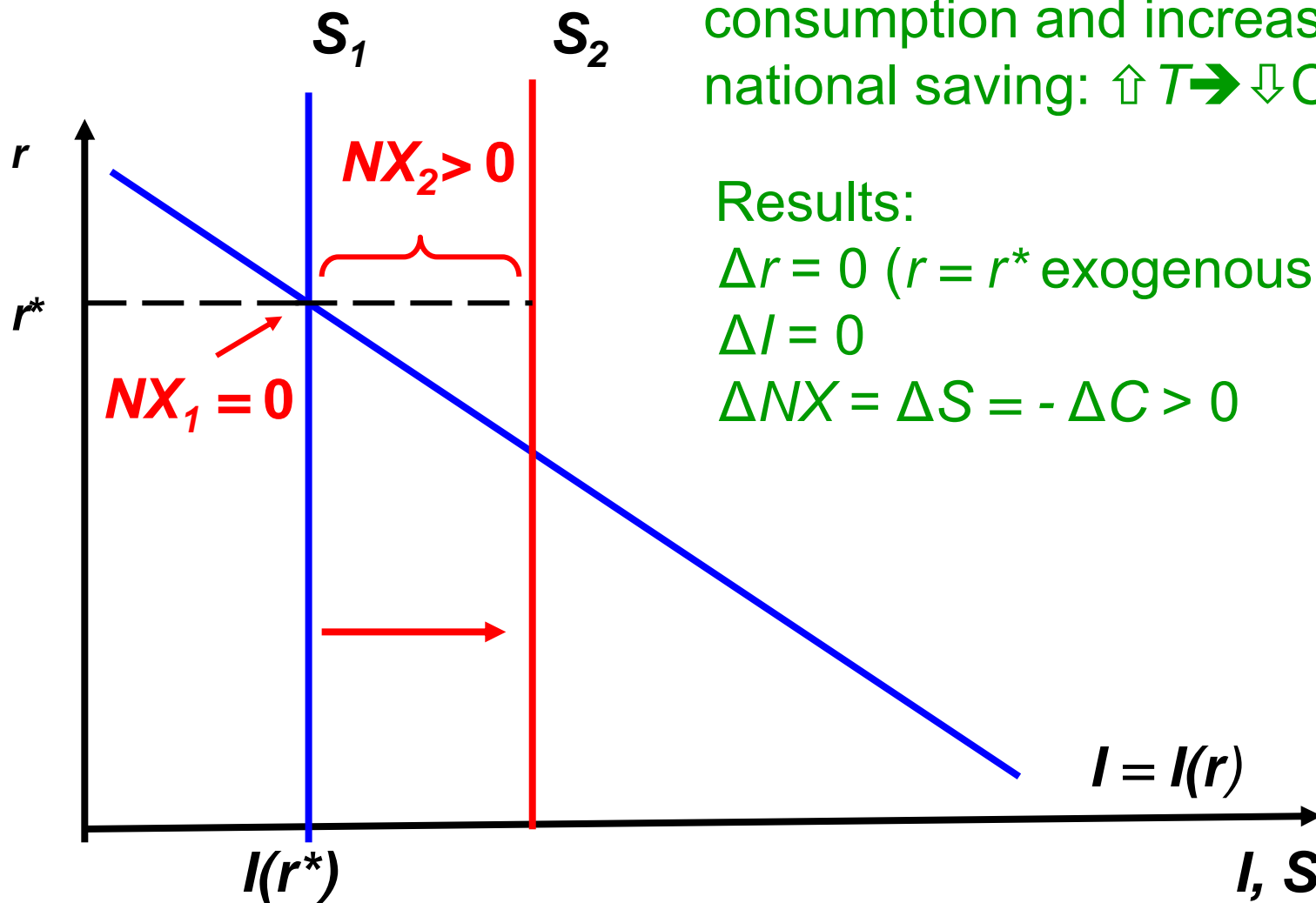
- Suppose that the level of domestic saving is initially S_1 and that both net capital outflow and the trade balance, are initially zero:

$$S_1 - I(r^*) = NX_1 = 0$$

- There is then an increase in taxes [$\uparrow T$], with no change in government spending.
- National saving **rises** by the amount of the increase in T multiplied by the *MPC*:

$$\text{Given: } \bar{S} = \bar{Y} - C(\bar{Y} - \bar{T}) - \bar{G}$$

$$\text{Then: } \Delta \bar{S} = -\Delta C = MPC \cdot \Delta \bar{T}$$



An increase in T decreases consumption and increases national saving: $\uparrow T \rightarrow \downarrow C \rightarrow \uparrow S$

Results:

$\Delta r = 0$ ($r = r^*$ exogenous)

$\Delta I = 0$

$\Delta NX = \Delta S = -\Delta C > 0$

□ Explanation:

$\bar{S} \uparrow$ from S_1 to S_2 , where $\Delta \bar{S} = MPC \cdot \Delta \bar{T}$

→ $\uparrow [S - I(r)]$ to $[S_2 - I(r)]$

→ $\uparrow NX$ from $NX_1 = 0$ to $NX_2 > 0$

□ Starting from a position of balanced trade, a change in fiscal policy which increases national savings creates a net capital outflow and produces a trade surplus.

□ Unlike in the closed economy model of chapter 3, there is no change in the domestic interest rate, and, hence, domestic investment spending. Instead, net exports rise by the amount by which consumption spending fell in response to the tax increase, maintaining an unchanged level of aggregate expenditure and output.

1c. The “twin deficits” phenomenon.

- Consider an economy which initially has a zero trade balance [$NX = S - I = 0$] and a balanced govt. budget [$G - T = 0$].
- Then, $G \uparrow$ with no change in T resulting in a govt. budget deficit [$G - T < 0$].
- But $\uparrow G \rightarrow \downarrow S \rightarrow \downarrow [S - I(r^*)] \rightarrow \downarrow NX \rightarrow NX < 0$
- Thus, the govt. budget deficit is accompanied by a trade deficit - the **twin deficits**.

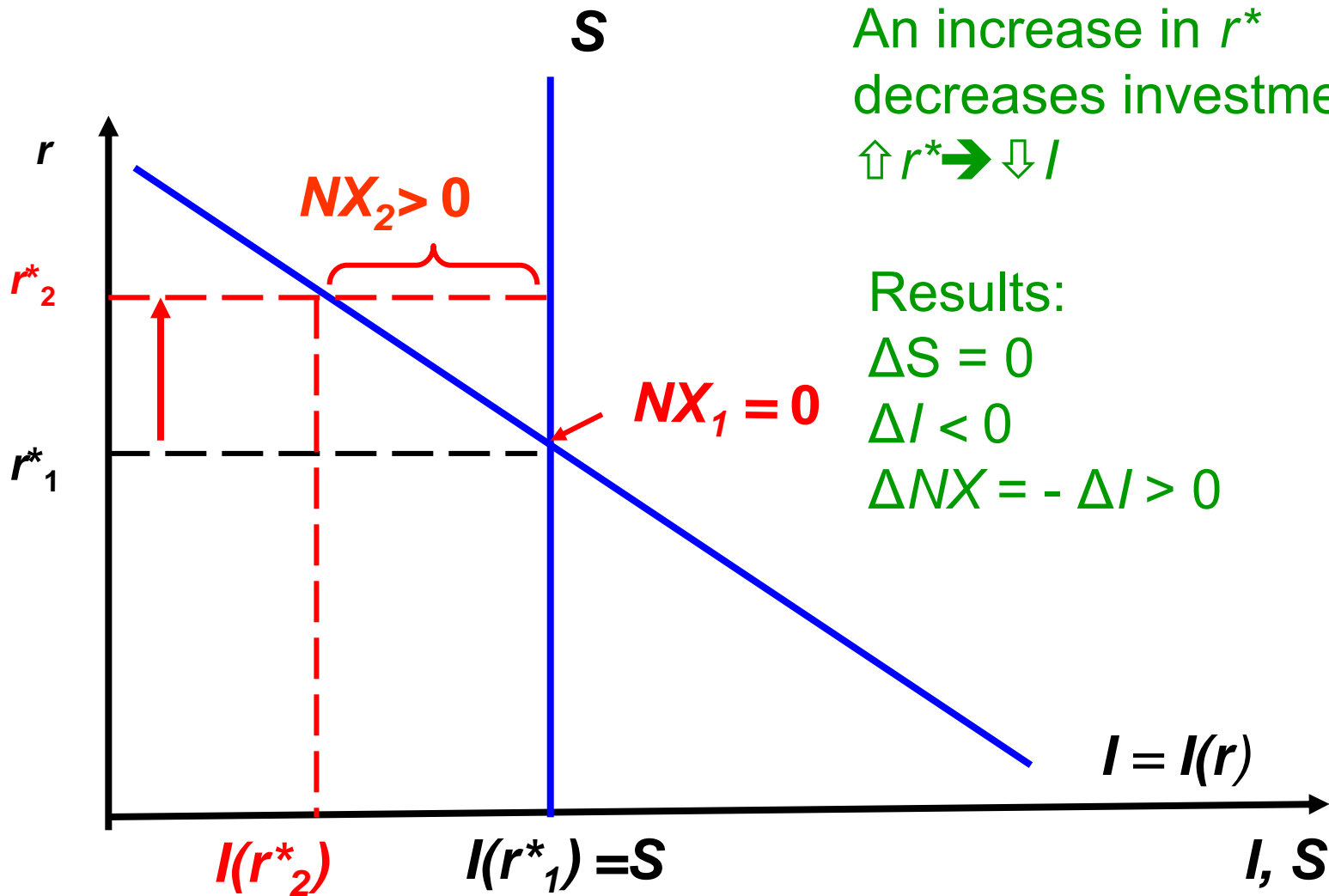
2. An increase in the world interest rate ($\uparrow r^*$)

- Suppose that the world interest rate is initially r^*_1 and that both net capital outflow and the trade balance, are initially zero:

$$S - I(r^*_1) = NX_1 = 0$$

- There is then an increase in the world interest rate from r^*_1 to r^*_2 no change in domestic saving (S).
- The domestic interest rate rises to match the increase in the world interest rate and domestic investment spending falls to $I(r^*_2)$. Net exports rise by the amount of the fall in investment spending, maintaining an unchanged level of aggregate expenditure and output.

Fig. 5-5



□ Explanation:

$\uparrow r^* \rightarrow \downarrow I$ from $I(r^*_1)$ to $I(r^*_2)$
 $\rightarrow \uparrow [S - I(r)]$ to $[S - I(r^*_2)]$
 $\rightarrow \uparrow NX$ from $NX_1 = 0$ to $NX_2 > 0$

- Starting from a position of balanced trade, an increase in the world interest rate which reduces domestic investment spending creates a positive net capital outflow and produces a trade surplus.

3. A shift in investment demand

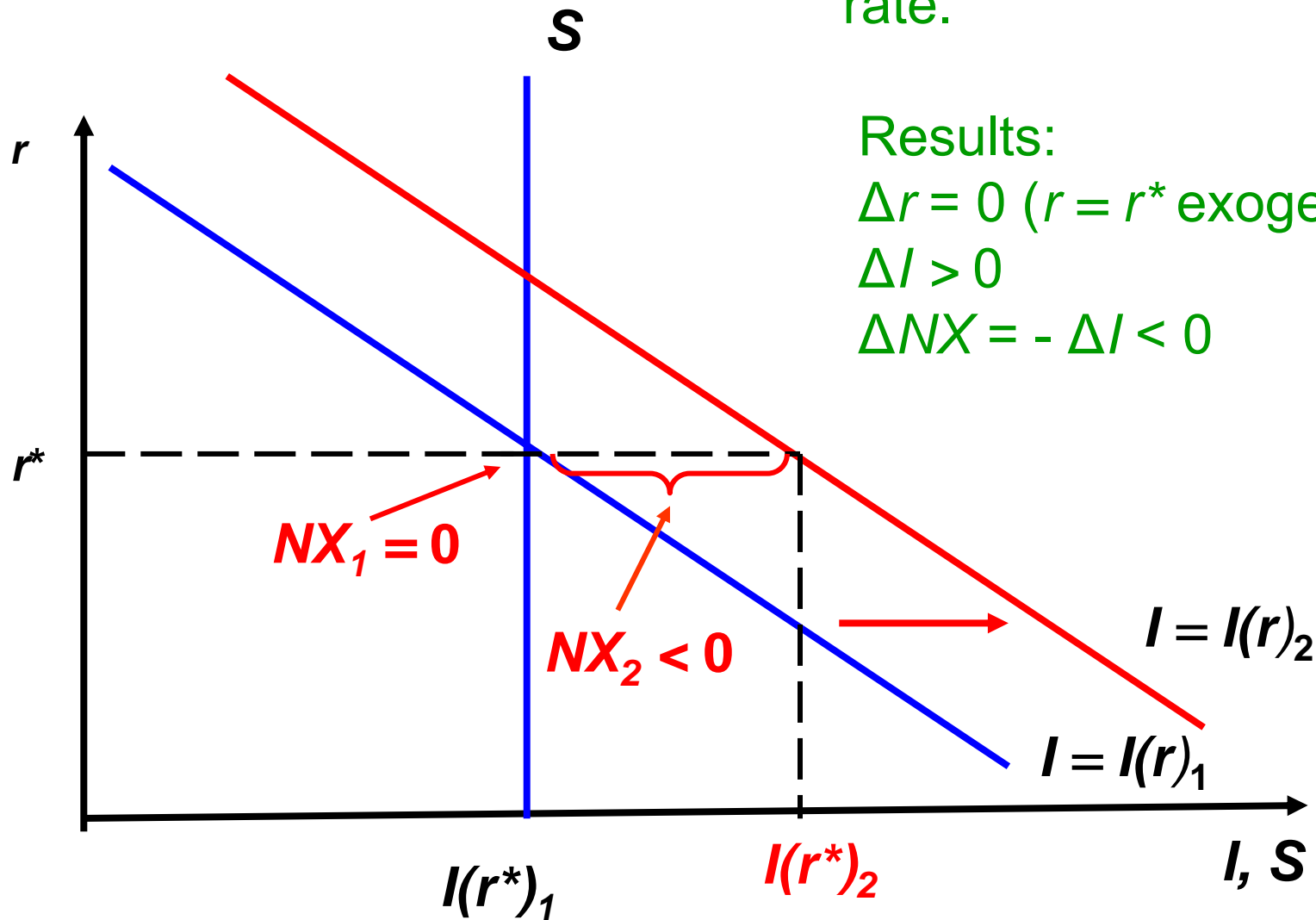
- Suppose that the domestic investment schedule is initially $I(r)_1$ and that both net capital outflow and the trade balance, are initially zero:

$$S - I(r)_1 = NX_1 = 0$$

- There is then an increase in the level of domestic investment at each interest rate and a rightward shift of the investment schedule to $I(r)_2$ with no change in domestic saving.
- Domestic investment spending increases at the given world interest rate and net exports fall by an equal amount, maintaining an unchanged level of aggregate expenditure and output.

Fig. 5-6

An increase the value of investment spending at the given world interest rate.



□ Explanation:

- ↑ I from $I(r^*)_1$ to $I(r^*)_2$
- ↓ $[S - I(r)]$ to $[S - I(r^*)_2]$
- ↓ NX from $NX_1 = 0$ to $NX_2 < 0$

- Starting from a position of balanced trade, an increase in domestic investment demand creates a negative net capital outflow and produces a trade deficit.

VI. The US Trade Deficit: A Case Study.

- ❑ Through the 1980s and 1990s to the present the United States has run trade deficits financed by large-scale foreign borrowing. Indeed, the US has gone from being the world's largest creditor to the world's largest debtor. (See Fig 5-7, p.135.)
- ❑ As predicted by our model, movements in US net exports have reflected changes in the balance between US national savings and investment ($NX = S - I$).

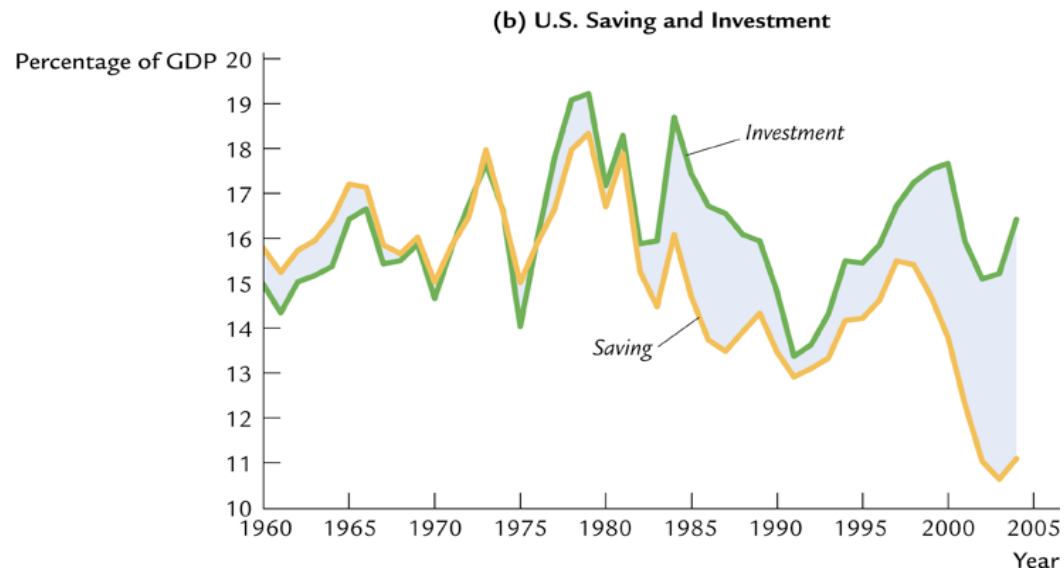
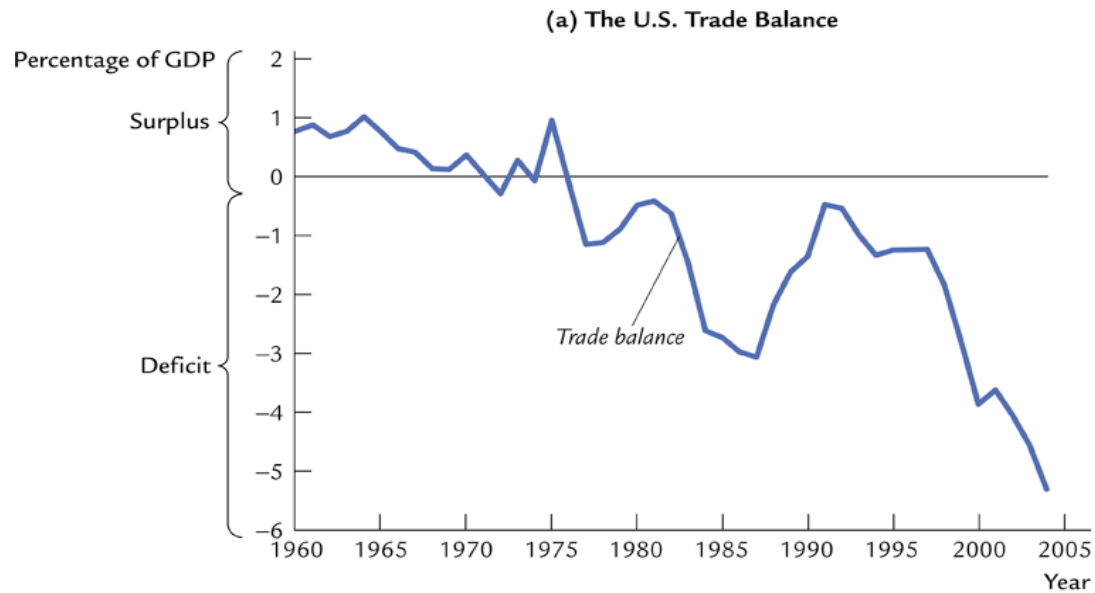


Figure 5.7 The Trade Balance, Saving, and Investment: The U.S. Experience
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- In 1981 the US Congress, with the support of President Reagan, passed legislation which substantially cut taxes over the next 3 years. Because the tax cuts were not accompanied by cuts in govt. spending the US federal budget went into substantial deficit. As the budget deficit widened, national saving fell as a percentage of GDP and the trade deficit increased (the “twin deficits” phenomenon).

- In the 1990s US fiscal policy tightened: President Bush (the first President Bush) and President Clinton authorized tax increases and Congress controlled spending, moving the US federal budget from deficit to surplus. National saving (as a proportion of GDP) rose. But domestic investment spending also rose (likely fuelled by the information technology boom) and as a result the trade deficit persisted.

- In the early 2000s US fiscal policy again became very expansionary as President George W. Bush cut taxes in 2001 and 2003. At the same time, the “war on terror” and the war in Iraq resulted in significant increases in government spending. The federal budget went into deficit, national saving fell to a historic low, and the trade deficit reached a historic high - the “twin deficits” phenomenon once again.